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National High School Model United Nations

COP **BACKGROUND GUIDE** | 53

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Committee History

The Conference of the Parties (COP) is the supreme decision-making body of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992. The UNFCCC was opened for signature at the 1992 Rio Earth Summit, held in Rio de Janeiro, Brazil. It then entered into force in 1994.[1] COP serves as a forum for cooperation, revision, and planning to combat climate change. COP gives life to the UNFCCC by assessing progress made under the Convention and the Paris Agreement. It is not a subsidiary body of the UN General Assembly, but the independent governing body of the UNFCCC treaty regime. Said regime operates in parallel with the UN system.[2] The UNFCCC's principal mandate is to stabilize greenhouse gas concentrations in the atmosphere, prevent dangerous anthropogenic interference in the environment, and to limit the increase of global temperature below 1.5°C.[3]

In addition to the UNFCCC, the COP is governed and instructed by a series of documents, including its Rules of Procedure, and previous decisions like the Paris Agreement. COP is an international committee working all around the world and having their annual meetings in a different place each year. Attendance has grown sharply in recent years, going from roughly 22,000 at earlier COPs to more than 56,000 attendees at COP30 in Belem, Brazil, in 2025.[4]

Since adopting the framework in 1992, COP has sought various advancements regarding its role and popularity in the fight against climate change. The topics of conversation have shifted over time. Since the 2010 Cancún, Mexico, meeting, the Conference of the Parties has actively discussed the responsibilities over climate action change and the role of developed states in assisting climate vulnerable the affected countries.[5] A loss and damage fund was one of the highlights of the previous COP at Sharm el-Sheikh, Egypt, in 2022. Its objective is to support countries with environmental damage through a global fund.[6] The fund was formally operationalized at COP28 in 2023. The World Bank serves as interim host, and initial pledges exceeded $700 million. Also at COP28 in Dubai in 2023, parties concluded the first Global Stocktake and, for the first time in COP history, agreed to language explicitly calling for 'transitioning away from fossil fuels'.[7]

However, the COP has been widely criticized because the climate crisis has only worsened since the establishment of the UNFCCC. The lack of binding commitments in solutions, international governance and compliance, and the consensus-based decision-making model create a constant lack of effective and stable solutions. Additionally, the ordinary sessions of the COP are held only once every year, creating significant time gaps between sessions. Extraordinary sessions can be held; however, they must be supported by at least one-third of the COP and can be answered within six months of the request being submitted.[8] Nevertheless, the COP has been vital in establishing frameworks for international cooperation and has marked a track for global governance relating to climate change.

1 UNFCCC, "What Is the United Nations Framework Convention on Climate Change?," accessed August 2026, https://unfccc.int/process-and-meetings/the-convention/what-is-the-united-nations-framework-convention-on-climate-change.
2 UNFCCC, "Status of Ratification of the Convention," accessed August 2026, https://unfccc.int/process/the-convention/status-of-ratification.
3 United Nations Framework Convention on Climate Change [UNFCCC], art.7, 1992.
4 Robert McSweeney and Ho Woo Nam, "Analysis: Which Countries Have Sent the Most Delegates to COP30?," Carbon Brief, November 11, 2025, accessed August 29, 2026, https://www.carbonbrief.org/analysis-which-countries-have-sent-the-most-delegates-to-cop30.
5 United Nations Climate Change, "Introduction to the Cancun Agreements", accessed September 9, 2023, https://unfccc.int/process/conferences/the-big-picture/milestones/the-cancun-agreements.
6 UNFCCC's Conference of the Parties, Decision 2/CP.27. Funding arrangements for responding to loss and damage associated with the adverse effects of climate change. FCCC/CP/2022/10. Section VI. (November 20, 2022).
7 World Bank, "Fund for Responding to Loss and Damage," accessed August 2026, https://www.worldbank.org/en/programs/fund-for-responding-to-loss-and-damage.
8 Jones, Todd. "Understanding the Limitations of the UNFCCC." Distribute ESG and Sustainability News to a Global Audience, December 23, 2010. https://www.3blmedia.com/news/understanding-limitations-unfccc.

TOPIC A

Expanding Green Energy in Rural Communities

COP | NHSMUN 2027

Photo Credit: IAfrica76

Introduction

The late 20th century and the 21st century have seen large advancements towards renewable energies like solar power, wind power, and hydroelectric power. Solar panels are cheaper than ever to produce, and the acceleration towards a fully renewable energy future get closer every day. However, having renewable energy or electricity sources across the world does not mean that all communities will receive reliable electricity. In 2023, approximately 666 million people still lacked access to electricity.[1]

Rural communities are also likely to remain disconnected because extending national power grids across long distances can be expensive and technically difficult. Furthermore, access to electricity does not mean sufficient or steady access. A household may have enough electricity for lights but may still use wood or charcoal for cooking.[2]

Traditional fuels like kerosene, charcoal, wood, and dung release carbon monoxide and other pollutants and have been linked to numerous health consequences. Traditional fuels have further been tied to an adverse impact on women and children.[3] Traditional fuel sources are likely to be used in the home, which often is inhabited by women and children more. Furthermore, and in many rural communities, women are tasked with replenishing fuel sources, which leaves them vulnerable to harassment, and also limits time for other tasks, including education.[4]

Falling renewable energy costs create an opportunity to address these inequalities without being forced to follow the same path of development as already-developed countries. Globally, the price of coal, one of the most popular energy sources across the world, continues to rise. Meanwhile, renewable energy technology continues to become more affordable as research continues to develop, potentially allowing rural communities to expand sustainable electricity production.[5]

Broadly, rural communities have been sidelined as it pertains to sustainable development and electrification. Governments and international institutions have prioritized national grids and other projects, even though rural communities face heavy consequences as a result of energy poverty. Furthermore, accountability and tracking measures, both associated with climate agreements and not, often count rural communities as part of countries as a whole, instead of viewing them as a relevant, independent metric.

Current international efforts demonstrate both the possibilities and limitations of financing rural green energy. Climate finance is currently insufficient and often requires loans, putting developing nations at bigger risk of prolonged debt.[6] Currently, Mission 300 seeks to connect African communities with electricity by 2030 using public funding, private investment, and various other projects.[7] While the project is still underway, it has shown success broadly. Meanwhile, Just Energy Transition Partnerships (JETPs) provide financing to help fossil-fuel-dependent economies transition toward renewable energy.[8] Both models, Mission 300 and JETP, faced criticism regarding debt, private-sector influence, and limited attention on rural communities.

Ultimately, delegates in COP will have to evaluate the role of energy and electrification in rural communities, the commitment to sustainable energy sources, and ensure that technologies are affordable. Considerations including land use, the rights of various groups, grid strength, and the current state of energy infrastructure are all

crucial in debating the future of green energy in rural communities.

History and Description of the Issue

CRITICAL ENERGY DIVIDES AFFECTING THE MODERN WORLD

In cities or other urban areas, people are clustered together. Typically, electrical utilities or grid systems serve many customers with few transmission and distribution lines. This generally makes power infrastructure more economically feasible and cheaper overall. Urban centers often have the demand, financial resources, and physical systems to support a consistent supply of energy.[9] These systems are often part of a national power grid: a countrywide network that carries electricity from power plants through transmission and distribution lines to homes, businesses, and other users.[10] In contrast, rural electrification may require extending transmission lines across long distances to reach comparatively few customers. The absence of large commercial customers can further limit potential revenue, and difficult rural terrain can raise construction costs.[11]

In the absence of electricity, households and businesses may rely on liquid petroleum gas, kerosene, gasoline, diesel, traditional biomass, or small generators for power.[12] These alternatives can be efficient in providing energy, but may be expensive, unreliable, dangerous, or environmentally harmful. However, having multiple fuel options can provide great benefits to individuals. With affordable vehicle fuel, there is better transportation of both people and products between urban and rural areas. For example, if there is a health emergency, someone can more quickly move to a local hospital. If a small rural farmer's extra produce could arrive at a market, then they could potentially begin to generate excess profit.[13] Similarly, diesel generators could improve local industries in ways such as powering workshop equipment or irrigation systems.[14] These fuels can be essential for improving rural communities.

Supplying all people with power can be costly and currently takes multiple forms. In 2025, about 57 percent of all global electricity was generated from coal, natural gas, oil, or other fossil fuels; renewable sources such as wind,

An example of a small diesel generator found in many rural areas

Credit: Zhejiang Bison Machinery Co.

solar, bioenergy, hydropower, and geothermal energy accounted for about 34 percent, while nuclear energy constituted about 9 percent.[15] However, electricity represents only one part of global energy use. Energy is also needed directly for transportation, cooking, heating, cooling, agriculture, and industry. Fossil fuels and some forms of bioenergy can be burned directly for these purposes, which contributes to greenhouse gas emissions and pollution.[16]

Most broad regions globally have made substantial progress toward near-universal electricity coverage, but rural communities remain disproportionately underpowered. For example, 92 percent of the world's population had access to electricity in 2023, but about 666 million people still lived without it.[17] Sub-Saharan Africa accounted for approximately 85 percent of those living without electricity. These percentages also only measure a basic level of access, since simply having a connection does not mean that electricity is reliable, affordable, or sufficient on a daily basis.[18]

As of 2024, roughly 3.44 billion people, or about 44 percent of the world's population, lived in rural areas.[19] Geography and political instability can further increase the difficulty of electrification for these communities.[20] Conflict may destroy existing infrastructure, endanger workers, interrupt fuel supplies, and discourage investments. Land mines, attacks on electrical systems, and rapidly changing territorial control can also prevent large power grids from being established or reliably maintained.[21] For example, in Nigeria, rural areas have limited state presence, inadequate infrastructure, and scarce resources that create fertile ground for violent conflicts. Thus, extremist groups or criminal organizations exploit the vacuum of state authority and become hotspots for criminal activities and violent conflict within rural areas.[22]

Further, some specific environmental concerns prevent power grid development in rural parts. Floods, earthquakes, landslides, wildfires, and severe storms may damage transmission lines. To fix this, proper equipment, clear roads, and other infrastructure are needed to keep energy systems operating, but this may be less available outside urban sprawls. Climate change can also intensify some of these risks. Therefore, when building for the future, new systems must be designed for both low emissions and long-term resilience.[23]

Other rural areas might be within protected ecological areas where new construction is restricted to protect endangered species, habitats, or conservation land. These protected areas might impede local economic growth if there is nowhere else energy infrastructure could be placed.[24] Even renewable energy systems, generally considered to be environmentally friendlier alternatives, do not eliminate these environmental concerns. Hydropower systems can alter rivers, wind turbines can harm birds and bats, transmission lines can disrupt animal habitats, and large solar projects occupy significant amounts of land.[25] Therefore, when developing rural energy systems, governments must address energy access, disaster resilience, local livelihoods, and biodiversity conservation all together.

Sub-Saharan Africa accounted for approximately 85 percent of those living without electricity

As green energy systems are often newer, upgrading to modern, efficient systems might also be too expensive for some rural communities.[26] The initial cost of solar panels, wind turbines, batteries, mini-grids, and efficient appliances may exceed what low-income households or local governments can afford, even when these technologies would reduce energy costs over time.[27] Rural areas may also lack trained technicians, replacement parts, and supply chains needed to maintain new systems.[28] There are therefore significant financial, technical, and infrastructural gaps in rural communities receiving clean energy.

Clean energy is currently heavily concentrated in advanced economies, with about 90 percent of investment concentrated in advanced economies and China, which leaves emerging and developing areas behind.[29] However, many rural areas have ready access to renewable sources of energy, such as solar energy, water streams, wind, and biomass. There are opportunities for these resources to be tapped, but rural communities are often overlooked and sometimes left out of discussions around green energy.[30]

This exclusion can also occur when projects are built on rural or Indigenous land. In Mexico, wind turbines were erected on the Isthmus of Tehuantepec, where rural households relied heavily on the land and practiced subsistence agriculture as well as maintained fisheries.[31] Critics argued that the over half a million inhabitants of the affected Indigenous and rural communities were not adequately included in decisions concerning land use and project development. This is not an isolated case; green energy systems often require large areas of land on which Indigenous peoples, smallholder farmers, and pastoralists depend, yet such individuals are routinely excluded from such conversations.

This creates a potential divide where rural communities may have the land, resources, and infrastructure needed for national energy transitions. However, they might not receive affordable electricity, local employment, ownership opportunities, or a meaningful role in decision-making.[32] When implemented properly, green energy can decrease reliance on fossil fuels and mitigate the environmental impacts of energy production. Further benefits include cost savings on energy bills, job creation in the community, and reduced energy loss due to local production and distribution.[33] However, projects that disregard land rights, cultural practices, or local livelihoods can generate opposition and reproduce the same inequalities that green-energy expansion is intended to address.

CASE STUDY: TRADITIONAL FUELS

One consequence of the rural energy divide is continued dependence on traditional fuels. Rural households must find other ways to meet essential cooking and heating needs where modern energy systems are lacking.[34] A household may even have electric lighting, but still burn wood or charcoal for cooking and heating. Consequently, electricity access alone does not necessarily eliminate dependence on traditional fuels.[35]

Households commonly depend on traditional biomass when electricity and clean cooking systems remain inaccessible.[36] Traditional biomass includes wood, charcoal, crop residue, and animal dung burned in open fires or basic stoves. Although biomass can generally replenish over time, its use is not automatically clean, sustainable, or carbon-neutral. For example, in India, 76 percent of the traditional fuels used for residential activities are non-renewable biomasses.[37] This contributes to deforestation and net carbon emissions. Biomass is not carbon-neutral if regrowth does not offset emissions, or if harvesting it causes deforestation and forest degradation.

Traditional biomass differs from modern bioenergy or liquid biofuels. The latter uses advanced technologies and commercial processes to create cleaner energy from organic

A "chulla" in Tamil Nadu, India, which is a traditional outdoor stove that burns biomass

Credit: mckaysavage

materials.[38] Burning wood and other traditional biomass releases carbon dioxide, methane, black carbon, and other pollutants. Trees may eventually absorb some of this released carbon, but this process takes time and may not occur if forests are permanently cleared or degraded.[39] Consequently, traditional biomass can contribute substantially to climate change even though its biological source is technically a renewable resource.[40]

Wood-based energy makes up more than 65 percent of global renewable energy use, but in some developing countries, over 90 percent of people rely exclusively on fuelwood, charcoal, and crop residues for cooking and heating.[41] These traditional fuels are often burned inside in open fires or inefficient stoves with poor ventilation. This fills homes with fine particulate matter, carbon monoxide, and other harmful pollutants.[42] Exposure can contribute to pneumonia, stroke, ischemic heart disease, chronic obstructive pulmonary disease, and lung cancer.[43] Burns, accidental fires, and kerosene poisoning create additional risks.[44] Currently, approximately 2.1 billion people worldwide still lack access to clean cooking fuels and technologies; household and ambient air pollution is associated with approximately 6.7 million premature deaths annually.[45] Women and children experience especially high exposure. In 2021, over 309,000 children under the age of 5 died because in many societies women and children spend more time inside, often cooking or near household fires.[46]

Traditional fuel dependence also furthers a gender divide. In many rural communities, women and girls are primarily responsible for gathering fuelwood, preparing fuel, and cooking.[47] If nearby forests are depleted, they may need to travel longer distances and carry heavier loads. This can reduce the time available for education, paid employment, rest, and political or community participation. Traveling through remote areas may also expose fuel collectors to injury, harassment, or gender-based violence.[48] Clean-energy policies can therefore advance climate mitigation, public health outcomes, education measures, and gender equality at the same time.

To address the issues related to problems caused by traditional fuel use, the UN Secretary-General established the Advisory Group on

Energy and Climate Change (AGECC), which recommended the ambitious goal of ensuring "access to clean, reliable and affordable energy services for cooking and heating, lighting, communications and productive uses" by 2030 in poor countries.[49] Sustainable Development Goal 7 also encompasses this goal to ensure access to affordable, reliable, sustainable, and modern energy for all by 2030.[50]

Progress toward these goals has been made with projects that phase out fuelwood as the dominant household energy source. Instead, green energy technologies such as solar photovoltaic systems, improved cookstoves, and biogas can be used as greener alternatives.[51] However, adoption is not uniform. For example, in Ethiopia, factors that improved green adoption rates were being a female-headed household, having a higher education level and income, and being a member of a cooperative.[52] Having larger forest land holdings or a reliance on biomass residues reduced the adoption probability for green energy. Delegates should therefore consider how community, economic, and social factors can encourage the transition of rural communities to green energy sources.

FALLING COSTS OF RENEWABLE ENERGY

Development experts once believed that developing countries would follow the same path as already-developed countries. They expected these countries to rely on fossil fuels, such as coal and oil, while their economies developed. Once they became wealthier, they would begin transitioning to renewable energy. For many years this seemed likely because solar panels and wind farms were relatively new and expensive. However, falling renewable-energy costs and rising fossil-fuel costs have the potential to flip this progression, with developing countries potentially adopting clean energy much earlier.[53]

Today, that is no longer the case. Even in developed countries like the United States, which has existing coal power infrastructure, coal power costs are rising. In fact, the cost of US coal power rose 28 percent between 2021 and 2024. In countries and regions that do not have coal power plants established already, the cost is even higher.[54] One of the few countries where coal power is still being affordably expanded is China. This is largely possible because China produces 90 percent of the coal it consumes. Without that domestic supply, affordable coal would not be possible.[55] Even so, renewable energy is still expanding rapidly throughout China, reducing its reliance on coal.

While fossil fuels have become more expensive, renewable energy has become substantially cheaper. Between 2010 and 2019, the cost of solar energy fell 82 percent, making it more affordable around the world.[56] It is a simple matter of economics that as energy costs fall, their use expands as they become more cost efficient. From 2015 to 2024, solar panel generation grew from 237.9 terawatt-hour (TWh) to 2,056.8 TWh, reflecting an average annual growth rate of 27.1 percent.[57] Other renewable energy sources, such as wind power, are experiencing similar trends of declining costs. Costs are projected to continue falling.

Between 2010 and 2019, the cost of solar energy fell 82 percent

BloombergNEF, a research group focused on energy production, predicts that the cost of renewables will continue to fall by 22 to 49 percent between 2025 and 2035.[58]

Most of this renewable energy expansion has happened in larger and more developed economies. However, there is increasing momentum to bring renewable energy to the most remote parts of the world. There are 600 million people in Africa that completely lack access to electricity. This is typically the case in remote communities that have yet to receive access to national power grids. Individual communities cannot pay the expenses of bringing an entire power grid to their doorsteps. Conversely, national governments are using their limited funds to electrify urban areas.[59] This leaves rural communities out in the cold.

To bring power to rural areas, communities are increasingly creating mini-grids. These are essentially local versions of national power grids, with each community featuring power generators (often solar) and distribution wires. Mini-grids are appealing for several reasons. First, they can be set up far faster and cheaper than expanding national power grids. This matters in communities that currently do not have electricity. The wait for a national power grid to arrive could be decades long, and electricity is needed today. Mini-grids can even be deployed in rural communities that are electrified, but use fossil fuels like diesel generators. Clean, low-cost solar power may allow for a rapid expansion of electrical use.[60]

Mini-grids and similar projects can even be deployed in developed countries with expansive national grids. In most countries, rural and remote communities are often among the most impoverished and typically have the least access to quality infrastructure. Low-cost renewable energy can help lift these communities out of poverty. For example, the US state of Minnesota offers a Community Solar Garden program, which allows low-income renters to subscribe to subsidized solar power. Such renters are often unable to install solar panels on their own due to the upfront costs and restrictions as renters.[61] In the remote Daintree Rainforest of northern Australia, residents rely on diesel generators for power. However, with a grant of AUD 18.75 million, the Daintree Microgrid Project sought to develop a solar power mini-grid.[62] Unfortunately, that project has since been indefinitely postponed due to disagreements about permitting timelines.[63]

An artistic rendition of what the Daintree Microgrid Project could have looked like

Credit: Australia Department of Climate Change, Energy, the Environment and Water

There are downsides, however. As seen with the Daintree Microgrid Project, regulations and politics can delay or entirely cancel such projects. Maintaining a mini-grid is also more cost-effective in the long term, but it requires trained and experienced technicians that may not be available in every community. This concern is amplified if a country has several mini-grids all using different standards and design principles (perhaps all funded by different sources). A technician would need to learn how different types of mini-grids are set up, adding to the amount of training required.[64] Still, these mini-grids offer exciting new options that rural communities have not enjoyed before.

Ultimately, the developing nations are no longer bound by rigid progressions for energy development. As the cost of renewable energy continues to fall and new technologies continue to develop, it is possible for developing countries to harness this momentum to rapidly expand electricity generation and distribution.

RURAL ENERGY AND THE COP FRAMEWORK

The annual COP meetings of the UNFCCC are perhaps the most significant climate-related negotiations taking place today. The focus of the member states during these meetings significantly informs where innovations and reforms will be made during the coming year. At these meetings, member states meet with various stakeholders ranging from green NGOs to fossil fuel producers. Many reports are issued by these stakeholders to try to influence the final decision of each COP meeting. Fortunately, rural communities have long been represented at these meetings. However, the focus of COP resolutions often diverges from the pleas made by organizations representing rural communities.

In the first COP meeting following the Kyoto Protocol's entry into force in 2005, the member states created a provision called the Clean Development Mechanism (CDM). This acted as a form of early carbon tax and credit system. The Kyoto Protocol created a system of emissions limits for countries, similar to what was set by the Paris Agreement. However, under the CDM, wealthier polluting countries could offset their own emissions by implementing "emission-reduction projects" in developing countries.[65] Essentially, wealthier countries could either reduce emissions themselves, or they could pay for developing countries to adopt green energy. Rural projects were particularly encouraged under this framework.

In some ways, the CDM was an enormous success. By June 2009 – only four years later – more than 2,600 projects had been registered under the CDM. In just 2008, USD 6.5 billion in transactions under the CDM were made.[66] On paper, the CDM ushered in a new wave of green investments. The impact, however, was extremely small. As one researcher put it, the projects were "blatantly inframarginal," meaning that they were investments that were already going to happen.[67] Rather than encouraging new investments, the CDM seemed to create a system that justified the pollution from more developed countries. Additionally, many governments and businesses said that the system of getting a CDM approved was mired in red tape, describing it as "cumbersome and unrewarding."[68] The CDM started to be phased out in November 2025.

The Paris Agreement, signed at COP21 in 2015, marked a dramatic shift in how climate goals were set. Under the Paris Agreement, each country is required to prepare and meet nationally determined contributions (NDCs) every five years.[69] These NDCs are, essentially, self-assigned goals for how the country plans to meet the UNFCCC's climate goals. This gives individual countries the freedom to set their own goals that reflect their unique circumstances.

Unfortunately, this removed any particular focus on rural communities. While countries are free to focus on rural energy in their NDCs, nothing requires them to. Furthermore, with no actual enforcement mechanism, countries can

design their NDCs as vaguely as they would like. If they do not meet their goals, they face no consequences. This highly voluntary nature of the Paris Agreement is sometimes touted as a strength and sometimes as a weakness.[70]

Of course, rural advocacy groups are still strong stakeholders at COP conferences. The World Rural Forum (WEF) is just one organization that routinely participates in these meetings. At COP30, WEF lobbied for countries to recognize that farms, particularly small family farms, take up a major portion of the global carbon footprint, and that the sector needs support. They also recommended numerous actions to support clean rural energy, such as reformed financing and loan systems that would increase farmers' access to the money needed to make major green investments.[71]

Sadly, this lobbying seems to have limited impact. The draft of the final report from COP30 makes no unique mention of rural energy. There are several discussions of issues that primarily impact rural communities, like deforestation and agricultural gas emissions. However, despite calling for significant green investments in these problems, there is no mention of how to sustainably power any new infrastructure or services.[72] This only undermines the very goals that the COP is trying to accomplish. In Zambia, for example, communities are overharvesting forested areas to pay for solar-powered devices because there is no funding or support for these investments.[73] Rather than solving environmental problems, the current COP framework seems to encourage merely exchanging one problem for another.

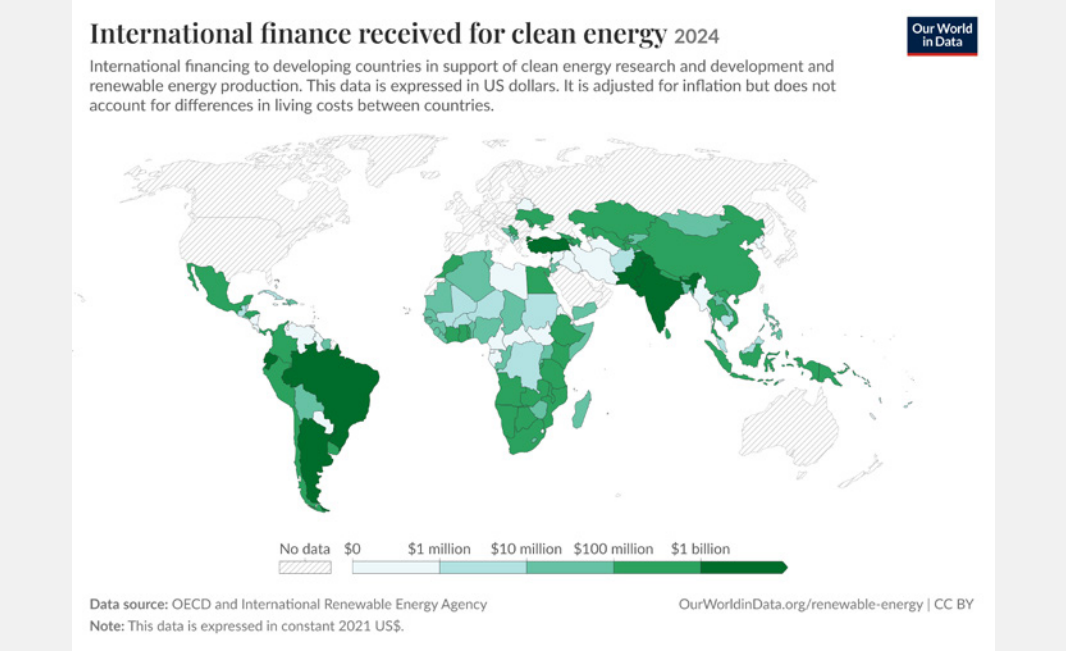
Current Status

THE ROLE OF CLIMATE FINANCE

Particularly since the Paris Climate Agreement was adopted in 2015, climate finance has been an increasingly prominent topic of global debate. The reality is that green energy projects on a national scale are expensive projects. Climate finance includes the financial and monetary systems used to help countries pay for mitigation and adaptations that will address climate change. Mitigation strategies may include retaining walls to make cities more resilient to severe storms, which are more common as climate change advances. Adaptation may include new green energy facilities that reduce a country's carbon footprint. Banks and governments typically make pledges, committing to providing a certain amount of climate finance. They then accept applications for parts of that funding.[74]

Studies have shown that climate finance is a powerful tool for reducing urban-rural energy inequalities. In particular, low-income countries stand to benefit the most from expanded climate finance. However, the amount of climate financing available is unable to keep up with the demand from countries and the needs of individuals. The IEA estimates that, to reach the goal of net-zero emissions by 2050, the amount of climate finance pledges must reach USD 4 trillion each year by 2030.[75] Any less, and there will not be enough resources to reach our ambitious climate goals. This is more than three times the amount of climate finance available in 2024, and this goal will be missed without urgent intervention.

Rather than solving environmental problems, the current COP framework seems to encourage merely exchanging one problem for another



A map showing the amount of climate financing received in 2024

Credit: Our World in Data, OECD, IREA

Even though the currently pledged climate finance is insufficient, a pressing challenge is the lack of pledges among the wealthiest countries. In 2009, the wealthiest countries agreed to provide USD 100 billion in climate financing by 2020. This goal was not reached until 2022. Even so, this is a small number compared to the 4 trillion expected to be needed by 2030. Least developed countries are quick to point out the hypocrisy, as the wealthiest countries have emitted the most greenhouse gases. “Those who shoulder the blame must foot the bill,” said Sitiveni Rabuka, Prime Minister of Fiji.[76] More concerning, this funding from wealthy countries is slowing and may even be shrinking. Between 2023 and 2024, financing from these countries only increased by USD 3.9 billion. Furthermore, in 2025, the United States rescinded its USD 11 billion annual commitment.[77]

Climate finance mostly comes in the form of loans. Organizations such as the World Bank offer countries low interest rates and long repayment periods, making the loans easier to repay. However, commercial banks and governments may also provide this financing. Although the lenders may vary, it is exceedingly rare for climate financing to be offered for free. The investors seek to at minimum recoup their invested funds or even make a profit.[78]

Because climate finance comes as loans, there is a further concern about countries being forced further into debt. Even with reduced interest rates, debt loads have still reached unsustainable levels for much of the world. In 2023, more than half of African countries spent more on debt interest than on healthcare. If climate finance truly creates more than USD 4 trillion of new debt each year by 2030, the payments on that debt threaten to cripple economic growth. Furthermore, this extra debt burden makes it harder for countries to respond to natural disasters, such as major storms or earthquakes. Such incidents usually create enormous repair and reconstruction costs, which are usually financed by debt. However, lenders are more reluctant to make loans to countries that already have large amounts of debt.[79] In this way, accepting climate financing may make a country more vulnerable to disasters in the short term.

Amid these numerous challenges, rural communities, particularly disadvantaged

populations, are most often left behind. When banks and governments that offer funding respond to whoever has the best proposal and capacity, this often favors wealthier communities with the resources to prepare more polished applications. In one study of climate finance in Canada, a funding applicant shared, "The application process itself is a barrier...the form can be over 20 pages, plus attachments and a feasibility study. For a small organization looking for, say, $6000, that's weeks of work with no guarantee of success." The different – but nonetheless pressing – needs of rural communities may also be overshadowed by more popular initiatives. Another Canadian funding applicant reported, "Which Indigenous community that's trying to address housing, health care, mental health, and the intergenerational trauma of residential schools is thinking about Tesla charging stations?"[80]

MISSION 300

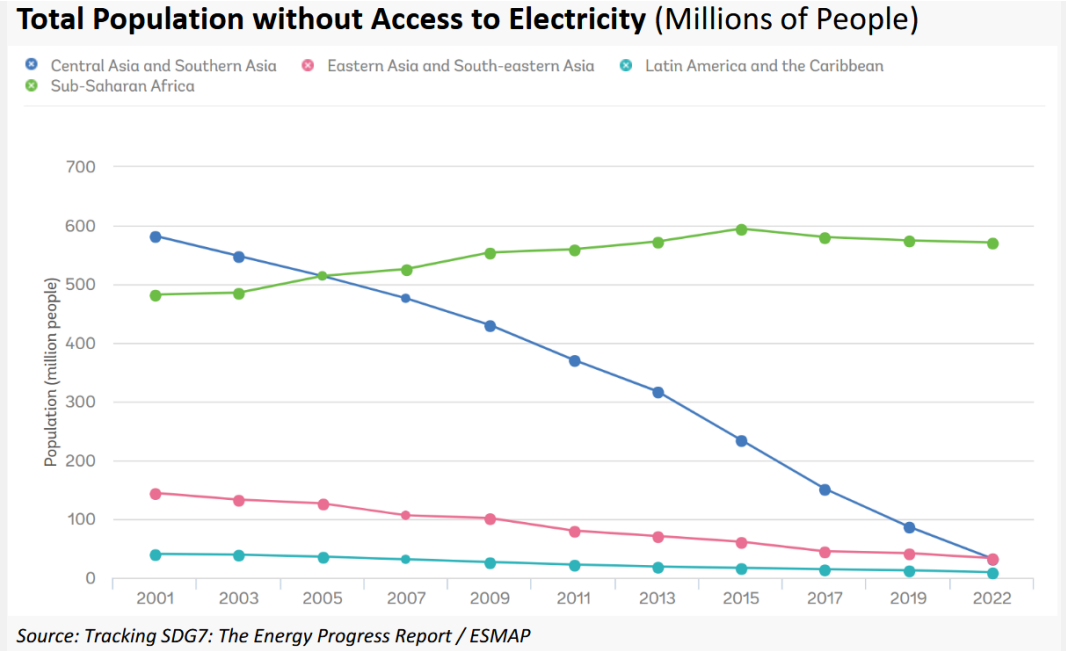
The vast majority of people that still do not have electricity are located in sub-Saharan Africa. In fact, over 600 million people lack this access out of a population of roughly 1.3 billion. A significant number of these people live in remote and rural communities. Great strides have been made to electrify communities across Latin America and Asia, but the same cannot be said of sub-Saharan Africa.[81]

To tackle this pressing problem, the World Bank Group and the African Development Bank Group joined forces with several civil society organizations in 2025 to start "Mission 300." This project seeks to connect 300 million Africans to electricity by 2030. By June 2026, 50 million people had been connected across 40 countries, marking an early, positive milestone that this goal can be reached.[82] To continue pushing towards this lofty goal, the leaders behind Mission 300 are planning significant increases in investments. The World Bank Group plans to double energy investments in Africa by 2030, amounting to USD 30 billion in investments.[83]

Mission 300 has undeniably been more successful than similar projects. The World Bank Group credits this success to the fact that the investments span every step of energy infrastructure – from power generation to last-mile distribution. It also says that it has made it easy for the private sector to make parallel investments. This provides additional funding that makes it possible to stack successes and

Electrification has become a uniquely African problem

Credit: ESMAP



accelerate growth. For example, improved regional infrastructure funded by the World Bank may make it easier for private companies to provide local systems that distribute that energy to homes and neighborhoods.[84]

Many of these investments are also focused on green energy as well, keeping sustainability top of mind. The Global Energy Alliance for People and Planet is one of the partner organizations that has kept the financing focused on sustainable energy. In the Democratic Republic of the Congo – which features challenging geography for creating truly nationwide infrastructure – it has committed USD 7 million to green mini-grid projects to electrify communities urgently. In Nigeria, another investment is connecting various mini-grid systems to build a more reliable and sustainable system. Woochong Um, CEO of the Global Energy Alliance for People and Planet, stated, "Our Alliance's work in Africa, including Mission 300, is proof of what's possible when governments, business, and philanthropy act together with urgency and purpose, turning ambition into real power, real jobs and real opportunity for millions across the continent."[85]

Mission 300 is not without its critics, however. As noted previously, many of these investments are not gifts. They are loans or equity investments, promising investors that their investments will be returned with a profit. This risks increasing Africa's already large debt burden, particularly if some projects start to fail. Labor unions across the continent have also come out against the initiative. Among several items, it objects to the concessions that governments are expected to make for funding. They point to one World Bank quote suggesting that governments would need to implement "significant subsidies" to private industry equal to 50% of the value of the investment. Instead, the labor unions call for an approach that favors existing public utilities rather than private enterprises.[86]

Only time will tell whether Mission 300 meets its goals. Even so, different countries may offer different perspectives on the project's overall success and what it means for the rural communities of Africa.

JUST ENERGY TRANSITION PARTNERSHIPS

Clearly, there are some concerns when funding involves loans from groups like the World Bank or private industry. There are questions about equity, accountability, and whether the projects are truly in the public interest. There is also generally more demand for funding than these sources can provide.[87] However, these remain significant sources of funding that many countries have to rely on.

However, these are not the only sources of funding available. National governments can also mobilize significant resources that could spark a green energy transition. As noted, developed countries struggled to meet and maintain their USD 100 billion goal by 2020. Often, developed countries have expressed a reluctance to provide blanket funding that could be corruptly or inefficiently used. General funding pledges, they claim, risk being wasted.[88]

At COP26 in 2021, South Africa partnered with several developed countries to develop a new funding partnership called a Just Energy Transition Partnership (JETP). South Africa's energy sector is in a particularly difficult position. Coal is a significant source of power for the country, with hundreds of thousands of jobs tied up in the coal sector. A rapid green transition would threaten to put vast numbers of workers out of a job. The JETP announced was a novel approach not just for the fact that this was a funding agreement between countries. It also outlined a five-year transition to bring clean energy and economic stability. The developed countries would make USD 8.5 billion in funding available to South Africa to fund green projects. South Africa, in exchange, would clear some regulatory hurdles (encouraging private investment), invest in critical infrastructure, and create job transition programs to help coal

workers find employment in green industries.[89]

The agreement was widely lauded when it was first announced. UN Secretary-General Antonio Guterres commented, "we need to build coalitions of support including developed countries, financial institutions, those with the technical know-how...The partnership with South Africa announced a few days ago is a model for doing just that." It also rapidly drew the attention of other countries that wanted to emulate the project. One South African representative noted, "we were approached by the Vietnamese, the Indonesians, the Philippines and the Indians to say 'we've looked at your plan, we've looked at what you've done, how did you do it, show us how you did it'...and wanting to collaborate with us."[90]

JETPs were soon launched in other countries as well. The next year, Indonesia signed an agreement for its own JETP worth USD 20 billion. Like South Africa, Indonesia's energy grid relied heavily on coal. The JETP sought to facilitate a similar transition as in South Africa, replacing 6.7 GW of coal-powered generators with green energy by 2030. Half of this money would come directly from the same developed countries behind the South African JETP. The other half would come from private businesses. The partnership also featured a number of other organizations, including the UNDP and the World Bank.[91]

Unfortunately, the Indonesian JETP is already facing significant challenges. The Trump Administration cancelled its pledged contribution to the JETP in 2025. At COP30 in Brazil, Indonesian representatives complained that the promised funding had failed to materialize. Paul Butarbutar, head of the JETP Indonesia Secretariat, said, "If there is no one really willing to jump in to finance the coal phase-out, then we will have to think about whether phase-out is actually the best option." Germany's press office, which co-leads the JETP, claimed that USD 6 billion of financing is in progress.[92] Still, with the 2030 deadline looming, the fulfillment of the JETP is at risk.

Of course, like most climate finance programs, these JETPs make little to no mention of rural communities. Most JETPs to date have focused on phasing out large, coal-fired power plants. This is certainly an important goal, but not every country is currently reliant on large coal power plants. Senegal, for example, recently signed a JETP. Senegal largely relies on oil for its electricity generation, so a coal phase-out is not needed (although oil-based energy certainly is a major polluter as well).[93] Notable, however, is that Senegal has a higher percentage of people who lack access to electricity (17.1 percent) than South Africa (9.8 percent) or Indonesia (0.1 percent).[94] Therefore, a just transition may look different in Senegal.

Indeed, Senegal's investment plan includes several aspects that will specifically impact rural areas. It intends to achieve universal access to electricity by 2030 and have 40 percent of its energy come from renewable sources by 2040 – a vast improvement from 3 percent today. However, some have said that the plan lacks accountability to the people of Senegal. It offers no metrics about how existing urban-rural divides will be monitored or which communities might

"If there is no one really willing to jump in to finance the coal phase-out, then we will have to think about whether phase-out is actually the best option."

benefit first. Different communities may require different strategies for electrification (such as national vs. mini-grids), and the plan offers little guidance about how these questions will be resolved.[95] Even in JETPs that seem more poised to specifically support rural communities, they still fall short.

Bloc Analysis

POINTS OF DIVISION

The familiar divide of "developed versus developing" countries will not serve delegates well in this committee. There is a significant amount of nuance in national policies on the energy transition, particularly among the developing countries. Nearly every country agrees (at least on paper) that rural communities deserve clean and reliable power. The real fault lines appear around the harder questions: Who pays for this transition? Should the money arrive as grants or as loans? Should electricity be delivered through large national grids or mini-grids? How much say should outside funders have over a country's own energy decisions?

The four blocs below are organized around how countries tend to answer those questions, not simply around how wealthy they are. Many states could fit into more than one group. Indeed, real negotiations may lead to rapidly shifting alliances. Delegates should treat these blocs as a starting point for finding allies, not as fixed teams.

STATES WORKING TOWARDS ELECTRIFICATION

This bloc includes the countries with large rural populations that still lack any electricity at all. Most are in sub-Saharan Africa, such as Nigeria, the Democratic Republic of the Congo, and Ethiopia. The scale of need here is enormous and urgent. As established previously, roughly 600 million people in sub-Saharan Africa live without electricity, and our best case scenario only sees us halving that number by 2030.[96] For these countries, the issue is not managing a transition from one kind of energy to another. It is securing first-time access for people who have never had it.

These countries also tend to be among the world's lowest income and most debt-laden. They will argue strongly that funding should come as grants – money that does not have to be repaid – rather than as loans. Piling on more debt can trap a country in repayment cycles that leave even less money for schools, hospitals, and future energy projects. Unfortunately, their wishes do not match reality. In 2023, debt-based instruments comprised about 83 percent of international financing for clean energy in developing countries. Grants accounted for less than 10 percent.[97] When wealthier nations point to their contributions, delegates in this bloc are quick to note that much of that support is actually lending that deepens the problem.

Delegates should be aware, however, that this bloc is not perfectly unified. Some governments prioritize extending the central national grid and building large power plants, while others favor small off-grid systems first. Many of these governments are participating in large coordinated efforts such as Mission 300 to speed up connections, but not all of sub-Saharan Africa is engaged. However, these countries have far more in common with each other than other states.

FOSSIL FUEL TRANSITION ECONOMIES

This bloc is made up of middle-income countries whose economies depend heavily on fossil fuels – especially coal – and the jobs that come with them. South Africa, Indonesia, India, and Vietnam are the clearest examples. For these countries, the central question is not first-time access but how to shift away from fossil fuels without throwing large numbers of people out of work. This is where the idea of a "just transition"

A solar-powered mini-grid in Nigeria

Credit: Rupumped

comes from. In South Africa alone, there are hundreds of thousands of jobs tied to the coal sector.[98] These jobs cannot simply be replaced overnight.

These countries generally welcome climate finance, but they are wary of deals that come with heavy conditions or that focus narrowly on shutting down coal. These concerns are not for optics only. After years of negotiations, India decided in 2024 not to pursue a JETP because it was "cautious about taking on additional loans through these partnerships." Indian officials made clear they wanted funding for expanding renewable energy in the form of grants, not loans, and without being forced to commit to a specific coal phase-out plan.[99] India also famously pushed, at COP26 in 2021, to soften the global agreement's language from "phase out" to "phase down" of coal. Although this wording change may seem small, it is a reflection of this bloc's insistence on transitioning at its own pace.[100]

Because their attention and their transition deals center on coal plants and national grids, rural access can slip down the priority list even in countries actively negotiating billions in climate finance. Delegates representing this bloc will need to balance the demands of coal regions and industrial workers against the needs of their own unconnected rural populations – two very different problems that compete for the same limited funds.

DEVELOPED DONOR AND CONTRIBUTOR STATES

This bloc consists of the wealthy countries that supply much of the world's climate finance. This includes members of the European Union, Germany, the United Kingdom, Japan, and, at times, the United States. Many of these nations belong to the International Partners Group, the coalition of donors behind the JETPs. Their policies shape how much money is available and on what terms. In general, this bloc favors mobilizing private investment and offering concessional loans (loans with low interest rates and long repayment periods) over providing large grants. It tends to attach conditions to funding to ensure the money is used effectively, such as policy reforms or anti-corruption measures.

The reliability of this bloc, however, has itself

become a key complaint of many countries. In early 2025, the United States withdrew all of its pledged contributions to JETPs around the world.[101] The remaining members responded by affirming their commitments and stating that they were seeking other partners to cover the work the United States had abandoned. Although this withdrawal was particularly notable, there have also been other struggles. As noted, these countries were collectively late to meet their goal of offering USD 100 billion in climate finance each year by 2020.[102] Countries in this bloc will often resist the argument that they are obligated to pay simply because they emitted the most greenhouse gases historically, preferring to frame their contributions as voluntary partnerships rather than debts owed.

EMERGING FINANCIERS AND TECHNOLOGY EXPORTERS

The final bloc is defined not by how much energy its members need, but by what they can supply. China is the dominant member, alongside Gulf states such as the United Arab Emirates and, in some respects, other large emerging economies. What makes this bloc distinct is its role as the world's workshop and banker for green energy. In 2024, China produced roughly 80 percent of the world's solar panels and remains by far the largest exporter, which means that much of the hardware needed to electrify rural communities is manufactured by a single country in this bloc.[103]

Beyond manufacturing, this bloc offers an alternative model of financing that competes with the World Bank and the Western donor system. China provides loans, technology, and construction expertise directly, often delivering completed projects at high speed. This can be much more attractive than the slow approval process behind World Bank loans, often requiring changes to national legislation. At the 2024 Forum on China–Africa Cooperation, China committed an estimated 50 billion US dollars to Africa for the following three years, including support for 30 clean-energy projects.[104]

Committee Mission

There are many mechanisms for expanding electricity access and replacing existing fossil fuel energy grids. This is, in fact, one of the major themes of COP meetings and multilateral funding agreements. However, as seen throughout this guide, these mechanisms routinely fail to address rural populations. While urban networks and national grids gain the majority of the world's attention and financing, rural communities are left to fend for themselves.

This neglect is to our collective detriment. These communities routinely rely on fossil fuels or even wood burning stoves that significantly pollute the air. The forces of climate change are also increasing the pressure on these communities. As rain patterns change and droughts worsen, the need for energy is increasing among rural farmers just to survive.[105] They must be provided with alternatives to diesel, coal, and kerosene as fuel sources. Otherwise, every step towards universal access to electricity will represent a step farther away from reaching our climate goals.

Many projects that are already being implemented as part of green energy transitions can easily be adapted to serve rural communities. It just requires political will and a conscious allocation of resources. Still, many of these systems are voluntary, so delegates must consider how countries can be incentivized to serve rural communities and allow their voices to be heard.

TOPIC B

Promoting Green Manufacturing

COP | NHSMUN 2027

Photo Credit: Michael Caven

Introduction

Green manufacturing brings together two major global goals: economic growth and climate action. For more than 200 years, manufacturing has helped countries grow their economies. It has created jobs, supported infrastructure, and raised living standards in many countries.[106] Yet this growth has come at a cost. Most industries still depend on fossil fuels and use large amounts of energy and raw materials. As a result, industry is the second largest source of emissions, only behind the energy sector.[107] Cutting these emissions is therefore a key part of the fight against climate change.

The transition to green manufacturing is not equally easy for every country. Many developed countries became wealthy through decades of carbon-intensive industrial growth. In contrast, many developing countries are still expanding their industries to create jobs and raise incomes. They must grow their economies while also reducing emissions. Some countries already have the money, technology, and industrial capacity needed to produce goods more cleanly. Others still struggle with limited funding, weak infrastructure, and poor access to new technology. These differences have made industrial emissions an increasingly important issue in negotiations under the United Nations Framework Convention on Climate Change (UNFCCC).

Green manufacturing aims to reduce the environmental effects of how goods are designed, produced, transported, used, and discarded. It encourages industries to use cleaner energy, waste fewer materials, recycle more resources, and adopt new production methods that release fewer emissions.[108] These changes can lower pollution while supporting economic growth. However, the Intergovernmental Panel on Climate Change (IPCC) argues that greater efficiency alone will not be enough.[109] Reaching net-zero emissions will require major changes across supply chains, production systems, and international cooperation.

Most countries agree that industrial emissions must fall. However, they disagree on how to reach that goal, with three debates shaping these discussions. The first is finance, as many developing countries argue that they need greater financial support to modernize their industries. The second is technology. Governments continue to debate how clean technologies should be shared and how developing countries can gain access to them. The third is responsibility. Countries disagree over how the costs of reducing emissions should be divided between developed and developing economies. These debates shape negotiations on climate finance, technology transfer, carbon border measures, and how the principle of Common but Differentiated Responsibilities should apply to industrial development.[110]

History and Description of the Issue

INDUSTRIALIZATION, EMISSIONS, AND GREEN MANUFACTURING

The Industrial Revolution began in Britain during the late eighteenth century. It transformed the economy from agriculture and handicrafts to machine-based manufacturing.[111] Steam engines, coal power, and mechanized production made it possible to manufacture goods on a much larger scale.[112] However, they also tied economic growth to the sustained use of fossil fuels.

This period established a connection between industrial development, energy consumption, and greenhouse gas emissions that continues today.[113]

Over the following century, industrialization spread across Western Europe, the United States, and Japan. Belgium, for example, began building factories in the 1830s and 1840s, focusing on wool spinning and metal production.[114] Germany and the United States followed later in that century. Both used coal-powered steam power and adopted the factory system. Japan followed a similar path beginning with the Meiji Restoration in 1868. Colonial systems supplied industrializing states with inexpensive raw materials, while population growth and competition between governments encouraged increasingly rapid production. Countries built manufacturing capacity with few environmental restrictions, creating wealth and technological advantages that remain unevenly distributed today.

The United States grew quickly after its Civil War in the 1860s. Railroads, steel, and later oil and electricity drove its growth. Industrial production expanded even further during the twentieth century, especially after World War II. Reconstruction, growing consumer demand, and the widespread use of automobiles, electricity, steel, concrete, coal, and oil increased both manufacturing output and emissions.[115] The postwar economic boom meant more people could afford cars, appliances, and other goods.[116] This created an even bigger demand for factories and fossil fuels. Although governments gradually began addressing visible pollution such as smog, greenhouse gas emissions continued to rise. By the time climate change became a major international concern, industrialized countries had already produced a large share of historical emissions.[117]

Industrialization is not all negative. The World Bank has linked industrialization to both poverty reduction and economic growth. Manufacturing has been a traditional path for countries moving from low- to middle-income status.[118] This creates a tension in which the same industrial growth that has supported economic development is also a major source of greenhouse gas emissions. This tension is addressed within the United Nations Framework Convention on Climate Change (UNFCCC) through the principle of Common but Differentiated Responsibilities (CBDR).[119]

CBDR states that all states are responsible

Coalbrookdale at Night, *an oil painting by Philipp Jakob Loutherbourg. Coalbrookdale is considered to be one of the birthplaces of the industrial revolution.*

Credit: Philip James de Loutherbourg

for addressing climate change, but their responsibilities and capabilities differ.[120] Countries that industrialized earlier, such as Britain and other Western nations, are responsible for the majority of historical emissions. On the other hand, countries industrializing today are often asked to pursue cleaner pathways, despite contributing far less to the problem historically. CBDR therefore shapes how the UNFCCC Conference of the Parties (COP) negotiations treat manufacturing. Developed countries are expected to lead on cutting emissions and to provide finance and technology. Developing countries, meanwhile, emphasize their continuing development needs and their dependence on international support for cleaner industrialization.

The United Nations Environment Programme describes climate change, biodiversity loss, and pollution as a "triple planetary crisis."[121] Its assessments connect these problems to current patterns of production, consumption, fossil-fuel use, and resource extraction. For manufacturing, this means that reducing environmental harm will require changes across entire production systems rather than only small improvements in factory efficiency.

The Intergovernmental Panel on Climate Change (IPCC) provides more specific data on how this transformation applies to manufacturing. IPCC's Sixth Assessment Report (Working Group III, Mitigation), Chapter 11, is one of the main scientific references on industrial decarbonization.[122] In 2019, industry produced about 24 percent of all direct global emissions.[123] The report also finds that industrial emissions have grown faster than any other sector since 2000. This growth is driven by demand for basic materials like steel, cement, and plastic. Also, the IPCC reports that global material stocks (everything already built and manufactured worldwide) grew from about 36 billion tons in 1900 to more than 1.1 trillion tons by 2020. Economic growth has therefore not reduced global demand for materials. The IPCC states that reaching net-zero emissions in industry is possible, but difficult and costly. Because industrial output continues to grow, efficiency improvements must be combined with broader changes to energy sources, materials, product design, and waste management.[124]

The IPCC identifies six broad strategies for industrial decarbonization. First, reducing demand means limiting the need for newly manufactured materials. Second, material efficiency means using fewer resources and making products last longer. Third, circular-economy practices keep materials in use through repair, reuse, and recycling. Fourth, energy efficiency reduces the energy wasted by factories and machinery. Fifth, industries can switch to cleaner energy and production methods, including electrification and green hydrogen.[125] Finally, carbon capture, utilization, and storage can capture some emissions that are especially difficult to eliminate.[126] These strategies generally work best when used together.

Traditional manufacturing often follows a linear model: raw materials are extracted, turned into products, and discarded after use. Green manufacturing instead attempts to reduce waste and emissions across the full supply

The United Nations Environment Programme describes climate change, biodiversity loss, and pollution as a "triple planetary crisis."

US Secretary of State John Kerry marks the entry into force of the Paris Agreement

Credit: US State Department

chain. It may combine cleaner energy, efficient production, longer-lasting products, recycling, and low-carbon technologies. These changes can reduce environmental harm while creating new industries, but they also require substantial investment and infrastructure.

INTERNATIONAL FRAMEWORKS AND CLIMATE AGREEMENTS

International climate agreements have gradually created mechanisms to finance, support, and measure industrial decarbonization. The Kyoto Protocol, adopted in 1997, established legally binding emission targets for participating developed countries and created mechanisms that could support cleaner industrial projects.[127] Its Clean Development Mechanism allowed emissions-reduction projects in developing countries to generate carbon credits that developed countries could purchase and count toward their Kyoto targets. Such projects included efficient boilers or renewable power.[128] For manufacturing specifically, developing countries could industrialize by building cleaner factories from the start.[129] In practice, however, demand for these credits collapsed after 2012. The mechanism struggled to deliver the scale of transformation that was intended.[130] Still, it set an important precedent. It showed that international agreements could help countries work together to finance and manage industrial emissions.

The Paris Agreement built on the Kyoto Protocol. Adopted in 2015, it created a broader framework in which every party submits its own climate plan while developed countries continue to lead in providing support to developing countries. The UNFCCC's Technology Mechanism, established in 2010 and later incorporated into implementation of the Paris Agreement, is made up of the Technology Executive Committee and the Climate Technology Centre and Network. It exists to move clean technology from developed countries to developing countries.[131] This matters directly for manufacturing because building a new factory efficiently often depends on technology, patents, and expertise that originated in more developed countries. The Technology Mechanism is one of the few concrete channels created to close knowledge and funding gaps. It allows developing countries to industrialize cleanly by giving them the tools to do so.

Not every manufacturing-related policy has come from the UNFCCC process itself. The European Union's Carbon Border Adjustment Mechanism (CBAM) is a part of its wider Clean Industrial Deal. It requires importers of certain carbon-intensive products, including steel, cement, and aluminum, to account for emissions embedded in those goods. Importers must purchase certificates corresponding to the EU carbon price, with adjustments when an equivalent carbon price has already been paid abroad.[132] The goal is to stop companies from simply moving their dirtiest production to countries with weaker climate regulations. This process is called carbon leakage. CBAM, however, has become one of the sharpest points of tension in global manufacturing policy. Developing country exporters argue it serves as a trade barrier since it can tax their exports before their industries have the money or technology to decarbonize.[133] The dispute raises a wider question for COP: whether climate-related trade rules should be established multilaterally or imposed independently by major importing markets.

The Paris Agreement also created a process for measuring progress. Under the Enhanced Transparency Framework, parties regularly report their emissions and actions. These reports contribute to the Global Stocktake, which assesses collective progress toward the Paris Agreement's goals every five years. The results are intended to inform countries as they prepare stronger future NDCs. Although this process cannot force a country to adopt a particular industrial policy, it can reveal whether current plans are sufficient to reduce industrial emissions.

COP29, held in Baku in 2024, included several initiatives focused on industrial decarbonization. Governments and companies launched the Climate Investment Funds' Industry Decarbonization program. It is aimed at steel, cement, glass, aluminum, and textile producers in developing countries. It is backed by roughly one billion dollars in funding.[134] Alongside it, the Climate Club's Global Matchmaking Platform was created to connect industrial companies in developing countries with the necessary financing and technology to decarbonize.[135]

COP29 also featured initiatives intended to create demand for low-carbon steel, cement, and other materials. Governments completed additional rules for international cooperation under Article 6 of the Paris Agreement and adopted a new climate-finance goal of at least 300 billion USD annually for developing countries by 2035. Parties also called for efforts to scale total climate finance from public and private sources to USD 1.3 trillion annually by 2035.[136] However, this broader finance goal is not guaranteed funding, and only a portion would support industrial projects.

At COP30 in Belém in 2025, governments continued discussing industrial investment, sustainable fuels, and support for decarbonization in the Global South.[137] However, parties remained divided over fossil-fuel transition timelines and unilateral trade measures such as CBAM.[138] Rather than resolving the trade dispute, governments continued a process of international dialogue. COP30, therefore, demonstrated growing interest in green industry but also the continuing difficulty of reconciling climate ambition, development, and trade.[139]

Outside the COP process itself, UNIDO functions as the UN system's specialized agency for turning these agreements into practical change. Its Resource Efficient and Cleaner Production (RECP) program has helped companies in more than 60 developing states. It has helped them cut waste, energy use, and water use while saving money. Its Global Eco-Industrial Parks Program goes a step further. It helps entire industrial zones share energy, water, and waste between neighboring factories. This means one company's waste heat or byproduct can become another's input. These programs are where the abstract language of "material efficiency" and "circular economy" from the IPCC's six strategies actually gets implemented.

Taken together, these frameworks show a clear pattern. Binding treaties like Kyoto in the 1990s created the first tools to finance industrial change. The Paris Agreement added a channel for technology transfer. Regional policies like CBAM show how climate rules for manufacturing can become sources of conflict. Recent COPs show governments and industry moving from pledges toward real funding and infrastructure, even as core equity disputes remain unresolved.

Nationally Determined Contributions (NDCs) communicate each country's plans for addressing climate change. NDCs may include industrial energy-efficiency standards, emissions-trading systems, renewable-energy targets, or support for cleaner steel and cement. However, many NDCs do not provide detailed plans for transforming individual manufacturing sectors.

THE GREEN MANUFACTURING TOOLKIT

Demand reduction, material efficiency, circular economy, energy efficiency, cleaner energy and materials, and carbon capture, utilization, and storage (CCUS) together map out how manufacturing could reach net zero. However, it is important to understand what these strategies look like on a factory floor. Four frequently discussed approaches are green hydrogen, electrification, circular economy design, and carbon capture. Together, they form what negotiators often call the green manufacturing toolkit.

Green hydrogen replaces the coal and natural gas that power the hottest, dirtiest parts of manufacturing. Ordinary hydrogen is not new to industry. Refineries and fertilizer plants have used it for decades. The problem is that most hydrogen currently used by industry is produced from fossil fuels. Producing this conventional hydrogen releases substantial greenhouse gas emissions before the hydrogen is used.[140] Green hydrogen instead comes from electrolysis, a process that uses renewable energy to split water into hydrogen and oxygen. This process leaves no direct emissions behind.[141]

This matters most for steel, where hydrogen can replace cooking coal as the chemical agent that strips oxygen from the iron ore. Sweden's HYBRIT project, a joint venture between steelmaker SSAB, miner LKAB, and utility Vattenfall, delivered the world's first hydrogen-reduced steel to a commercial customer in 2021. The venture is scaling toward 2.7 million tons of fossil-free sponge iron a year by 2030.[142] Success there could cut Sweden's total national carbon emissions by roughly 10 percent on its own.[143] Yet green hydrogen remains expensive. Producing it today costs 1.5 to 6 times more than making hydrogen from fossil fuels. Additionally, global electrolyzer capacity is growing quickly but still supplied less than one percent of hydrogen demand in 2023.[144] Green hydrogen may therefore be most valuable in sectors where direct electrification is difficult, although its future role will depend on costs, infrastructure, and access to renewable electricity.

Electrification swaps fossil-fueled furnaces and boilers for electric ones. This is done particularly through industrial heat pumps and electric boilers. For example, in food processing plants, steam is used to pasteurize milk, sterilize

Green hydrogen remains expensive. Producing it today costs 1.5 to 6 times more than making hydrogen from fossil fuels

canned foods, and clean equipment. Traditionally, this steam is produced by gas-fired boilers. Electrification replaces these with electric boilers or industrial heat pumps, allowing the facility to generate the necessary heat without burning fossil fuels. Though it sounds simple, roughly 70 percent of the energy used in manufacturing goes toward process heat. Much of this heat has historically required burning fuel directly on-site.[145]

Nonetheless, electrification only cuts emissions if the electricity feeding it is clean. This ties electrification closely to the broader renewable energy transition. Industrial heat pumps can now deliver heat up to 150°C, and electric boilers can reach steam temperatures of 350°C. This covers a large share of manufacturing's actual heat needs.[146] The European Union has built electrification directly into its industrial policy. The EU aims to raise the economy-wide electrification rate to 32 percent by 2030. This is detailed under the EU's Clean Industrial Deal and related energy policies.[147] This technology, unlike hydrogen, is largely available today. Its adoption is primarily limited by cost, electrical-grid capacity and infrastructure. High upfront capital costs, slow grid connections, and unfavorable electricity-to-gas price ratios in many countries make adoption challenging or impossible.[148] For manufacturers in developing countries, electricity can be unavailable, expensive and unreliable. This is less a technology gap and more an infrastructure and financing gap.

A circular economy addresses how products and materials are designed, used, recovered, and reused. The Ellen MacArthur Foundation is one of the concept's most influential advocates. It defines a circular economy as a system built on three principles: eliminating waste and pollution, keeping products and materials in use for as long as possible, and regenerating natural systems.[149] In manufacturing terms, this means designing products that can be repaired, refurbished, or fully recycled, instead of products built to be replaced. Recycling steel can reduce demand for newly mined iron ore and generally requires less energy than producing steel entirely from raw materials.[150] The IPCC folds the same logic into its own framework. It argues that material efficiency and circular practices can do work that energy efficiency alone cannot. This is due to industrial output currently growing faster than efficiency gains can offset it.[151] Some circular-economy strategies may cost less than constructing entirely new energy or carbon-capture systems, although redesigning products and supply chains can still require substantial investment. They rely more on redesigning supply chains and business models than on large-scale technological changes. This is part of why UNIDO's Global Eco-Industrial Parks Programme focuses so heavily on sharing waste, water, and energy between neighboring factories.[152]

CCUS is the toolkit's most controversial member. Rather than avoiding emissions, CCUS traps carbon dioxide after it forms, typically at the smokestack, and either buries it underground or repurposes it for industrial use. This matters enormously for cement. Roughly 60 percent of cement-related emissions come not from burning fuel but from the chemical reaction that turns limestone into clinker. Because these emissions result from a chemical reaction rather than fuel combustion, they cannot be eliminated simply by switching to renewable energy.[153] CCUS is one important option, alongside measures such as reducing clinker use, developing alternative materials, and decreasing demand for new cement.

Global capture and storage capacity passed 50 million tons of CO_2 per year in early 2025. Additional announced projects could greatly expand capacity by 2030, although not every proposed facility will necessarily be completed.[154] China recently brought online the world's first CCUS project built specifically for a cement plant, and Norway's Brevik facility is set to become the largest cement sector capture project in the world.[155] Even so, CCUS carries real risks for the equity debate. Roughly 80 percent of the capture capacity expected to be operating in 2030 is located in North America and Europe.

This means the countries best positioned to deploy this technology are, again, the ones that industrialized first.[156] Critics also warn that CCUS can become a justification for continuing to build fossil-fueled plants rather than replacing them, since the technology promises to clean up emissions rather than preventing them.

No single approach can eliminate all industrial emissions. Green hydrogen and electrification require abundant clean electricity, circular practices can reduce demand for new production, and carbon capture may address some emissions that remain difficult to avoid. The appropriate combination will differ by country and industry.

EQUITY AND TECHNOLOGY TRANSFER

Green manufacturing technologies are not equally available to every country. Green hydrogen, industrial electrification, circular economy redesign, and carbon capture all demand large amounts of upfront capital, skilled researchers, strong adaptation policies, and infrastructure that already-industrialized states built up over more than a century. Developing countries are expected to industrialize using tools that may remain expensive, difficult to access, or unproven in particular industries and national contexts, while competing against economies that industrialized first and that still dominate global manufacturing output today. This gap sits at the center of nearly every conflict inside the UNFCCC process. It is also written directly into the language of the Sustainable Development Goals (SDGs).

Sustainable Development Goal 9 calls for resilient infrastructure, inclusive and sustainable industrialization, and innovation. Target 9.4 encourages countries to upgrade infrastructure and adopt cleaner industrial technologies according to their respective capabilities.[157] Other targets call for stronger research capacity and support for domestic technology development in developing countries.[158] Together, these targets recognize that cleaner manufacturing requires more than setting emissions goals. Countries also need infrastructure, skills, research institutions, and access to technology.

The gap is stark in the most recent SDG reporting. In 2024, manufacturing value added per capita in Europe and Northern America reached a record USD 4,986. Meanwhile, the same figure sat at just USD 163 in Sub-Saharan Africa and the least developed countries.[159] Medium- and high-technology manufacturing is the kind of production that tends to pay for its own research and adopt cleaner processes fastest. It made up roughly 46 to 48 percent of manufacturing value added in developed countries. On the other hand, it only accounted for 16 to 18 percent across Sub-Saharan Africa.[160] Research capacity tells a similar story. Wealthy economies employ thousands of researchers per million people, while many developing regions employ closer to a hundred.[161] Meanwhile, the emissions these gaps are meant to address keep climbing rather than falling. Global carbon dioxide emissions from fuel combustion and industrial processes hit a record 37.6 gigatons in 2024, up 0.8 percent from the year before and 8.3 percent since 2015.[162] Even as individual factories become

Even as individual factories become less carbon-intensive per unit of output, total industrial emissions keep increasing

less carbon-intensive per unit of output, total industrial emissions keep increasing. Much of the growth still to come is expected to happen in developing economies that have not fully industrialized.

Financing has not closed this distance. The Climate Policy Initiative's annual Global Landscape of Climate Finance tracks climate-related financial flows and has repeatedly found that total climate finance remains far below estimated global needs.[163] However, only part of this total concerns manufacturing because climate finance must also support energy, transportation, agriculture, adaptation, and other priorities. The money that does flow is unevenly distributed in ways that matter directly for green manufacturing. Finance leans heavily toward mitigation over adaptation. Within mitigation, it leans toward energy generation and transport rather than industry itself.[164] It also leans toward the wealthier and a handful of large emerging economies. Private capital in particular is concentrated in markets that already look profitable. This leaves many developing countries underfunded relative to their climate and development needs.[165] As a result, potentially viable industrial projects may not proceed because governments and businesses cannot obtain affordable financing.

The Green Climate Fund is one institution designed to address this financing gap. Established in 2010 as part of the UNFCCC's financial mechanism, it provides grants, concessional loans, guarantees, and equity investments for projects in developing countries.[166] It funds projects in areas including buildings, cities, industries, and appliances, making it a possible source of support for green manufacturing.[167] However, the Fund must divide limited resources across mitigation and adaptation priorities, and its available financing remains much smaller than developing countries' total needs.

Taken together, these frameworks describe a structural imbalance rather than a simple funding shortfall. Developed economies built their industrial base first, largely through fossil-fuel-intensive production and before modern climate regulations existed. These countries now hold the manufacturing value, research capacity, and patents that the green manufacturing toolkit depends on. Developing economies are expected to industrialize cleanly using tools that are frequently developed, patented, or controlled elsewhere. They are financed by flows that consistently fall short of demonstrated need. Bodies like the Green Climate Fund and mechanisms like the Paris Agreement's Technology Mechanism exist precisely because that imbalance was written into the SDGs and the UNFCCC from the start. Any resolution that proposes new green manufacturing standards, incentives, or reporting requirements will eventually have to answer who pays for developing countries to meet them, and on what timeline.

Current Status

CASE STUDY: THE EU'S GREEN INDUSTRIAL TRANSITION

Industrial emissions remain difficult to reduce because global demand for steel, cement, chemicals, plastics, and other materials continues to grow. Although investment in low-carbon industrial technologies has increased, most commercial projects remain concentrated in countries with substantial public funding, reliable infrastructure, and access to affordable clean energy. Many announced hydrogen, carbon-capture, and low-carbon steel projects have not yet reached full operation. Meanwhile, developing countries face pressure to expand manufacturing and employment while avoiding the high-emissions development paths previously followed by wealthier states. Current negotiations, therefore, focus not only on which technologies work, but also on how to finance them, measure their emissions reductions, and distribute their

costs.

The European Union provides one of the clearest tests of whether the green manufacturing toolkit can be translated into binding policy. Its European Climate Law requires a reduction of at least 55 percent in net greenhouse gas emissions by 2030, compared with 1990 levels, and climate neutrality by 2050.[168] To support this goal, the Fit for 55 package strengthens the EU Emissions Trading System and expands renewable-energy and efficiency requirements.[169] These policies demonstrate how climate targets can be incorporated into domestic law, but they also impose costs on industries, workers, and consumers.

The broader European Green Deal also includes industrial policies intended to expand domestic production of solar panels, batteries, electrolyzers, and other low-carbon technologies.[170] The Green Deal Industrial Plan and Net-Zero Industry Act seek to simplify regulation, expand financing, train workers, and strengthen access to critical raw materials.[171] These policies reflect a concern that Europe could adopt ambitious climate requirements while becoming dependent on foreign manufacturers for the technology needed to meet them.

The EU and its member states have offered billions of euros in public support for hydrogen, low-carbon steel, batteries, and other industrial projects. Companies including Thyssenkrupp, ArcelorMittal, and Swedish steel producers have announced plans for hydrogen-based production.[172] These investments demonstrate the scale of public support that may be required before low-carbon heavy industry becomes commercially competitive.[173]

These projects have also encountered serious difficulties. High electricity prices, expensive hydrogen, slow infrastructure development, and policy uncertainty have caused some companies to delay or cancel planned investments.[174] In 2025, for example, ArcelorMittal cancelled a subsidized hydrogen-based steel project in Germany.[175] Such decisions raise questions about whether public subsidies can guarantee lasting industrial transformation and whether European companies will instead move energy-intensive stages of production to countries with cheaper renewable power.[176]

The EU's Carbon Border Adjustment Mechanism is its most internationally controversial policy. After a transitional reporting period, its definitive system began in 2026. Importers of covered

Blast furnace 5 in the Landschaftspark Duisburg-Nord, Duisburg, North Rhine-Westphalia, Germany

Credit: Dietmar Rabich

products must account for the emissions embedded in those goods and purchase corresponding certificates.[177] The EU argues that CBAM prevents companies from moving production to jurisdictions with weaker climate policies. Many trading partners respond that it imposes European rules on foreign producers and may restrict developing-country exports before affordable clean alternatives are available.[178]

The results of the EU's approach remain contested. Emissions from European heavy industry have fallen substantially since 1990, but some of this progress has been offset by emissions embedded in imported goods.[179] European manufacturers also face higher energy costs than many competitors in the United States and China.[180] The EU must therefore balance three goals: reducing emissions, maintaining industrial competitiveness, and preventing production from simply moving abroad.[181]

The EU's experience matters beyond its own borders because its policies directly affect foreign manufacturers seeking access to the European market. Its combination of emissions targets, carbon pricing, industrial subsidies, and border measures demonstrates both the possibilities and controversies of an ambitious green industrial strategy. It also raises a central question for COP: whether similar rules should be coordinated internationally or remain under the control of individual importing markets.

CASE STUDY: CHINA'S DUAL ROLE AS INDUSTRIAL POLLUTER AND GREEN TECH LEADER

China is simultaneously the world's largest annual greenhouse gas emitter, a major producer and consumer of coal, and the largest manufacturer of several clean-energy technologies.[182] Its policies therefore demonstrate how industrial growth can expand both fossil-fuel use and the production of technologies needed for decarbonization.

China currently accounts for roughly a third of global carbon dioxide emissions, while coal still supplies half of its primary energy mix.[183] China's provincial governments approved almost 100 gigawatts of new coal-fired power capacity in 2024 alone. This is the largest single-year expansion in a decade, driven largely by concerns over energy security.[184] New coal plant construction activity slowed in 2025, but China and India together still accounted for the overwhelming majority of all new coal plant proposals worldwide.[185] A newer and more specific problem has emerged alongside this. Research from the Centre for Research on Energy and Clean Air found that as China cleans up its wealthy eastern coastal cities, heavy industry is relocating west into provinces like Xinjiang and Guangxi. Researchers have reported rising emissions or pollution in some inland industrial regions, even as conditions improve elsewhere.[186] In other words, China's environmental progress in its most visible cities has partly come from moving the dirtiest manufacturing somewhere less visible. This is a domestic version of the same carbon leakage

China's provincial governments approved almost 100 gigawatts of new coal-fired power capacity in 2024 alone

Wind farm in Guangling County, Shanxi

Credit: Hahaheditor12667

problem the European CBAM is meant to solve internationally.

However, China spent more than twice as much on its green energy transition in 2023 as any other country in the world. That investment made it the dominant global supplier of green technologies discussed in the green manufacturing toolkit.[187] Chinese firms control roughly 60 percent of the global electric vehicle battery market, and China is home to the single largest green hydrogen project on the planet, while also hosting roughly 40 percent of the world's hydrogen refueling stations.[188] In 2023, China installed more solar photovoltaic capacity in a single year than the entire world installed the year before. It also built three-quarters of all the new wind farms constructed globally that year.[189] This scale of manufacturing has done something the international frameworks discussed earlier in this guide have struggled to achieve on their own. They have driven down the global price of solar panels and EVs, making them more accessible to developing countries that could never have afforded to develop this technology domestically. Chinese-made solar equipment now lights rural communities in Zimbabwe.[190]

China's domestic solar, battery, and EV industries have grown so large and are so heavily subsidized, that they now produce more than China's own market can absorb at current prices. The European Union has observed this pattern before. A flood of cheap, subsidized Chinese solar panels in the early 2010s is widely credited with wiping out much of Europe's solar manufacturing base. EU officials have said they do not want the same fate for their automotive industry. In October 2024, the European Commission imposed final tariffs of up to 35.3 percent on Chinese-made electric vehicles. This followed an investigation the Commission launched on its own initiative, rather than in response to a complaint from European carmakers. However, China opened anti-dumping investigations into European brandy, pork, and dairy exports. It also filed a formal challenge to the EU's duties at the WTO in November 2024. The dispute captures a genuine tension in the green manufacturing debate. The same Chinese scale that makes solar panels and EVs more affordable has also produced accusations that heavily subsidized exports are undercutting competitors. Supporters emphasize lower prices and faster clean-technology deployment, while

critics warn that domestic producers elsewhere may be unable to compete.

This dual identity creates a complex negotiating position for China inside the UNFCCC process. As the world's largest current annual emitter, China faces enormous pressure to accept binding emissions cuts similar to those other states have already pledged. Yet, under the CBDR principle, China has historically negotiated as a developing country. It argues that its per-person emissions and per-person wealth remain well below those of the United States or the European Union, even as its total emissions surpass both.[191] At the same time, China's manufacturing dominance in solar, batteries, and EVs means it now behaves less like a country waiting for green technology transfer and more like the source of that transfer for everyone else. Its exports and overseas investments have made China an important source of clean technology for other developing countries, although these commercial relationships are separate from the UNFCCC's formal Technology Mechanism. This makes China simultaneously the country other developing states point to when arguing they should be allowed more time to industrialize, and also the country developed nations point to when arguing that rapid, cost-competitive green manufacturing is already achievable at a large scale.

China's trajectory is less a settled case study than a live and unresolved argument. It indicates that a country does not need to choose cleanly between industrial polluters and green technology leaders. It can be both at once, and the resulting tension shapes nearly every position China stakes out in COP negotiations.

EMERGING PRODUCTION AND SUPPLY-CHAIN PRACTICES

Nearshoring means relocating production closer to the market it ultimately serves, rather than continuing to ship components and finished goods across oceans. It represents a direct reversal of the offshoring model that has defined global manufacturing since the mid-20th century. The environmental case for reversing the model depends on the product, transportation method, and energy used at the new production site. A garment manufactured in Cambodia and sold in Europe can travel more than 60,000 kilometers before it reaches a customer. That is one and a half times the circumference of the Earth.[192] Shortening that distance cuts transport emissions directly if production methods and energy sources remain comparable. However, moving a factory closer to consumers could increase total emissions if the new location relies on more carbon-intensive energy or less efficient production. Industry surveys suggest the shift is underway. The environmental benefit is not the only driver. Nearshoring also improves supply chain transparency, making it easier for buyers to verify labor standards and environmental compliance at factories they can actually visit. It also improves resilience against the kind of shipping disruptions that exposed the fragility of long global supply chains during recent years.[193] For manufacturing policy specifically, nearshoring interacts directly with the equity debate. It can pull production and jobs out of developing countries that currently depend on serving distant export markets, even as it lowers the emissions of the goods those markets consume.

The second major shift is digitalization. This is often bundled together under the label Industry 4.0. It refers to the fusion of sensors, data, automation, and artificial intelligence inside factories themselves. Potential benefits include better coordination between factory departments, tighter integration with suppliers, and real-time monitoring that lets a factory identify energy waste or material loss as it happens, rather than discovering it in a quarterly report.[194] This connects directly to the material efficiency and energy efficiency strategies in the IPCC's framework. Digitalization works as the connective tissue that makes the six strategies easier to measure, verify, and improve continuously.

A third shift is turning that same digital

infrastructure into a formal condition of market access rather than a voluntary best practice. The European Union's Ecodesign for Sustainable Products Regulation is introducing a Digital Product Passport. It is a machine-readable record that documents a product's materials, carbon footprint, and recyclability across its entire lifecycle.[195] Batteries are the first test case. From February 2027, every electric vehicle, light transport, and industrial battery above 2 kilowatt-hours sold in the EU must carry a passport recording its raw material sourcing, carbon footprint per manufacturing plant, recycled content, and end-of-life handling. The requirement applies to any manufacturer selling into the European market, regardless of where the battery was actually produced.[196] Regulators intend to extend the same passport requirement to textiles, furniture, electronics, and construction materials once they have enough feedback from the battery rollout. For manufacturers, this converts what the IPCC calls material efficiency and circular economy strategy into a literal condition of market access. It depends entirely on the same sensors, data standards, and verified reporting driving the wider Industry 4.0 shift.

Some digital tools can be adopted more quickly than major hydrogen or carbon-capture infrastructure, but their cost and accessibility vary widely. Nearshoring may require the construction of entirely new facilities and supply chains, but unlike hydrogen or carbon-capture technology, it requires no new invention, just a change in sourcing decisions. Industrial digitalization relies on software and sensors that already exist and continue to drop in costs. These practices could create opportunities for some developing economies who cannot yet afford the other technologies. Whether that potential translates into real adoption, however, still depends heavily on the financing and technology-transfer questions. Even inexpensive digital tools require reliable electricity, internet infrastructure, and technical training that remain unevenly distributed around the world.

Bloc Analysis

POINTS OF DIVISION

Every position in this committee traces back to one underlying fact: countries are not being asked to do the same thing. Countries that finished industrializing in the last century face different choices than countries trying to build their first steel mill today.[197] Moreover, the green manufacturing toolkit costs different amounts of money and carries different risks depending on which side of the divide a country sits on. There are no clean ideological camps built around climate belief versus climate denial. On the contrary, almost every state in the UNFCCC accepts that industrial emissions must fall. Nigeria, for instance, has submitted a long-term low-emissions development strategy to the UN. Although the strategy supports industrial decarbonization, it also examines the potential economic costs and emphasizes the need for international finance and technology.[198] The disagreement lies in who pays for that fall, how fast it happens, and whether the rules governing it are written by the countries who already built their economies burning fossil fuels, or by everyone at once.

The five blocs emerge from two related points of division. The first concerns whether importing countries should use trade measures to encourage industrial decarbonization. The second concerns how quickly developing exporters should be expected to adopt cleaner manufacturing systems and what financial or technological support they should receive. Countries that import large volumes of steel, cement, and other carbon-intensive goods have an interest in pricing carbon at the border. Doing so protects their own manufacturers from cheaper, dirtier competition abroad. Not every importer, however, wants to pay that price the same way. The EU, for example, is willing to accept the diplomatic friction and higher consumer costs that come with pricing carbon at the border, in order to keep its own domestic

carbon pricing meaningful.[199] The United States sees that same tool very differently. It has no federal carbon price of its own and has instead relied on blanket tariffs, including a 25 percent levy on imported steel and aluminium. Unlike CBAM, these tariffs do not vary according to the emissions produced while manufacturing a particular good. This approach therefore protects domestic industry without establishing a common method of carbon accounting.[200] This disagreement divides importers into two blocs. Green-first importers support linking market access to the carbon intensity of imported goods. Cost-conscious importers may still protect domestic manufacturing, but they prioritize affordability, competitiveness, and energy security over carbon-based trade requirements.

A second fault line runs through the exporting countries. It does not track neatly with income level. Exporters disagree over whether strict green standards primarily threaten existing industries, create opportunities to build new industries, or impose costs that poorer economies cannot yet absorb. These differences produce the final three blocs. Some of the world's largest manufacturing exporters view rapid, externally imposed decarbonization rules as a threat to hard-earned markets. India, Brazil, South Africa, and China have organized diplomatically to resist them. They issued a joint BASIC statement calling carbon border measures discriminatory. India's government even called CBAM a straightforward trade barrier and weighed a formal WTO challenge.[201] But other developing economies see the green transition as their best chance to build a manufacturing base for the first time. Morocco lacks the coal reserves or legacy steel industry that might push it towards conventional industrialization. It has instead committed 35 billion USD to green hydrogen development and co-founded the African Green Hydrogen Alliance. This pact also includes Kenya, Namibia, Mauritania, Egypt, and South Africa. South Africa's participation illustrates why these blocs are not fixed alliances. It may oppose unilateral carbon border measures as an established exporter while also supporting international investment in new green industries through its role in the African Green Hydrogen Alliance, which was created specifically to attract capital and technology transfer before wealthier competitors lock up the same resources.[202]

Finally, there is a distinction among developing countries. Some developing countries view green manufacturing as an immediate industrial opportunity, while others believe that energy access, employment, and poverty reduction must take priority until sufficient international support becomes available. Vietnam illustrates this directly. It has pledged net-zero emissions by 2050, but its own climate targets have been rated critically insufficient by independent trackers. Sustaining its goal of 6 to 7.5 percent annual GDP growth requires roughly 10 percent annual growth in power generation. This growth cannot be provided by clean capacity just yet.[203] Bangladesh, for instance, carries per-capita emissions below the least-developed country average. However, it frames its own climate pledges as dependent on international finance it has not yet received.[204] These countries frequently base their position on a historical grievance: the countries asking them to industrialize cleanly are the same countries that industrialized dirtily. They are still, in absolute terms, far richer for it.

The five blocs are not fixed alliances with formal membership. Instead, they represent five recurring approaches to trade rules, industrial development, climate finance, and technology transfer. A country may align with one bloc when discussing carbon border measures but support another bloc's position when negotiating green hydrogen finance or technology access. Delegates should therefore identify their country's priorities on each proposal rather than treating these blocs as permanent coalitions.

GREEN-FIRST IMPORTERS

This bloc is composed of wealthy, industrialized countries. These countries import significant volumes of carbon-intensive goods. They have chosen to use that import demand as leverage for global decarbonization, even when doing so raises costs at home. They believe that manufacturers should face comparable climate expectations regardless of where their products are made.

The European Union is this bloc's clearest example. Its Carbon Border Adjustment Mechanism entered its definitive regime as of January 2026. It requires importers of steel, cement, aluminum, fertilizers, electricity, and hydrogen to purchase certificates matching the embedded carbon in those goods. The EU has moved to expand rather than retreat from this policy. It has taken steps to extend its scope to downstream products in mid-2026 despite sustained diplomatic pushback.[205] The EU has paired this with the Green Deal Industrial Plan and Net-Zero Industry Act. It is explicitly trying to keep green manufacturing capacity inside its own borders, instead of outsourcing emissions elsewhere.[206]

Countries in this bloc generally argue that carbon pricing at the border is the only way to make ambitious domestic climate law meaningful. Without it, industries facing a real carbon price at home would be undercut by imports made without any carbon price. Their central negotiating priority at COP is defending this kind of trade-linked climate policy against accusations that it serves as protectionism in disguise. Some members also support technical assistance to help developing-country exporters measure emissions and comply with new standards.[207] However, delegates will disagree over whether compliance assistance is sufficient or whether affected countries should also receive direct financial and technological support to decarbonize production.

Delegates in this bloc may support common methods for calculating embedded emissions, international reporting standards, green public procurement, carbon pricing, and financial assistance that helps exporters meet stricter market requirements.

COST-CONSCIOUS IMPORTERS

This bloc also imports large volumes of carbon-intensive manufactured goods. However, its members are more reluctant to use carbon pricing or detailed emissions accounting as conditions of market access. They place greater emphasis on affordable energy, domestic industrial competitiveness, supply-chain security, and voluntary incentives for cleaner production. The United States provides the clearest example of this bloc. It has no federal carbon price of its own. American exporters may therefore face foreign carbon-border requirements without receiving credit for a comparable national carbon price, although some individual US policies and production methods may still reduce industrial emissions. This is a real friction in transatlantic trade talks.[208] Instead of building a carbon border mechanism, the United States has relied on blanket tariffs. These include a 25 percent tariff on imported steel and aluminium, that applies regardless of the carbon intensity of production.[209] This reflects a broader posture common to this bloc.

Protecting domestic manufacturing and energy affordability is treated as the more urgent priority. Emissions-based trade tools are often viewed skeptically as legally questionable under WTO rules and administratively harsh for industry.[210] Countries in this bloc are not opposed to green manufacturing outright. However, they resist allowing importers who already have a domestic carbon price to dictate the global trade rules. They are also likely to resist any COP-level effort to formalize carbon border adjustments as a global standard. Instead, they may favor tax incentives, research funding, domestic manufacturing subsidies, voluntary industry commitments, or agreements focused on

particular sectors such as steel and cement.

ESTABLISHED EXPORTERS SEEKING AN EQUITABLE TRANSITION

This bloc consists of large, already industrialized developing countries. Its members generally support industrial decarbonization but oppose timelines and trade requirements they believe were designed without sufficient consideration of developing-country circumstances. They have substantial manufacturing sectors to protect, and they have organized some of the most coordinated opposition to rapid, externally imposed decarbonization rules seen at recent COPs.

India, Brazil, South Africa, and China often negotiate together under the BASIC grouping, although their national industries and preferred climate policies differ substantially. They issued a joint statement as early as 2021, calling carbon border measures discriminatory and a violation of equity and common but differentiated responsibilities.[211] India's government has gone furthest. It called CBAM a straightforward trade barrier and weighed a formal challenge at the World Trade Organization. It also rejected European proposals that it simply increase its own domestic carbon tax to offset the mechanism's impact.[212] South Africa has raised similar objections, describing CBAM as a unilateral measure that ignores the needs of developing economies. Analysis from the UN Conference on Trade and Development estimates that India, Brazil, South Africa, and Indonesia combined could face export losses up to 5.6 billion USD a year from carbon border measures.[213]

These countries are not rejecting green manufacturing as a goal. Several, Brazil in particular, are simultaneously investing heavily in clean industrial capacity. What unites this bloc is a shared insistence that the pace and rules of decarbonization should be negotiated multilaterally instead of being imposed by importer blocs. There is also a shared fear that rapid compliance costs could undercut the export industries their economies depend on before cleaner alternatives are commercially ready.

Delegates in this bloc may support multilaterally negotiated emissions standards, longer transition periods, exemptions or special treatment for developing countries, recognition of national circumstances, and direct financing to help exporters adopt cleaner production methods. They may also argue that revenues collected through carbon border measures should be returned to affected developing countries rather than retained by importing states.

GREEN-FIRST EMERGING MANUFACTURERS

This bloc consists of developing economies with smaller or less entrenched carbon-intensive industrial sectors. Many have chosen to treat green manufacturing as a possible path into industrialization. Morocco is a clear example. Lacking coal reserves or a legacy steel industry, it has instead committed USD 35 billion to green

They issued a joint statement as early as 2021, calling carbon border measures discriminatory and a violation of equity and common but differentiated responsibilities.

hydrogen development. By utilizing its world-class solar and wind resources, Morocco aims to capture roughly 4 percent of global hydrogen demand by 2030, leveraging its proximity to European export markets.[214] Morocco co-founded the African Green Hydrogen Alliance alongside Mauritania, Namibia, Egypt, South Africa, and Kenya, a coalition explicitly built to pool resources and negotiate leverage around clean industrial development.[215]

Kenya's own Green Hydrogen Strategy aims to replace a fifth of the country's fertilizer imports with domestically produced green ammonia by 2027. On the other hand, Namibia's Green Industrialization Blueprint envisions an entire integrated renewable hydrogen and ammonia industry built around coastline and wind resources.[216] What distinguishes this bloc from Established Exporters is the absence of an existing industrial base. Because they have fewer older, carbon-intensive facilities to replace, some may be able to build cleaner industries from the beginning. However, they still risk becoming dependent on foreign investors, imported technology, and demand from wealthier markets. At the same time, they have more to gain from being early suppliers of clean industrial inputs to markets like the EU. Their main negotiating priority lies in ensuring the finance and technology transfer mechanisms actually reach them, before larger and more resourceful competitors seize the same opportunity.

Unlike Growth-First Emerging Manufacturers, these countries generally view climate requirements as a potential source of investment and market access rather than primarily as a constraint on development. However, their support remains conditional on receiving financing, infrastructure, training, and access to technology. This bloc may support concessional financing, regional green-industrial hubs, shared research programs, local workforce requirements, guarantees for early-stage projects, and trade agreements that provide reliable markets for green hydrogen, ammonia, steel, or other low-carbon products.

GROWTH-FIRST EMERGING MANUFACTURERS

This bloc is composed of developing and least-developed countries that have prioritized industrial growth, energy access, and poverty reduction. Its members do not necessarily reject green manufacturing, but they argue that rapid decarbonization cannot come at the expense of reliable electricity, employment, food security, or basic development needs.

Vietnam illustrates this clearly. It has pledged net-zero emissions by 2050 and joined the Global Coal to Clean Power Transition Statement. However, its energy sector still accounts for 60 percent of national emissions. Independent climate trackers have rated Vietnam's current targets as insufficient to meet global temperature goals, although Vietnam maintains that its transition depends on international support and continued economic development. This is because the government's ambition to become a high-income country by 2045 depends on sustaining 6 to 7.5 percent annual GDP growth, requiring roughly 10 percent annual growth in power generation that current clean capacity cannot fully supply.[217]

Nigeria presents a similar pattern, but from a different angle. Its own long-term low-emissions strategy recognizes that shifting its industrial sector away from gas and oil could impose substantial economic costs without sufficient external support.[218] Bangladesh distinguishes between actions it can undertake with domestic resources and more ambitious actions that depend on international finance, technology transfer, and capacity-building. Its emissions may continue to rise as industrialization and urbanization expand, even while its emissions per person remain comparatively low.[219]

What unites this bloc is not indifference to climate change. Many members face severe and immediate climate risk. However, they argue that the finance and technology gap is too large for them to meet binding, accelerated

decarbonization mandates. Without substantial support, they warn that such requirements could restrict industrial development, raise energy costs, and deepen poverty rather than producing a just transition.

This bloc may support conditional emissions targets, flexible timelines, grants rather than additional debt, expanded energy access, workforce development, and technology-sharing arrangements that build domestic manufacturing capacity. Its members may also resist sanctions, carbon border charges, or reporting requirements that could exclude smaller producers from international markets.

Committee Mission

The United Nations Framework Convention on Climate Change Conference of the Parties, commonly known as COP, is the annual gathering of every state party to the UNFCCC. It is also the supreme decision-making body of the UNFCCC.[220] It is not a permanent legislative body, so it does not possess independent enforcement authority. It is instead the world's principal forum for negotiating how countries will act together on climate change. It translates scientific findings from bodies like the IPCC into political commitments, financial mechanisms, and international agreements such as the Kyoto Protocol and the Paris Agreement.[221] COP does not write domestic law for any country, and it cannot force a state to industrialize one way or another. What it can do is negotiate shared goals, create the financial and technological channels that make those targets more achievable, and review collective progress toward the commitments they make.[222]

Green manufacturing sits at the center of what COP was built to negotiate. Industry is the second largest source of direct global emissions. Unlike energy generation, it cannot simply switch to a single clean alternative. It requires new materials, new processes, and new supply chains built up over decades.[223] This makes industrial decarbonization one of the hardest problems on the COP agenda. It also exposes deep disagreements between wealthy industrialized states and developing countries. Existing tools, including climate finance, technology cooperation, capacity-building, NDCs, and transparency mechanisms, can help address this uneven transition.[224] COP's task is not simply to restate that industrial emissions must decline. Delegates must consider who finances that transition, how quickly it happens, and whether the rules are written collectively or imposed on individual countries or regional organizations.

COP cannot mandate that a specific factory adopt a specific technology, and it cannot overrule a country's sovereign right to pursue its own development path. What it can do is shape the incentives, financing structures, and international norms that make one path more attractive than another. Delegates should treat proposals accordingly. A resolution that simply repeats an emissions target does little that the Paris Agreement has not already done. A resolution that strengthens access to the Green Climate Fund, clarifies how technology transfer actually reaches developing-country industries, or creates shared standards for emissions reporting and international cooperation uses this committee for what it is actually equipped to do. Delegates are encouraged to consider historical responsibility while also developing practical mechanisms for reducing future emissions, focusing on which mechanisms this committee can strengthen to make a cleaner industrial transition possible for every country at once.[225]

Research and Preparation Questions

Your dais has prepared the following research and preparation questions as a means of providing guidance for your research process. These questions should be carefully considered, as they embody some of the main critical thought and learning objectives surrounding your topic.

TOPIC A

1. How wide is the gap between urban and rural energy access in your country? Which communities still lack electricity or clean cooking fuel?
2. Which fuels does your country rely on for power? How dependent is your country (and/or economy) on fossil fuels?
3. Does your country give climate finance, receive it, or both – and does it prefer grants, loans, or private investment?
4. Has your country taken part in efforts like the CDM, JETPs, Mission 300, or deals with China, and what did those reveal about its priorities?
5. Do your country's NDCs and recent COP commitments address rural communities, or focus elsewhere?
6. Does your country treat rural energy access as a priority, or does it get sidelined by bigger goals like phasing out coal or expanding national grids?

TOPIC B

1. Should the countries that industrialized first, and produced most of history's emissions, bear a larger share of the cost of helping others industrialize cleanly? Where should that responsibility end?
2. Tools like CCUS (Carbon dioxide Capture, Utilization, and Storage) let heavy industry keep running while capturing emissions afterward, instead of preventing them in the first place. Is this a genuine bridge to a cleaner future, or a way to delay real change?
3. Clean technologies like green hydrogen and carbon capture cost a lot of money and require skills and equipment that many countries do not have yet. Should wealthier countries be required to share this technology? Is this about fairness, or about wealthier countries protecting their own advantage?
4. Nearshoring production can cut transport emissions, but it can also pull jobs and factories away from developing economies that depend on export manufacturing. How should countries weigh climate benefits against economic harm to others?
5. What kinds of solutions, funding, sharing technology, clearer rules for reporting emissions, could actually help make manufacturing cleaner around the world?

Important Documents

TOPIC A

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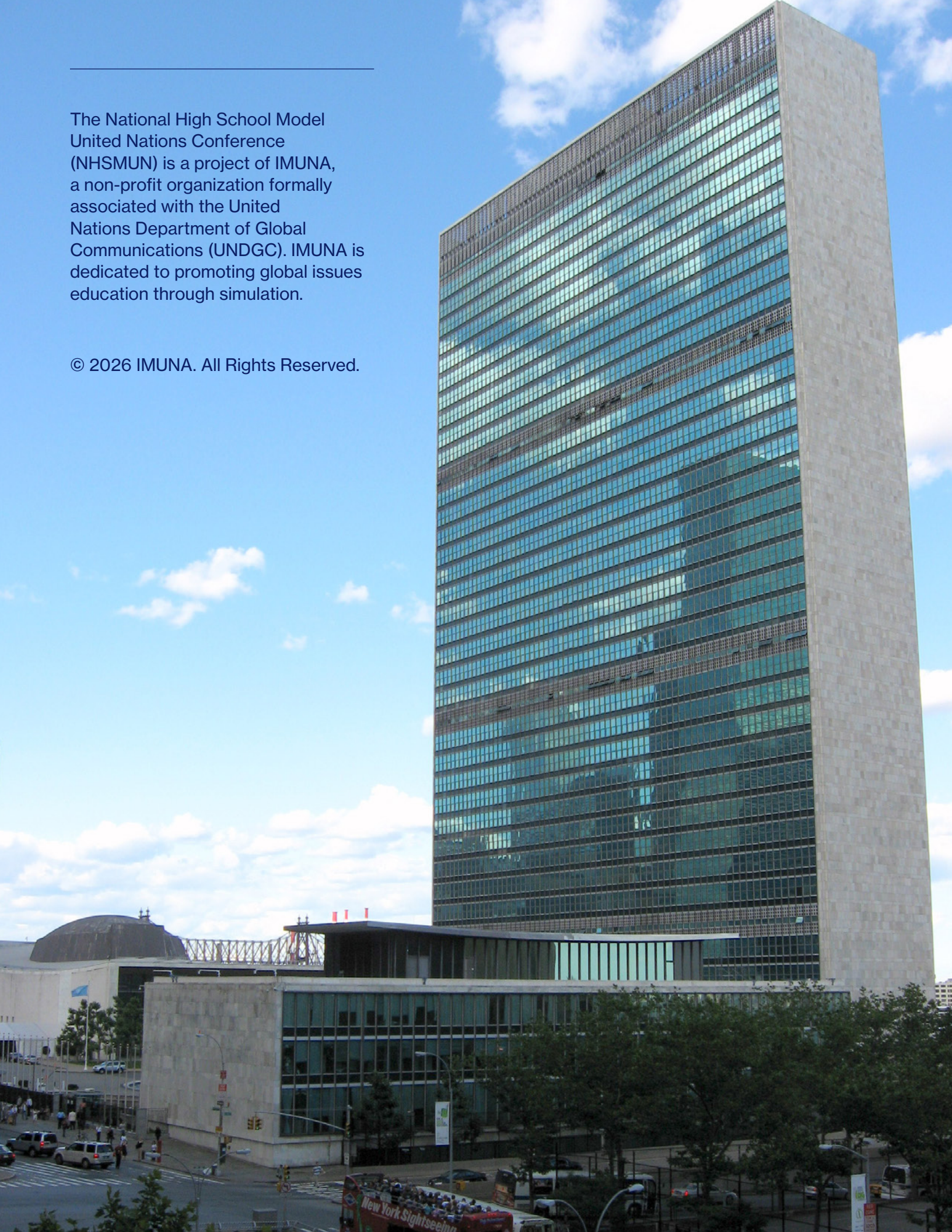
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