Forum: Group of Twenty (G20)

Issue: Developing investment and open innovation for bioeconomy and nature-based solutions to address climate challenges

Chair: Andrea Tseng Chen, Secretary

Introduction

Since the 19th century, when the world began to industrialize, the Earth has warmed approximately 1.1C - all living species are on the brink of extinction. 88% of the ocean's surface is littered of waste, one-third of the world's forest is lost, and over 6 billion people are dependent on the energy from fossil fuels. These worsening statistics call for an urgent international effort towards climate development, yet marine and land species continue to face the consequences of human apathy. The causes of climate change are detrimental to not only our environment, but to civilization as well. Without realizing that human activities are the single culprit to the climate crisis, air pollution and natural disasters would intensify, thus displacing millions of people and leaving many vulnerable to destitution.

While most high-income countries are responsible for the major factors of climate change, their economies are sufficient enough to provide resources to avoid the harm they inflict. However, coastal communities, like those of Bangladesh and Philippines, and low-income economies lack the financial capability to fund adaption costs. The scale of climate transition required to mitigate the effects of global warming in the next decade demands greater innovative actions than what is being implemented in the status quo.

To preserve our ecosystems and the health of all, the International Energy Agency (IEA) warns of the vital amount of decarbonization in order to achieve the Paris Agreement goals by 2030. However, such immediate change can only best be attained through investment in heavy research and development of technologies. Innovation in international partnerships and financial sectors is also critical to improve the effectiveness of technological solutions and lower energy costs. A low-carbon future will no doubt request great adjustments in human habits, but with the right support in the fields of institutional building and knowledge transfer, our planet will be restored.

Definition of Key Terms

Open Innovation

Collaborative effort where companies or organizations utilize expertise from external sources to develop innovative technologies

Nationally Determined Contribution (NDC)

Each party of the Paris Agreement is required to update an action plan to cut carbon emissions every five years

COP28

The United Nations Climate Change Conference, or COP, a climate summit convened every year

Small Island Developing States (SIDS)

Group of 58 low-lying coastal nations vulnerable to rising sea levels and marine pollution

Bioeconomy

Production of industrial materials/foods through the use of renewable energy, involving biological knowledge and science

Nature-based Solutions (NBS)

Sustainable approaches to preserve and restore ecosystems while addressing socio-environmental challenges

Net Zero

When carbon dioxide emissions released into atmosphere are balanced with emissions reduced

Fossil Fuels

Fuels formed from decomposing organisms, such as coal or oil, supplying majority of world energy demands

Greenhouse Gas (GHG)

A gas trapping heat in earth's atmosphere and absorbing infrared radiation from sunlight

1.5 Degrees

A climate policy suggested by the IPCC of limiting global warming to no more than 1.5 degrees, signed at Paris Agreement by all 196 countries

Carbon Footprint

Total amount of carbon dioxide emitted into the atmosphere by a person, company, or country

Renewable Energy

Energy derived from natural-replenishable sources like wind or water

Ocean Acidification

Decrease in pH level of the ocean due to human-induced carbon emissions

Deforestation

Forest clearance for the conversion into other land purposes

Marine Pollution

Harmful substances and debris washed into the ocean from land-based activities

Background Information

Greenhouse Gas Emissions

The Industrial Revolution introduced a whole new energy source, fossil fuels - a cheap and instant material that soon supplied 80% of the world's heat and electricity. As the market for fossil fuels doubles every year, the growth of climate challenges heightens to an extent that decides the health of our planet's future. The burning of fossil fuels, such as coal and natural gas, releases immense amounts of carbon dioxide (CO_2) into the atmosphere. While global energy consumption rates are rising higher every year, the finite amount of these natural resources are unable to be replenished and will eventually fail to meet the demands for energy.

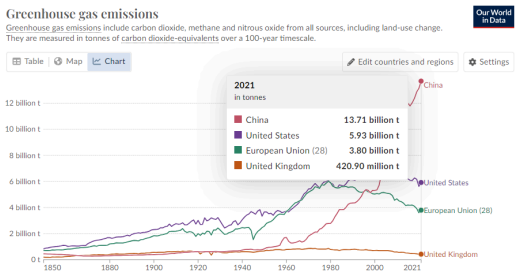

Figure #1: Annual greenhouse gas emissions by country

Land Degradation

The deterioration of the quality of land is caused by droughts and human-induced processes such as overgrazing or clearcutting. A primary result of land degradation is the loss of soil structure, becoming incapable of supporting animals and plants. Soil is the largest carbon sink on Earth. When land usage is poorly managed, soil loses its ability to store carbon and nitrous oxide is released into the atmosphere. According to the United Nations Convention to Combat Desertification, land degradation has lowered the productivity of one-quarter of the world's land surface and the loss of terrestrial biodiversity is evident. Not only does this issue place a heavy burden on underdeveloped countries, the health and food security of the global population is threatened by land degradation.

Water Cycle and Availability

The accessibility of water resources to all living organisms is understood through the water cycle and its three main phases: evaporation, condensation, and precipitation. Carbon emissions and industrial damage has directly affected the water cycle around the globe. Due to global warming, the heat causes the water in lakes and rivers to evaporate at a faster rate than ever before. In Bolivia, one of the world's largest lakes has completely dried up resulting from the local mining industry and climate crisis. Lake Poopó, which had once supported the livelihoods of fishermen and was home to hundreds of species, is now a cracked deserted land.

After the evaporation stage, water vapor forms heavy clouds and begins to revert back to the liquid state. This is the process of condensation, where precipitation (rain or hail) falls out of clouds. As the ozone layer depletes and temperatures arises, moisture is tightly packed in the atmosphere, causing unstable wind patterns and extreme rain storms. With increased precipitation, climate disasters are more likely to occur including different degrees of flooding, hurricanes, and monsoons. Water scarcity, specifically in dryland regions, threatens the safety of health-care facilities and risks the contamination of diseases or illnesses.

Marine Life

When carbon dioxide dissolves in the ocean water, carbonic acid forms and the reduction in carbonate ions results in ocean acidification. The ocean has absorbed an estimated 29% of global CO_2 emissions since the Industrial Revolution, marine species are under pressure as the ocean becomes more acidic. Organisms that use calcium carbonate, a form of chalk, as their shells or skeletons are unable to reproduce efficiently due to low levels of pH. Clams, crabs, and corals are one of the foundation layers of the food web, consumed by larger fishes that humans rely on for a protein source and income.

Climate Finance

Issue with the status quo

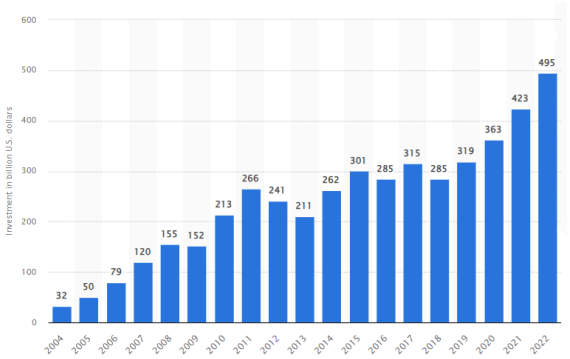

Figure #3: Investment in renewable energy worldwide (in billions U.S. dollars), 2004 to 2022

Major Countries and Organizations Involved

China

As the world's leading nation in greenhouse gas emissions, China has produced 284 billion tons of CO2 since 1850 and is responsible for 27% of total emissions. The country's difficulty in tackling the roots of the climate crisis lies within their fast-growing economy. From a global scope, many of China's major industries, including those of steel and textile, showcase their dominance in the areas of manufacturing and consumerism. Being the world's largest exporter of goods and services, China relies heavily on the burning of coking coals to fuel its economy and support its large population of 1.4 billion people. Despite ranking as first of top carbon emitters, China is aware of its impact on the climate. According to the Renewables 2021 Global Status Report, China has contributed 1.45 billion kilowatts of renewable installation, which is over 50% of the global renewable energy capacity. The country further

pledges to achieve carbon neutrality by 2060 and to transition towards solar and wind power generators to account for its total energy consumption.

United States

The United States had begun industrializing at an early stage compared to the rest of the world, an average American is accountable for far more emissions than any other country. The Climate Science Special Report (CSSR) reports daily tidal flooding due to melting glaciers and alterations in ocean circulation, while regions in the West have been experiencing large-scale wildfires as temperature warms. The Biden executive order issued in 2022 proposes an infrastructure bill that incentivizes industrial transition towards electric vehicles and emission reduction technologies, utilizing clean fuels such as carbon-free hydrogen. However, to reach the Net zero goal before 2050 calls for operative plans on directly decreasing fossil fuel production, which also recognizes the role of the US to aid other countries in combating the climate crisis.

India

As of 2023, India remains at its rank of the third largest greenhouse gas emitter in the world, and so happens to be fourth on the list of countries worst-affected by climate change. Along with the challenges of the Covid-19 Pandemic, India's economy is struggling to meet its carbon reduction targets and lack of progress have already started to take form in environmental catastrophes India has been dealing with this past year. Intense monsoon rains have hit northern parts of India, causing more than 3,000 deaths, diminishing 4.8 millions of acres of farmland, and destroying homes that belonged to hundreds-thousands of people. Rather than simply promising the prioritization of reaching Net zero emissions, India's people request for the government to take more action towards climate management for the food insecurity and death tolls the population suffers currently.

Indonesia

Indonesia, a nation that economic income and nutrition depended heavily on their large tropical forests and marine biodiversity, is amongst one of the world's top carbon emitters due to large deforestation and forest fires. As the severity of climate hazards escalates and sea-levels are expected to rise, Indonesia faces the risk of extreme population exposure with 70% of Indonesians living in coastal communities. To serve quality commodities to foreign markets implies the degradation of natural landscape for agricultural means, Indonesia is experiencing devastating droughts and floods that may reverse all of its nation's progress against malnutrition and poverty. In the most recent NDC report published by the UNFCCC, Indonesia's climate statistics exhibits higher GHG decrease rates from 29% to 31.89% and states its commitments to recondition 2 million hectares of peatlands by 2030.

The European Union (EU)

Involved in environmental action since the early 1990s, the EU has long been a fundamental player in the United Nations climate negotiations and have emerged as the world's top four largest GHG emitters due to coal-fired power plants, specifically in Poland and Germany. The European Green Deal, approved in 2020, aims to reach carbon neutrality by 2050 through the reassessment of economic policies and to achieve a circular economy that ensures food security and elimination of air pollution. To finance the proposals, the Sustainable Europe Investment Plan looks to acquire at least $1 trillion USD from public and private investment, targeting regions that are coal-dependent. In addition to a cost-effective transition, the EU sets its path following the "Fit for 55" plan in revising existing legislations to confirm the policies of the Council and European Parliament aligns with the climate objectives.

The World Bank Group (WBG)

The World Bank Group is the largest multilateral funder of climate finance and intends to open low-carbon markets with the transition to wind and solar power. Initiating the Climate Change Action Plan, the WBG raised over $17.8 billion USD in 2019 through working with private investment sectors and seeks to increase their budget for the next action plan towards expanding clean energy access, carbon reduction technologies, and electrified economies. In 2016, the WBG invested in six million solar panels in Egypt, avoiding 2 million tons of GHG emissions. The organization supports NDCs in adopting smart-climate practices and rewards underdeveloped countries to become more sustainable with farmland, bettering the livelihoods of farmers and providing job opportunities. Under its plan of Climate Adaptation and Resilience, the WBG has financed disaster risk management in 30 countries, secure water systems for 15 million people, and the reforestation for agricultural communities.

Environmental Defense Fund (EDF)

Founded in 1967, the Environmental Defense Fund (EDF) is an United States-based non-profit organization (NGO) that focuses on innovative private-sector partnerships and collaborating with large corporations in hopes to achieve environmental solutions that satisfies market demands. The EDF works along with the assistance of scientists, economists, and lawyers in order to propose policy initiatives backed up with analytical research and considering each nation's economic circumstance. Some key accomplishments include participation in several enactments of climate protection laws, for example, the Safe Drinking Water Act (SDWA) in 1974 and the Endangered Species Act of 1973. In light of the Paris Agreement goals, the EDF released the BluePrint 2020, outlining an agenda for a 20% decrease in US carbon emissions by promoting energy management strategies and sustainability of commercial fishery.

Intergovernmental Panel on Climate Change (IPCC)

The IPCC is an intergovernmental body established by the United Nations Environment Programme, where all 195 member states elect a department of scientists to prepare assessment reports. Instead of conducting their own experimental research, scientists gather existing literature

papers on individual subject matters and present in-depth proposals in response for the government and general public. The most recent completed work, the Sixth Assessment Report in 2021, warns of the possibility that keeping global temperature under 2 degrees will be impossible unless immediate cuts to CO2 emissions and methane are made. Moreover, authors claim that the melting of ice sheets and rising sea levels will be “irreversible for centuries to a millenia”.

Greenpeace

Greenpeace is a campaign network founded in 1971 operating in multiple countries. The organization advocates for climate action through direct confrontation with harmful businesses and has raised $343 million in funding from its supporters and external foundations. Greenpeace has been acknowledged as one of the world’s most influential environmental groups, following its mission to protect endangered species and provide transparent knowledge to populations to heighten environmental awareness. The campaign is successful in gaining support through straightforward advocacy, such as exposing illegal logging of natural forests in a UNESCO world heritage site and hosting seminars to discuss unregulated fishing in Southeast Asia. Major victories of Greenpeace include the Ban of Commercial Whaling Worldwide in 1982, campaigning for the 1996 Global Ban on Nuclear Testing, and more.

United Nations Framework Convention on Climate Change (UNFCCC)

The UNFCCC is an international treaty signed in Brazil in 1992 with the overall direction of stabilizing GHG concentrations in the atmosphere. The first implementation of the treaty, the Kyoto Protocol of 1997, outlines the obligations of each signatory country from developed to under-developed nations, thus calls for continual policy-making negotiations and meetings. The UNFCCC recognizes national differences in wealth and ecological factors, hence fighting climate change is a concern to all people and will demand a combined effort between countries. Governments submit an annual report on reforms of climate policies and the total GHG emissions produced by their nation. Though not all signatories were able to execute their action plans for each commitment phase, the treaty provides a concrete framework for expectations on carbon emissions.

Timeline of Events

Date	Description of event
1760-1840	Age of Industrialization - widespread usage of coal to fuel factories and steam engines, trend of deforestation accelerates
May 9, 1992	UN Framework Convention on Climate Change - recognized destabilization of climate caused by human activities, sets goal to reduce GHG emissions

December 11, 1997	The Kyoto Protocol - defines role of industrialized nations responsible for high level of GHG emissions, direct funds for developing countries
December 12, 2015	The Paris Agreement - international treaty adopted by 196 parties to keep global temperature below 2 degrees
August 9, 2021	IPCC Sixth Assessment Report - immediate cuts to avoid global warming of 1.5

Relevant UN Resolutions and Treaties

- 5/5. Nature-based solutions for supporting sustainable development : resolution / adopted by the United Nations Environment Assembly, 7 March 2022 **(UNEP/EA.5/RES.5)**
- Further guidance to an entity entrusted with the operation of the financial mechanism of the Convention, for the operation of the Special Climate Change Fund, 14 April 2004 **(FCCC/CP/DEC/2003/5/CP.9)**
- Sustainability, international economy, integrated-environmental accounting and economic instruments, 1992 **(A/CONF.151/PC/DEC/3/9)**
- Draft resolution on enhancing the circular economy : draft resolution / the Group of African States, 27 January 2022 **(UNEP/EA.5/L.17)**

Possible Solutions

Recommended solutions from different perspectives and weigh the pros/cons of each solution mentioned in order to encourage delegates to consider different factors in their clauses. Limit this section to 3-5 solutions. You should include solutions that have been attempted in the past and evaluate the effectiveness, are currently being implemented and should be in the future. All possible solutions should follow the format below:

The potential solution summarized into one sentence (this sentence should be bolded). A description of the solution including how it directly solves the issue at hand, who is involved, and how it can be carried out. Always include the disadvantages/limitations to the written solution, so delegates are more aware of what to focus on when trying to write a detailed and comprehensive resolution.

Bibliography

Naruetharadhol, P., et al. “Towards the Open Eco-Innovation Mode: A Model of Open Innovation and Green Management Practices.” *Cogent Business & Management*, edited by Len Tiu Wright, vol. 8, no. 1, Jan. 2021, p. 1945425. *DOI.org (Crossref)*, https://doi.org/10.1080/23311975.2021.1945425.

“Climate Change Already Worse than Expected, Says New UN Report.” *Environment*, 28 Feb. 2022, https://www.nationalgeographic.com/environment/article/climate-change-already-worse-than-expected-un-report.

Climate Change Widespread, Rapid, and Intensifying – IPCC — IPCC. https://www.ipcc.ch/2021/08/09/ar6-wg1-20210809-pr/. Accessed 31 Jan. 2024.

This Is Why Fighting Climate Change Is so Urgent - Environmental Defense Fund. https://www.edf.org/climate/why-fighting-climate-change-so-urgent. Accessed 31 Jan. 2024.

Ritchie, Hannah, et al. “Greenhouse Gas Emissions.” *Our World in Data*, Jan. 2024. *ourworldindata.org*, https://ourworldindata.org/greenhouse-gas-emissions.

“Clean Energy - Global Investment 2022.” *Statista*, https://www.statista.com/statistics/186807/worldwide-investment-in-sustainable-energy-since-2004/. Accessed 31 Jan. 2024.

Which Countries Are Contributing the Most to Climate Change? https://www.cnn.com/interactive/2023/12/us/countries-climate-change-emissions-cop28. Accessed 31 Jan. 2024.

Pettersson, Helen Regan, Carlotta Dotto,Marco Chacon,Henrik. “US vs. China: How the World’s Two Biggest Emitters Stack up on Climate.” *CNN*, 29 Oct. 2021, https://www.cnn.com/2021/10/28/world/china-us-climate-cop26-intl-hnk/index.html.

Loria, Kevin. “Trump Just Pulled out of the Paris Agreement — but the US Has Contributed More to Climate Change than Any Other Country.” *Business Insider*, https://www.businessinsider.com/us-effect-on-climate-change-co2-emissions-warming-2017-6. Accessed 31 Jan. 2024.

On the Frontline of Climate Crisis, Worlds Most Vulnerable Nations Suffer Disproportionately | Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small

Island Developing States.

https://www.un.org/ohrlls/news/frontline-climate-crisis-worlds-most-vulnerable-nations-suffer-disproportionately. Accessed 31 Jan. 2024.

US EPA, OAR. *Glossary of Climate Change Terms*.

https://19january2017snapshot.epa.gov/climatechange/glossary-climate-change-terms. Accessed 31 Jan. 2024.

“How Greenpeace Has Changed the World.” *Greenpeace UK*,

https://www.greenpeace.org.uk/about-greenpeace/victories/. Accessed 31 Jan. 2024.

European Climate Policy - History and State of Play | Climate Policy Info Hub.

https://climatepolicyinfohub.eu/european-climate-policy-history-and-state-play.html. Accessed 31 Jan. 2024.

“World Bank Group Report Proposes Policies, Investments to Enable Indonesia to Achieve Its Development and Climate Goals.” *World Bank*,

https://www.worldbank.org/en/news/press-release/2023/05/03/world-bank-group-report-proposes-policies-investments-to-enable-indonesia-to-achieve-its-development-and-climate-goals. Accessed 31 Jan. 2024.

“Land Degradation Neutrality for Biodiversity Conservation. Briefing Note.” *UNCCD*, 23 Dec. 2019,

https://www.unccd.int/resources/publications/land-degradation-neutrality-biodiversity-conservation-briefing-note.

Nations, United. “Land - the Planet’s Carbon Sink.” *United Nations*,

https://www.un.org/en/climatechange/science/climate-issues/land. Accessed 31 Jan. 2024.

“Indonesia.” *UNDP Climate Promise*,

https://climatepromise.undp.org/what-we-do/where-we-work/indonesia. Accessed 31 Jan. 2024.

Nations, United. “All About the NDCs.” *United Nations*, https://www.un.org/en/climatechange/all-about-ndcs. Accessed 31 Jan. 2024.

“10 Key Takeaways from the IPCC’s Landmark Climate Report.” *The Independent*, 9 Aug. 2021, https://www.independent.co.uk/climate-change/news/ipcc-report-2021-summary-climate-b1899189.html.

“How Is Climate Change Impacting The Water Cycle?” *WorldAtlas*, 15 Sept. 2021, https://www.worldatlas.com/articles/how-is-climate-change-impacting-the-water-cycle.html.