KADIR HAS UNIVERSITY
MODEL UNITED NATIONS CLUB

UNFCC

STUDY GUIDE

STRENGTHENING GLOBAL CLIMATE ADAPTATION AND MITIGATION STRATEGIES UNDER THE PARIS AGREEMENT

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1. Letter From Secretary General

ar Delegates,

is with great pleasure and profound respect that I welcome you to HASTRAIN'25 Model United Nations nference.

you prepare to embark on three days of diplomacy, debate, and discovery, I want to express how honored m to have each of you as part of this year's conference. HASTRAIN has always been a platform where ung leaders challenge themselves, broaden their perspectives, and learn to navigate the complexities of bal issues. This year, we aim to elevate that experience even further.

ur role as delegates goes far beyond representing a country or defending a policy. You are stepping into a ace where your voice has power where your ideas, arguments, and negotiations can shape meaningful tcomes. Whether you are a first time participant or an experienced delegate, I encourage you to approach ery session with curiosity, confidence, and an open mind.

r academic team has crafted thoughtful and timely agendas that reflect some of the most urgent allenges our world faces today. I trust that your preparation, dedication, and passion will bring these pics to life in ways that are both impactful and inspiring.

roughout HASTRAIN'25, remember that diplomacy is built not only on speaking, but also on listening. spect the diversity of perspectives around you, challenge yourself to think critically, and embrace the portunity to grow both as a delegate and as a global citizen.

vish you productive debates, meaningful collaborations, and unforgettable memories. May ASTRAIN'25 be a conference that empowers you, challenges you, and reminds you of the importance of ur voice in shaping the future.

arm regards,
zrin Sadigova
cretary-General
ASTRAIN'25 Model United Nations Conference

2. Letter From Committee Board

Dear delegates,
Welcome to HASTRAIN'25 and UNFCCC Committee!
We are Cansu Solmaz Hurşitoğlu and Tibet Tuna Topçu, your committee board members and Hamza Gezersu, your academic assistant. We are having the honor to serve as the board members of this committee.

On behalf of the Committee Board for the UNFCCC Committee, we extend our warmest welcome to all delegates. We are thrilled to have you participate in this prestigious Model United Nations conference. The UNFCCC Committee focuses on critical issues related to climate change, emphasizing the importance of the Paris agreement. As delegates, you have a unique opportunity to engage in meaningful debate, negotiation, and problem-solving to address these pressing issues. This study guide contains many prominent information about the agenda while giving an open space for you to also do your own research.

Remember, regardless of your country's position in the agenda, you are all equal in the committee and you have all the resources in your hands to come up with great solutions and innovative ideas to achieve the goals set by the committee.

If you have any kind of questions regarding either the agenda item or the committee, please do not hesitate to contact us via email. I recommend you to not limit yourself with the study guide, it's better to research more to achieve more!

We wish you all the best in your preparations and look forward to seeing you at HASTRAIN`25.

Best regards,

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3.Introduction to the Committee

TheUnited Nations Framework Convention on Climate Change (UNFCCC) is a leading globaltreaty that ensures cooperation in international responses to climate change. It forms thebasisfor subsequent legal frameworks, including the Kyoto Protocol and the influential Paris Agreement. The UNFCCC has 198 Parties, comprising 197 States and the European Union, making it one of the most widely ratified international treaties.

The UNFCCC relies on scientific assessments from the Intergovernmental Panel on Climate Change (IPCC) to inform its decisions and guide its negotiations. The IPCC is a United Nations agency operating within the United Nations to assess scientific data on climate change. It was established in 1988 by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO).

Under the UN Framework Convention on Climate Change (UNFCCC), governments strive to establish policies, mobilize resources, and organize actions to minimize climate change indicators and adapt to its inevitable impacts. The Convention operates on fundamental principles such as equity, common but differentiated responsibilities and respective competencies (CBDR-RC), and sustainable development, ensuring that climate action is equitable, inclusive, and effective. As the impacts of climate change intensify (rising sea levels, extreme weather events, ecosystem damage), coordination within the UNFCCC becomes increasingly important.

Each member state has one vote and participates equally, as is the case with all procedural committees. Recognizing that the committee's resolutions have substantial ethical, moral, and political significance for the member nations despite not being legally enforceable is one of its most crucial functions. Since its inception, UNFCCC has served as the principal platform for nations to discuss collective frameworks for global warming and climate change and it will continue to clear the path for international compliance and collective will in global politics. The decisions made here have long-lasting effects, as they help establish precedents and legal frameworks for future international agreements and conventions.

4. Key Terms and Definitions

United Nations Framework Convention on Climate Change: The United Nations Framework Convention on Climate Change (UNFCCC) is the principal global treaty for coordinating international responses to climate change. It provides the foundation for subsequent legal instruments, including the Kyoto Protocol and the landmark Paris Agreement.

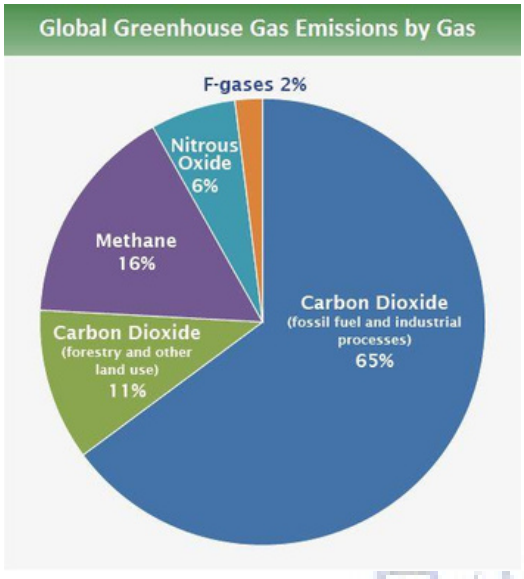
Paris Agreement: The Paris Agreement is an international treaty which legally binds its signatories to act to fight climate change. It`s goal is keeping global warming 1.5°C.

Kyoto Protocol: The Kyoto Protocol is an international treaty adopted in 1997 that aimed to reduce the emission of gases that contribute to global warming.

Climate Change: Climate change is a long-term change in the average weather patterns that define Earth's local, regional, and global climates.

Mitigation: Climate change mitigation refers to any action taken by governments, companies or people to reduce greenhouse gases, or to enhance carbon sinks that remove them from the atmosphere.

Greenhouse Gases: These are gases in the earth's atmosphere that trap heat.



Climate Resilience: This refers to the ability of an ecosystem, society or business to anticipate, prepare for and respond to the impacts of climate change

Carbon Emission: Carbon dioxide emissions are those stemming from the burning of fossil fuels and the manufacture of cement

Global Warming: this is a progressive increase in the earth's temperature generally due to the greenhouse effect caused by increased levels of carbon dioxide, and other pollutants.

Greenwashing: behaviour or activities that make people believe that a company is doing more to protect the environment than it really is

5. Introduction to the Agenda Item: Strengthening Global Climate Adaptation and Mitigation Strategies under the Paris Agreement

The climate change has been a significant topic for diplomatic agendas since the first inception of global warming as an upcoming global crisis by the global scientific community and it is an area of environmental laws and multinational agreements that aims reduction in human interference with the climate and better adaptation to the changing climate. While the first notion of a change in the Earth's climate as a result of human activity was established in the late 19th century, 1960s saw rise in global concerns for climate change. Since then nations around the world enacted laws and regulations within themselves and signed treaties among each other for combating climate change. The Convention gave birth to several treaties, namely the Kyoto Protocol in 1997 and the Paris Agreement in 2016.

Within this context, the Paris Agreement stands as the most comprehensive and universally supported international framework aimed at guiding the global response to climate change. While its adoption in 2015 marked a key moment of the solution process, the subsequent years have underscored the need to further strengthen both adaptation and mitigation efforts in order to meet the Agreement's long-term objectives. However, recent assessments show that existing national commitments and implemented measures fall significantly short of the pathways needed to meet agreed temperature targets and protect vulnerable populations from increasing climate impacts.

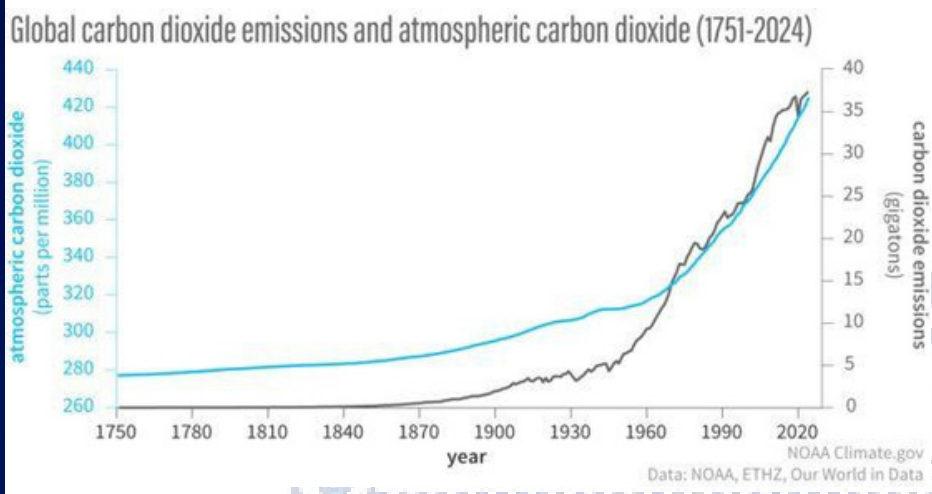
Rising global temperatures, droughts, devastating hurricanes, glacier melt, sea level rise, food insecurity, and the endangerment of island nations demonstrate that the crisis is already shaping national policies, human security, and international relations. This agenda item focuses on how global climate adaptation and mitigation efforts can be strengthened within the framework of the Paris Agreement to protect communities and ensure a stable and sustainable future.

New and Emerging Climate Challenges

The ever-changing global landscape has introduced new climate vulnerabilities that require innovative policy interventions. Modern climate risks are not only the result of industrial emissions, but are also exacerbated by urban sprawl, inadequate infrastructure, economic dependence on fossil fuels, and unequal development patterns. Even the water consumed by individuals for their daily needs contributes to global warming. These emerging challenges, such as climate-induced displacement, biodiversity collapse, food system vulnerability, and the increasing frequency of catastrophic weather events, demonstrate that climate change transcends traditional environmental concerns. Addressing these interconnected risks requires

comprehensive strategies that align short-term national capacities with long-term global goals. Conversely, countries and their policies are failing to act accordingly.

Modern Views of Climate Impacts



Climate Impacts Experienced by Individuals

a. Intensifying Daily Vulnerabilities

Extreme heat waves, rising food prices due to declining agricultural production, flash floods, and air pollution are becoming a part of daily life for millions of people. These impacts disproportionately affect marginalized communities, older people, children, and those living in informal settlements. While often overlooked in policy debates, these experiences highlight how climate change directly shapes individual well-being and daily life.

b. Climate-Induced Migration

An increasing number of people are being forced to flee their homes due to flooding, water scarcity, coastal erosion, or declining agricultural productivity. While most of these people do not cross borders, internal displacement is rapidly increasing, creating new challenges for governments and humanitarian systems. Even when migrating to other countries, they often bring diseases from their home countries with them, paving the way for global or regional epidemics.

Institutional Climate Challenges

a. Gaps in Climate Finance

Climate finance remains a cornerstone of the Paris Agreement, but access to finance remains unequal. Many developing countries struggle to secure the resources needed for renewable energy transitions, resilient infrastructure, or disaster response systems. Therefore, they rely on a system built on minerals and fossil fuels. The failure of developed countries to consistently meet their climate finance commitments is deepening the global adaptation gap and slowing mitigation.

b. Technology and Capacity Inequalities

While some countries are rapidly implementing innovative technologies such as early warning systems, green hydrogen, or carbon capture solutions, many lack the technical capacity to adopt similar measures. Inadequate education, a lack of data systems, and limited institutional frameworks hinder the implementation of climate strategies at the national level. Economic and developmental challenges stand in the way. This institutional gap remains one of the greatest obstacles to achieving the Paris Agreement goals.

The Role of the UN Framework Convention on Climate Change and the Paris Agreement

The United Nations Framework Convention on Climate Change (UNFCCC), as a pillar of global climate governance, provides a platform for states to negotiate policies, monitor progress, and organize long-term strategies to stabilize atmospheric greenhouse gases. Since its adoption in 1992, the UNFCCC has evolved into a complex institutional framework encompassing advisory bodies, financial mechanisms, transparency measures, and implementation frameworks designed to support states with diverse capacities and development needs. As climate risks have intensified over the past three decades, the role of the UNFCCC has expanded beyond mere negotiations.

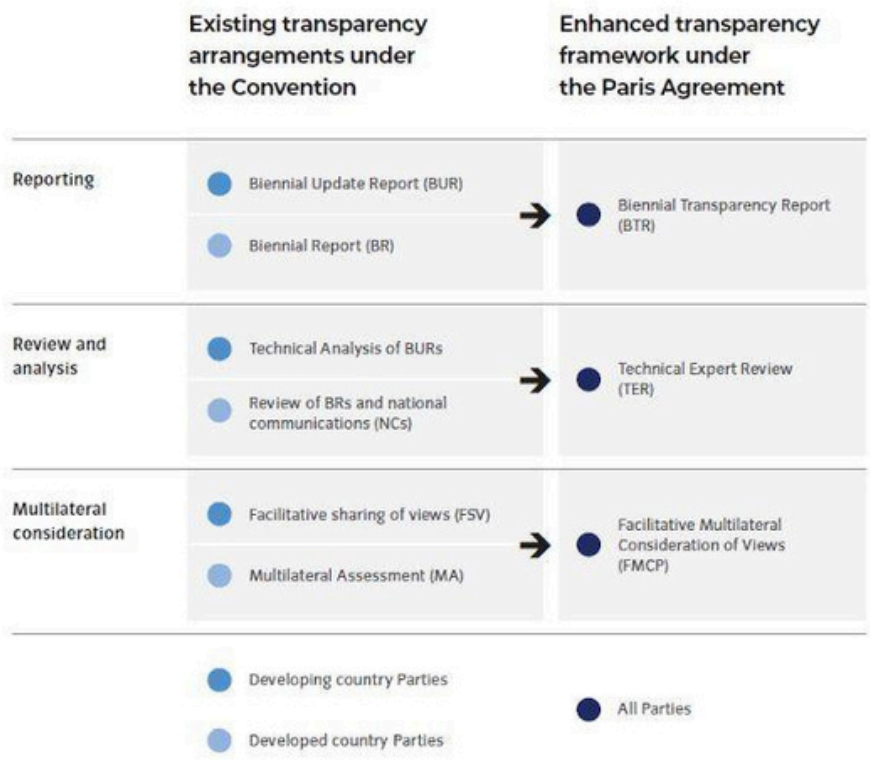
The Paris Agreement, adopted at COP21 in 2015, is considered the most transformative and ambitious international agreement ever created to combat climate change. Its significance stems not only from the global consensus it has established but also from the innovations it has introduced to the international climate regime. The Paris Agreement, the third-generation

climate agreement after the UN Framework Convention on Climate Change (UNFCCC) (1992) and the Kyoto Protocol (1997), has reshaped global climate governance in numerous unprecedented ways.

Building on guidance from the International Panel on Climate Change (IPCC) and the Convention's stated goal of limiting atmospheric greenhouse gas concentrations to levels that would prevent dangerous climate change, the Paris Agreement clarifies that global average temperature increases must remain "well below 2°C" compared to pre-industrial levels and that "efforts to limit such an increase to 1.5°C should be pursued." These "temperature targets" help define what the international community considers dangerous climate change and set a more ambitious direction for the development of individual and collective efforts by Parties, generally relative to current progress. In other words, it defines its goal as a profound, global transformation over the coming decades, from an economy primarily dependent on fossil fuels to one that achieves a stable state where global emissions are "net zero" and atmospheric greenhouse gas concentrations stabilize at levels incompatible with the temperature targets. The Paris Agreement aims for three-dimensional transformations: economic, social, and political.

The agreement's Enhanced Transparency Framework (ETF) significantly strengthens accountability. Under this system, countries must regularly report:

- emissions data,
- progress on NDCs,
- adaptation actions, and
- climate finance contributions



These reports are fed into the Global Stocktake, a comprehensive assessment of collective progress toward achieving the Paris goals, every five years. The Stocktake is designed to augment ambition and guide future NDCs. This mechanism is a first.

The Paris Agreement represents the third major phase of international climate agreements, following the 1992 UN Framework Convention on Climate Change (UNFCCC) and the 1997 Kyoto Protocol. Adopted before the Rio Earth Summit, the UNFCCC established the goal of stabilizing greenhouse gas concentrations at levels that would prevent dangerous human interference with the climate system. It also established key institutions, notably the annual Conference of the Parties (COP), and established the first global system for reporting national emissions inventories and communicating climate policies.

A key element of the UNFCCC is the principle of common but differentiated responsibilities and respective capabilities (CBDR-RC), which "recognizes that developed countries should lead and support developing countries in combating climate change." This principle is operationalized through the Annexes to the Convention: Annex I (industrialized countries), Annex II (wealthier OECD members obligated to provide financial support), and non-Annex I (developing countries). This differentiation led to the widespread acceptance of the agreement, which now encompasses 197 Parties.

However, the Convention itself did not set binding emissions targets. To address this limitation, Parties adopted the Kyoto Protocol in 1997, establishing legally binding emissions reduction commitments for developed countries: a collective reduction of 5% below 1990 levels between 2008 and 2012. The targets were negotiated separately, with the EU committing to 8% and others agreeing to different limits or controlled increases. While some countries faced significant reductions, others—particularly transition economies—obtained additional permits by leveraging the historically high baselines of 1990.

Kyoto introduced improved compliance and accounting systems, including carbon budgets denominated in Assigned Amount Units (AAUs), emissions trading, and the Clean Development Mechanism (CDM), the first global system for creating certified offsets in developing countries. The Protocol's Implementation Unit monitored compliance, and penalties were imposed on countries exceeding the established limits.

The Protocol faced political challenges, particularly when the United States refused to ratify it after its initial signature. This necessitated Russian ratification for its entry into force. Following an intense diplomatic campaign, largely led by the European Union, Russia agreed to ratify the Protocol, enabling the Kyoto Protocol to enter into force on February 16, 2005.

This historical evolution, from the broad framework of the UNFCCC to the legally binding targets of Kyoto and the universal and flexible architecture of the Paris Agreement, reflects the international community's ongoing efforts to strengthen global climate governance in response to increasing climate risks.

6. Historical Background

1896 First Scientific Discoveries

Svante Arrhenius published his groundbreaking work, "The Effect of Carbonic Acid in the Air on the Temperature of the Earth," in the Publications of the Astronomical Society of the Pacific.

Conference of the Parties (COP 1)

COP 1 adopted a Berlin Mandate calling for negotiations to begin on legally binding targets for reducing greenhouse gas emissions.

1997 The Kyoto Protocol

The Kyoto Protocol, adopted in 1997, established the targets and mechanisms necessary for the implementation of the UNFCCC. The 40 most industrialized countries listed in Annex B of the Protocol are expected to reduce their emissions by at least 5% between 2008 and 2012 compared to 1990 levels. The target varies by country. The six greenhouse gases resulting from human activities are: CO2, CH4, N2O, HFCs, PFCs, and SF6.

Italso established the Clean Development Mechanism (CDM), which allows developed countries to invest in emissions reduction projects in developing countries to offset their own emissions. The Kyoto Protocol was a key milestone in international efforts to combat climate change and paved the way for future climate solutions. AFterwards United States withdrew from Kyoto Protocol.

Kyoto Protocol served as a model for European Union for Emissions Trading System, which is the world's foremost and most extensive emissions trading initiative. Doha Amendment to the Kyoto Protocol Governments reached an agreement to accelerate the achievement of a universal climate change agreement by 2015. They also committed to developing options to intensify emissions reduction efforts beyond existing commitments before 2020. They also adopted the Doha Amendment to the Kyoto Protocol, which established new targets for emissions reductions among participating countries from 2012 to 2020.

Paris Agreement

The adoption of the Paris Agreement marked a turning point in global climate diplomacy, establishing the first universally applicable and legally binding framework to combat climate change. Designed to guide international action for the coming decades, the Agreement aims to limit global average temperature rise to 2°C above pre-industrial levels while urging countries to continue efforts to limit warming to 1.5°C. It calls for global greenhouse gas emissions to peak as soon as possible and aims for a projected balance between anthropogenic emissions and removals by the second half of the 21st century. Beyond mitigation, the Paris Agreement outlines an integrated approach that includes strengthening

adaptation efforts, mobilizing financial and technological assistance for developing countries, enhancing technology transfer and capacity-building initiatives, and addressing the growing challenges of loss and damage. At its core, the Agreement emphasizes strength in unity and collective strength.

7. Case Study

Sea Level Rise in the Maldives: A Nation on the Front Line

Rising sea levels and warming oceans pose an existential challenge to island nations. As one of the most touristic countries in the world, Maldives, is now in danger. The World Bank recognises the Maldives as being highly vulnerable to climate change due to a combination of geographic, social and political factors. This makes the nation's citizens and economy at risk, with estimates showing a GDP loss of 2.3% by 2050 and 12.6% by 2100.

The nation currently allocates USD 10 million each year to coastal adaptation projects aimed at addressing sea level rise in the Maldives. However, this amount will need to increase to USD 8.8 billion to safeguard its existing islands from the encroaching seas. The Maldives faces the risk of being submerged due to rising sea levels. Without assistance from developed countries, adapting will be nearly impossible, and the iconic white sand beaches may disappear.

Eighty percent of the Maldives lies less than one meter above sea level, making it one of the lowest-lying island countries in the world. The highest natural point in the Maldives is only two and a half meters above sea level, making it highly vulnerable to even small increases in sea levels. This means that even small changes in sea level on this island can significantly impact it.

Rising and falling sea levels associated with climate change increase the country's vulnerability to floods and storm surges originating in the Indian Ocean. These surges are expected to become more frequent and intense due to climate change in the Maldives.

Despite contributing less than 0.01% to global greenhouse gas emissions, the Maldives is at significant risk due to rising sea levels, saltwater intrusion, coastal erosion, and increasingly

severe storms. These threats are not theoretical; they are occurring right now. Some inhabited islands have already been partially evacuated because of persistent flooding, while the country's economy, heavily reliant on fisheries and tourism, has experienced substantial losses due to warming waters and coral bleaching.

Efforts made by Government of Maldives

The Government of the Republic of Maldives through Ministry of Climate Change, Environment and Energy (MCCEE) is implementing 'Building Climate Resilient Safer Islands in the Maldives' project financed by Green Climate Fund (GCF) and supervised and co-financed by Japan International Cooperation Agency (JICA).

Component 1: Establishment of the Integrated Coastal Zone Management (ICZM)
Component 2: Implementation of Coastal Conservation/Protection Measures against Coastal Disasters
Component 3: Development of Disaster Warning and Information Dissemination System
Component 4: Development of Basic Data Collection and Sharing System Related to Climate Change

Furthermore, the government of Maldives targets net zero emission until the end of 2030.

8. Possible Solutions

The sustainability of life on Earth is under increasing threat due to human-induced climate change. This perilous change in the Earth's climate is caused by increases in carbon dioxide and other greenhouse gases in the atmosphere, primarily due to emissions associated with burning fossil fuels.

Over the next two to three decades, the effects of climate change, such as heatwaves, wildfires, droughts, storms, and floods, are expected to worsen, posing greater risks to human health and global stability. These trends call for the implementation of mitigation and adaptation strategies. Pollution and environmental degradation exacerbate existing problems and make people and nature more susceptible to the effects of climate change.

In this committee, we should examine the current state of global climate change from different perspectives. We ought to summarize evidence of climate change in Earth's spheres, discuss emission pathways and drivers of climate change, and analyze the impact of climate change on environmental and human health. We also should explore strategies for climate change mitigation and adaptation and highlight key challenges for reversing and adapting to global climate change.

- Plans for adapting and mitigating climate change-induced environmental problems should be combined with urgent applicable solutions/actions for reducing environmental pollution/degradation.

- Addressing global issues related to climate change, such as the sustainable management of global warming and the induced/associated changes on soil health, air pollution, water, and food security, waste management, and finding alternative energy sources are the major challenges of the 21st century and needed to achieve the United Nations Sustainable Development Goals (UNSDGs).

- Reducing climate change-induced environmental pollution aligns with the zero pollution vision for 2050 and is urgently required to decrease the levels of pollutants in air, water, and soil to mitigate the potential ecological and human health hazards associated with climate change.

These aims also meet the 2030 key targets to reduce pollution sources. These targets include improving air, water, and soil quality, aiming to reduce the number of premature deaths caused by pollution, and reducing the release into the environment, which will help strengthen the green and economic environmental growth and create a healthier, socially fairer planet.

- Reducing pollutants in the air is important for human health and the environment. Therefore, we urgently need to control and reduce multi-pollutant emissions, decrease the concentrations of particulate matter in the air, regulate the use of small coal-fired boilers, accelerate desulfurization and de-nitrification, improve the quality of the fuels,

and control urban dust including the release of brake and tire wear materials from traffic systems.

- Harnessing soil carbon sink capacity for adaptation and mitigation of climate change, reducing soil erosion and including it as a source for GHGs in the global carbon budget, enhancing the use efficiency of agro-ecosystems inputs, using global dry-lands, and restoring degraded soils are among the most important soil-centric options for addressing global issues.

- Remediation of degraded soils and reducing GHG emissions from soils could be achieved via the application of organic amendments such as crop residue return and biochar.

- Coupling citizen science with advanced technologies such as remote sensing and sensor networks can provide more accurate information about pollution and environmental degradation in near real-time. This approach can help researchers, policymakers, and the general public make informed decisions about planning for and addressing these environmental issues.

Those actions could contribute to the mitigation of climate change-driven negative impacts and enhance the strategy of “producing more from less”, which achieves the Sustainable Development Goals or the Agenda 2030.

Climate change poses a critical threat to the development of future infrastructure, especially in regions where poverty is prevalent and the key assets such as urban-built infrastructure are underdeveloped for meeting even the current needs let alone the needs in the future due to every growing urbanization:

- Therefore, new/future infrastructure assets should be prioritized, planned, designed, built, and operated to account for the climate changes that may occur over their lifetimes. Scenario modeling studies demonstrate that the effectiveness of nature-based

management strategies depends on future climate conditions, such as the extent of warming, and global wind speed.

From traditional infrastructure to climate-resilient infrastructure. Infrastructure networks are assets, interdependent, and long-lived across sectors. Decisions made now about the design, location, and operation of these assets will determine their longer-term resilience to the impacts of climate change:

- Improving resilience in this area is important to climate adaptation and mitigation, particularly since adequate, reliable infrastructure underpins future development. The continued global trend towards increasing urbanization requires a rethink of how cities and metropolitan regions are built and operated to remain functional in the coming decades. Cities produce more than 70% of the global CO2 emissions.

As the impact of climate change becomes increasingly apparent, cities worldwide recognize the need to adapt their infrastructure to mitigate its effects. This will require significant changes to complex urban infrastructure, which will take time and require careful planning. Retrofitting existing infrastructure will also be necessary to make it more resilient to the impacts of climate change:

- Cities must be prepared to handle the amplified stresses and shocks exerted by the environment at all spatial scales. Ideally, changes in urban infrastructure must aim to improve the capacity for mitigation and adaptation simultaneously to address the challenges posed by climate change. By doing so, cities can become more sustainable and resilient for current and future generations.

- Nature-based solutions (NBS) or natural climate solutions are part of the response to limiting climate change and could also help address the interlinked crisis of global biodiversity losses. Natural climate solutions involve conserving, protecting, restoring, or better managing ecosystems to remove CO2 from the atmosphere. For example, allowing forests to regrow, restoring coastal wetlands and freshwaters, and switching

to restorative agricultural practices that support healthy soils, such as cover crop rotation.

These ecosystems reduce climate change by enhancing their ability to sequester CO2 in plants, soils, and sediments and once more become ‘net sinks’ of carbon (meaning they store more carbon than they emit). They also provide a wide range of other important benefits, such as cleaner air and water, natural hazard management, economic benefits, and increased biodiversity. Many studies explored the important function of NBS, that is, the network of green and blue space in a city can play a key role in adapting them against climate change- induced natural hazards and climate resilience of urban energy systems.

Cost-effective assessment of land-based carbon sequestration and reduction of GHG emissions using remote sensor technology. Measuring soil carbon changes over time requires field and laboratory methods that are accurate, reliable, and reproducible. Some methods are established in academia, industry, and the service sector, including chemical oxidation, high-temperature combustions , and carbon analyzers. The soil bulk density is measured for carbon stock assessment, typically by the core method, from undisturbed samples. Field sampling, especially for subsoil sampling, is costly and soil carbon laboratory methods have a high cost per sample:

- Reducing disaster costs by acquiring near real-time data on climate change-related disasters. The extreme disasters caused by climate change are increasing. The frequency and intensity of floods,549 droughts, hurricanes, heat waves, and wildfires have increased, resulting in an increasing number of affected people and economic losses.

- Early warning of long-term impacts of climate change. In addition to short-term extreme weather, climate change will also bring many irreversible long-term impacts, which may drastically change human life. Through long-term observation of glacier area and mass, it was found that the accelerated melting of temperate glaciers, which are called the tower of water, led to the imbalance of water resources in arid areas

- Providing basic data support for the global carbon cycle. The continuous accumulation of GHGs is the root cause of climate change. Sentinel-2 satellite observations can provide global GHG concentration data, including CO2, CH4, N2O, and other GHGs.

- Monitoring the impact of climate on the land surface carbon sink from global satellite observations. In particular, satellite observations have been used to monitor changes in forest carbon stocks, which represent a major component of the carbon sink on land surfaces.

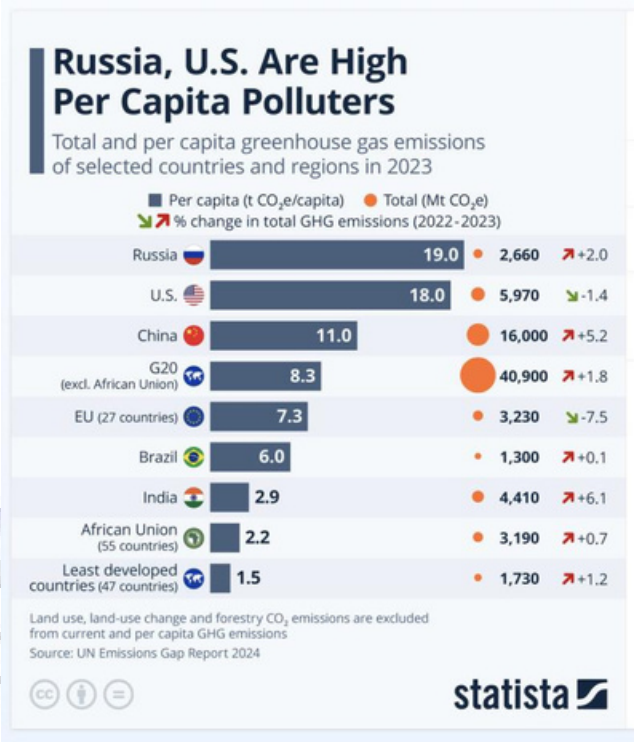
To achieve a net zero carbon economy, spectral-informed AI carbon modeling provides cost-effective strategies for rapid quantification of soil carbon sequestration to mitigate global climate change. These data-driven AI soil and terrestrial carbon models built on data hypercubes interpreted by machines provide distinct advantages compared to human understanding of ecosystem processes engrained in simulation models:

- Utilizing Data-driven AI models is simpler, more flexible, and allows the identification of the main drivers of processes, such as soil carbon sequestration (‘gray boxes’). In addition, they benefit from the myriad of data types, formats, and resolutions they can handle to create spatially and temporally continuous digital twins of soil properties, functions, and processes, including carbon change and GHG emissions.

9. Major Parties Involved

Since our committee which is United Nations Framework Convention on Climate Change (UNFCCC) has the agenda item of “Strengthening Global Climate Adaptation and Mitigation Strategies under the Paris Agreement” that requires a great international attention for the purpose of ensuring fruitful solutions, we have to dive into the major parties involved with the aim of exploring ambidextrous perspective towards the discussions and solutions.

Developed Nations and Major Emitters



The term "developed nations" is addressed for the countries of the European Union, United States of America, Japan, Canada etc. which are the states that have a mature and sophisticated economy, usually measured by gross domestic product (GDP) and/or average income per resident. These countries are one of the highly in-charge states that are responsible for the majority of cumulative greenhouse gas emissions since the Industrial Revolution. Owing to these sets of circumstances, the situation generates an expectation under the Paris Agreement for greater mitigation ambition and financial emission.

Of the world's top emissions producers, Russia and the United States emit the highest per capita emissions. According to data from the UNEP's Emissions Gap Report 2024, Russia produced 19000 tons of carbon dioxide equivalent per person in 2023, closely followed by the U.S. with 18000 tons. China produced nearly half that at 11000 tons per capita.

When looking at total emissions, then China was the biggest single-country emitter of GHGs in 2023 at 16,000 tons, accounting for 30 percent of global emissions. This is up 5.2 percent from 2022. The U.S. is the second biggest emitter at 5,970 tons in total, having accounted for 11 percent of the global total last year (-1.4 percent since 2022). India, in third place, accounted for eight percent of the global total at 4,410 tons (+6.1 percent from 2022).

As this chart shows, GHG emissions across the G20 members increased by 1.8 percent between 2022 and 2023, accounting for 77 percent of global emissions. The UNEP highlights that if all 55 African Union countries were to be added to the G20 nations, more than doubling the number of countries from 44 to 99, total emissions would only increase by five percentage points. These figures hit home the wide disparities that exist in emissions output globally. The least developed countries group consists of 47 countries and yet it only accounts for three percent of global emissions.

Data on CO2 emissions specifically, which are just one type of GHG, shows that a number of other countries not highlighted in this roundup produce even higher levels of emissions. As Katharina Buchholz details, several countries on the Arabian peninsula are particularly high polluters per capita, including Qatar, Kuwait and Saudi Arabia.

Developing and Climate-Vulnerable Countries

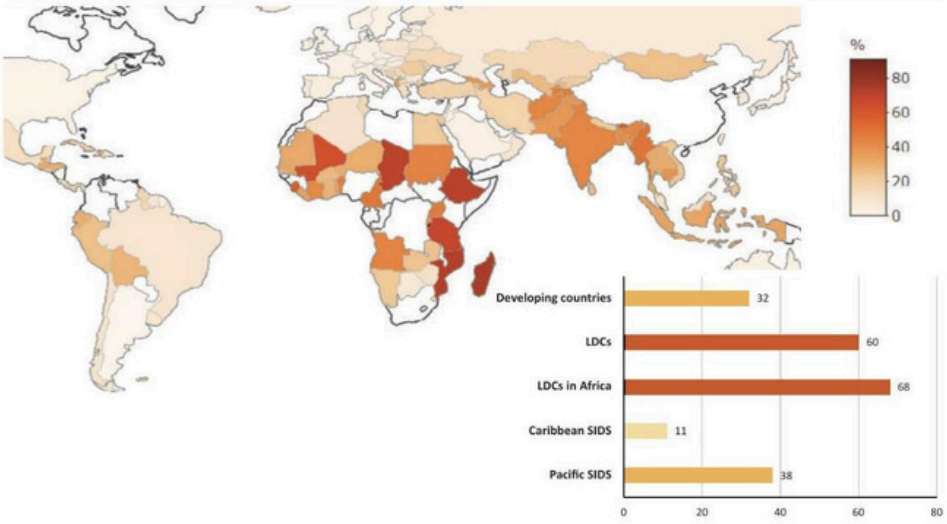
Developing countries in the tropical and subtropical zones will be adversely affected by climate change, and that agriculture, fishing, and tourism sectors will be their three sectors most vulnerable to climate change. Many developing countries will face significant challenges to maintain production, and related employment and export levels in these sectors over the coming years and decades.

Moreover, within developing countries, people who are already most vulnerable and marginalized will also experience the greatest impacts. In many settings, women will be more vulnerable than men to the adverse impacts of climate change because they are proportionally more dependent on threatened natural resources then men. In addition, women have less access than men to resources such as land, credit, agricultural and fishing inputs, decision-making structures, technology, training and extension services that would enhance their capacity to adapt to climate change.

After highlighting the importance of agriculture, fishing, and tourism in developing countries' employment and GDP, this chapter reviews the projected impacts of climate change on sectoral productivity and output with a view towards identifying adaptation actions that can limit adverse economic and trade impacts.

Small Island Developing States are among the least responsible for climate change – yet, they stand to suffer the most in terms of negative impacts. Despite contributing less than one percent of greenhouse gas emissions, small island developing states are highly vulnerable to tropical cyclones, hurricanes, storm surges, and droughts. From 1970 to 2020, these states lost US$153 billion due to weather, climate, and water-related hazards.

Figure 8. The percentage share of employment in agriculture, forestry, and fishing in 2019



Source: ILOSTAT, 2020; most recent data (data unavailable for countries in map shown in white).

As part of our flagship State and Trends in Adaptation (STA) series (STA20, STA21, STA22, STA23), the 2025 edition provides an integrated overview of climate risks, adaptation action, and financing needs and gaps in small island developing states. Drawing on strategic partnerships, the report brings together the best knowledge on the science, policy, and practice of climate adaptation in these states.

Energy-Exporting and Fossil-Fuel-Dependent States

The perspectives shape the approach of low- and middle-income countries (LMICs) to climate change mitigation and fossil fuel supply. Meeting the Paris Agreement's temperature objectives implicitly demands leaving fossil fuels underground (LFFU), which entails considerable reductions in their production. Most of the existing reserves should be left untapped stranding related investments, labour, and infrastructure. Compounding the justice issues involved in climate change, the problem of stranded assets and resources has acute equity implications since most reserves are in the Global South (BP, 2022). These dilemmas have increasingly been addressed in the literature, tracing a clear link between supply-side climate policies and stranded assets. However, until recently, supply-side measures received little attention, while fossil fuel production was largely absent in climate negotiations.

Attention to often-overlooked developing country governments in supply-side policy is critical for two reasons (Heras & Gupta, 2024). First, developing countries are important in international mitigation policies. Due to their fossil fuel dependency and plans for continued economic growth, they account for nearly two-thirds of total annual emissions and will be responsible for virtually all future emissions growth. The institutionalization of mitigation efforts in the Global South needs to balance climate ambition with development challenges, but the conventional narrative of the Right to Development (RtD) entails strategies that may result in stranded assets and carbon lock-in and disparities between large emitters developing countries and poorer nations. Second, developing countries play a significant role in LFFU: states control most reserves, and governments have a major influence in boosting production. In non-OECD countries, governments ultimately own the potential losses arising from stranding fossil fuel-related assets.

Against this background, the paper investigates the leaders and laggards in the climate change governance regime employing a neo-Gramscian analytical approach and situating the analysis in INEA's debates on the politics of multilateral environmental agreements. Through a content analysis of documents submitted to the UNFCCC, the paper examines how ten different LMICs have defined their role in addressing climate change and LFFU, focusing on the supply side of mitigation policies and the energy sector. To my knowledge, no previous publications have investigated developing countries' submissions to the UNFCCC from a neo-Gramscian perspective. Comparable studies employed critical discourse analysis in National Determined Contributions (NDCs) or examined producing countries' NDCs.

Key International and Non-State Actors

Non-state actors include private sector businesses, international institutions, city authorities, state and regional authorities, parliamentary bodies, civil society organisations, trade unions, and research and academic bodies. In different ways all these play important roles in national and global climate action. But they are not parties to the UNFCCC or the Paris Climate Agreement. This has created some uncertainty in defining the proper relationship between them and the UNFCCC and COPs. This note proposes a way of taking forward the non-state actors' agenda. It starts from two premises.

The first is that reinventing the wheel should be avoided. There have been concerted attempts to coordinate the nonstate actors agenda at an international level for around a decade. Some of these have been successful; others less so. There are lessons to learn: the best should be retained, the rest revised. There is no need to start again. The second premise is that any future arrangement should rest on the proper division of responsibility between the UNFCCC and its Secretariat and non-state actor initiatives. These have different accountabilities, which should be respected in organising the relationship between them.

This note is concerned primarily with the activities of non-state actors at an international level. Within nation states such actors can be extremely varied, and have many different relationships with governments. There is no one-size-fits-all approach which can be recommended on how they should be coordinated or made accountable.

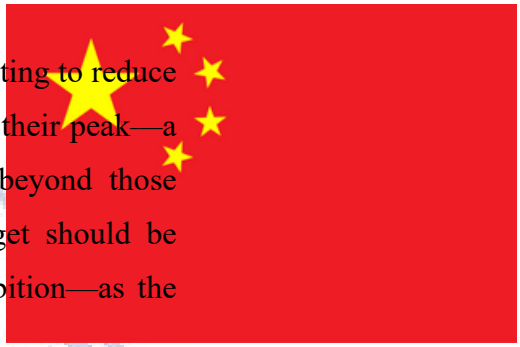
At an international level non-state actors are fewer and more institutionalised. In many sectors there are now initiatives and partnerships aiming to deliver climate action of one kind or another. Some are associations or alliances of private sector businesses. Some bring together other kinds of non-state actors, such as cities, regional governments or multilateral development banks. A number are partnerships between different types of organisation – often involving businesses and governments, sometimes with civil society organisations also involved.

United States of America

The United States has the technology to reduce net emissions rapidly while supporting economic opportunity and growth, improving quality of life, and delivering environmental justice in the United States. Addressing the climate crisis requires tackling all emitting sectors of the economy and all greenhouse gases, scaling up the many solutions the state already has, while investing in innovation to broaden the set of solutions, enabling multiple pathways to reach net zero emissions in the United States by 2050.

After a careful process involving analysis and consultation across the U. S. federal government, and with leaders in subnational and Tribal governments, civil society, and the private sector, the United States is communicating an economy-wide target of reducing its net greenhouse gas emissions by 61-66 percent below 2005 levels in 2035. The entire 2035 range is on a straight line or steeper trajectory to net zero emissions by 2050 for all greenhouse gases.

China



On 3 November 2025, China submitted its 2035 NDC, committing to reduce economy-wide net greenhouse gas emissions by 7–10% from their peak—a conservative target unlikely to drive emissions reductions beyond those already expected under existing policies. However, the target should be understood as a floor, not a ceiling, for China's climate ambition—as the government emphasised, China is "striving to do better."

China's 2035 NDC targets further enhance these three goals. However, China risks falling short of its CO2 emissions intensity reduction targets under both the 14th Five-Year Plan (2025) and the previous NDC (2030), partly due to the impacts of COVID-19 and slower economic growth. Closing the remaining gap in carbon intensity reductions and meeting the 2030 NDC target will require substantially greater climate ambition in the 15th Five-Year Plan.

European Union

The EU is one of the most influential and active players within the system of global climate governance. As a supranational union of 27 members with binding legislation in the field of climate policy, it regularly assumes the role of a high ambition leader in the call for more ambitious collective action within the Paris Agreement framework. The EU positions climate policy at the core of both its domestic development model and its global diplomatic identity, striving to be the first climate- neutral region in the world by 2050, a goal legally enshrined in the European Climate Law.

EU climate diplomacy also closely interacts with its domestic economic strategy: shifting to renewable energies, hydrogen technologies, sustainable mobility, and circular economic models. Through programs like Horizon Europe and cross-border green technology partnerships, the EU is internationally advocating the need for accelerated transformation of energy systems while promoting technology transfer in larger multilateral climate cooperation frameworks.

Brazil

Brazil holds a unique position in global climate governance, being the steward of the Amazon rainforest, one of the world's largest carbon sinks and most biodiverse ecosystems. Brazil has sought to position itself, under the framework of the Paris Agreement, both as an important emerging economy and a key environmental actor, based on claims of the need to balance development with conservation. A recent shift in the country's politics has brought renewed commitments to reduce deforestation, restore degraded lands, expand renewable energy, and strengthen environmental enforcement. Brazil's updated climate plans aim to align with global efforts to limit warming, while the government often leverages
its significant natural capital in calls for increased international financial support for forest protection and sustainable development.

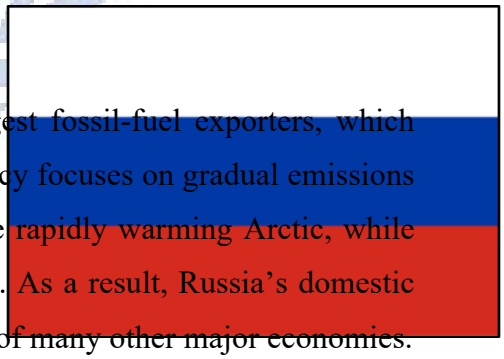
At the UNFCCC, Brazil consistently advocates for nature-based solutions, South-South cooperation, and results-based finance mechanisms that reward countries for preserving critical ecosystems like the Amazon. It supports greater adaptation funding to developing countries while allowing flexibility in its own agricultural and industrial development. Brazil also plays a strategic role in debates on Article 6 carbon markets, favoring rules that would work for land-use and forest-related credits. However, domestic interests-agribusiness, land-use conflict, and economic inequities among them-continue to affect the scale and predictability of its climate actions. Brazil's position thus combines high environmental ambition with a strong call for global equity, financial support, and acknowledgment of its unique ecological responsibility.

Saudi Arabia

With its position as one of the world's largest exporters of oil, Saudi Arabia holds a key position in global climate politics. Its climate strategy is based on a balance between emissions reduction and protection of economic stability and energy security. It pledged net-zero emissions by 2060 and promotes initiatives including the Saudi Green Initiative, focusing on renewable energy expansion, afforestation, and technological solutions such as carbon capture and storage. Nevertheless, its economy still remains heavily dependent on fossil fuels, shaping its cautious approach toward rapid decarbonization.

Within the UNFCCC, Saudi Arabia often resists strong language on fossil-fuel phaseouts and instead advocates for flexible “multiple pathways” to mitigation. It emphasizes the importance of technology, energy efficiency, and carbon management rather than reducing oil production. At the same time, Saudi Arabia supports increased climate finance for developing countries and seeks recognition of the challenges faced by energy-exporting economies. Its overall stance combines gradual transition, economic protection, and a preference for technological rather than structural solutions.

Russia



Russia is a major global emitter and one of the world’s largest fossil-fuel exporters, which makes its stance central to climate negotiations. Its climate policy focuses on gradual emissions reductions, energy efficiency, and adaptation, especially in the rapidly warming Arctic, while maintaining economic reliance on oil, gas, and heavy industry. As a result, Russia’s domestic climate actions tend to be slower and more cautious than those of many other major economies.

In the UNFCCC, Russia generally supports flexible, non-binding commitments and resists language that restricts fossil-fuel production. It favors technological improvements and adaptation measures over ambitious mitigation targets, and often aligns with other energy-

exporting states. At the same time, Russia backs increased climate finance and capacity-building for developing countries, emphasizing equity and national development priorities.

Alliance of Small Island States (AOSIS) / SIDS

The Alliance of Small Island States (AOSIS) represents countries that are among the most vulnerable to sea-level rise, extreme weather, and other climate impacts. With limited land area, economic fragility, and high exposure to climate risks, these states view global climate action as an existential issue. AOSIS consistently advocates for keeping global warming below 1.5°C and for rapid, ambitious emissions reductions from major emitters to protect their long-term survival.

In the UNFCCC, AOSIS is a strong voice for scaling up adaptation finance, operationalizing the Loss and Damage Fund, and improving access to climate finance for small and vulnerable economies. The bloc pushes for early-warning systems, resilience building, and concrete deadlines for financial commitments. AOSIS often leads high-ambition coalitions and uses moral and scientific arguments to push the international community toward stronger action and accountability.

10. Questions to be addressed

1. Despite the clear scientific and environmental urgency of limiting global warming to 1.5°C, what economic, social and political factors have contributed to the inadequacy of current Nationally Determined Contributions (NDCs)?

2. Why do many member states continue to face significant obstacles in building climate-resilient systems, and which international or regional barriers most seriously impede their adaptation capacity?\

3. How can the social and economic barriers faced by underdeveloped and developing countries be eliminated?

4. In what ways do fossil fuel dependence, energy security concerns, and industry lobbying continue to hinder global progress toward emissions reduction targets?

5. What changes or incentives could be introduced to the Paris Agreement's NDC framework to promote more ambitious pledges and ensure nations are held accountable for fulfilling them?

6. What strategies can be used to strengthen climate adaptation in highly sensitive regions, particularly through early warning systems, climate-resilient infrastructure, and developed disaster preparedness?

7. What changes can be made to climate funding systems to ensure that financing and budgets are more accessible, transparent and equitable for developing countries and small island states?

8. How can the global community support the transition of fossil fuel-dependent economies to renewable energy without jeopardizing employment, social stability, or energy security and sustainability?

9. How can member states actively communicate and collaborate with other prestigious institutions such as unions and UN bodies in the solution proposal, system development and budgeting stages?

10. How can public awareness be raised about reducing carbon footprint, limiting plastic use, and supporting recycling?

11. How can states prevent misinformation and greenwashing by individuals and institutions?\

12. What new monitoring, reporting and verification (MRV) systems could be used to increase transparency and improve the precision of global climate data under the Paris Agreement?

Further Reading

- https://unfccc.int/sites/default/files/resource/Enhanced%20Transparency%20Framework.pdf

- https://books.google.com/books/about/Verifying_Greenhouse_Gas_Emissions.html?id=5jJkAgAAQBAJ

- https://www.un-ilibrary.org/content/books/9789210054911c006/read

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