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INTERNATIONAL INITIATIVES TO CURB GREENHOUSE GAS EMISSIONS AND COMBAT CLIMATE CHANGE

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ABSTRACT

The current global challenges of the greenhouse effect and global warming stem from the accumulation of greenhouse gases, including water vapor, carbon dioxide, methane, nitrous oxide, and chlorofluorocarbons. Human-induced activities, such as deforestation, fossil fuel combustion, and industrial emissions, intensify this natural phenomenon, accelerating global warming and consequent climate change. Recognizing the urgency of the issue, international efforts, exemplified by global climate change summits and agreements, aim to establish binding targets and a unified approach. Innovative strategies, such as carbon credits and trading within Emissions Trading Systems (ETS), offer a tangible means to curb greenhouse gas emissions. These credits represent prevented carbon dioxide emissions and contribute to the global endeavor of mitigating climate change.

INTRODUCTION

The greenhouse effect is the natural warming of the earth that results when gases in the atmosphere trap radiation from the sun that would otherwise escape into space. During the day, the sun shines through the atmosphere, warming earth's surface. At night, the earth's surface cools, releasing heat back into the air and some of this heat is trapped by the greenhouse gases in the atmosphere. This process makes earth much warmer than it would be without an atmosphere (14˚C instead of -18˚C). The gases that trap the outgoing radiation are greenhouse gases which entail water vapor (H_2O), carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and chlorofluorocarbons (CFC) mainly (Table 1). Though the greenhouse effect is a natural phenomenon, due to erroneous human activities such as clearing forests, burning fossil fuels, releasing industrial gases to the atmosphere, *etc*., the emission of greenhouse gases is increasing at an alarming rate. This has in turn resulted in global warming. Global warming is the unusual rapid increase in earth's average surface temperature primarily due to greenhouse effect. Though this warming trend has been going on for a long time, its pace has significantly increased in the last hundred

years due to human activities which has resulted in climate change which refers to long-term shifts in atmospheric temperature and weather patterns. Climate change caused by greenhouse gas emissions is, by its very nature, a global issue. A common strategy and binding targets must therefore be defined on a planetary scale to effectively combat global warming and climate change. This has been the aim of many international climate change initiatives, from the Earth Summit in Rio in 1992 to the universal Paris Agreement adopted in December 2015 and the annual COPs.

Table 1: Greenhouse gases, their concentration in atmosphere and global warming potential

Greenhouse Gases	Atmospheric concentration	Global Warming Potential (GWP)
CO_2	401 ppm	1
Methane	1780 ppb	25
Nitrous oxide	319 ppb	298
CFC 11	250 ppt	4600
CFC 12	553 ppt	10600
HCFC 22	132 ppt	1700
HCFC 23	12 ppt	12000

INTERNATIONAL INITIATIVES TO REDUCE GREENHOUSE GAS EMISSIONS AND COMBAT CLIMATE CHANGE

1) United Nations Framework Convention on Climate Change (UNFCCC)

In 1992, 194 countries joined this international treaty to address the problem of climate change. This is also known as Rio Earth Summit. Stabilizing atmospheric concentrations of greenhouse gases to avoid dangerous anthropogenic interference was the aim of this summit. The headquarters is at Bonn, Germany. The components of UNFCCC are COP, Secretariat, Expert Groups, Financing and the Global Environment Facility and Subsidiary bodies. The principles of UNFCCC are to reduce overall climate impact, educate for climate action, promote sustainable and responsible consumption and advocate for climate action through communication.

2) Kyoto Protocol

The Kyoto Protocol, the first international treaty to set legally binding targets to cut greenhouse gas emissions, was adopted on 11 December 1997. Owing to a complex ratification process, it entered into force on 16 February 2005 and had 192 member countries. The Kyoto Protocol operationalized the United Nations Framework Convention on Climate Change by committing industrialized countries and economies in transition to limit and reduce greenhouse gases (GHG) emissions in accordance with agreed individual targets. In its Annex B, the Kyoto Protocol had set binding emission reduction targets for 37 industrialized countries and these targets added up to an average 5 per cent emission reduction compared to 1990 levels over the five-year period 2008–2012 (the first commitment period). To enable countries to meet their emissions reduction targets, the Kyoto Protocol established three market-based mechanisms: emission trading, clean development mechanism and joint implementation mechanism. In Doha, Qatar, on 8 December 2012, the Doha Amendment to the Kyoto Protocol was adopted for a second commitment period; however, Kyoto Protocol has been superseded by the Paris Agreement in 2015.

3) The Cancun agreements

The Cancun Agreements were a set of significant decisions by the international community to address the long-term challenge of climate change collectively and comprehensively over time, and to take concrete action immediately to speed up the global response to it. The agreements, reached on December 11 in Cancun, Mexico, at the 2010 United Nations Climate Change Conference, represented key steps forward in capturing plans to reduce greenhouse gas emissions, and to help developing nations protect themselves from climate impacts and build their own sustainable futures. It encompassed finance, technology and capacity-building support to help countries meet urgent needs to adapt to climate change, and to speed up their plans to adopt sustainable paths to low emission economies that could also resist the negative impacts of climate change.

The goals include,

- Establish clear goals and a timely schedule for reducing human-generated greenhouse gas emissions over time to keep the global average temperature rise below two degrees
- Encourage the participation of all countries in reducing these emissions, in accordance with each country's different responsibilities and capabilities to do so
- Mobilize the development and transfer of clean technology to boost efforts to address climate change, getting it to the right place at the right time and for the best effect on both adaptation and mitigation

- Set up the Green Climate Fund to provide support to developing countries to assist them in mitigating climate change and adapting to its impacts
- Protect the world's forests, which are a major repository of carbon; governments have agreed to launch concrete action on forests in developing nations, which will increase going forward.

4) The Durban Agreements

The UN Climate Change Conference in Durban was a turning point in the climate change negotiations. In Durban, governments clearly recognized the need to draw up the blueprint for a fresh universal, legal agreement to deal with climate change beyond 2020, where all would play their part to the best of their ability and all will be able to reap the benefits of success together. The Durban outcome recognized, in its spirit and intention that smart government policy, smart business investment, and the demands of an informed citizenry, all motivated by an understanding of mutual self-interest, must go hand in hand in pursuit of the common goal. The key goals include,

i) Second commitment period of the Kyoto Protocol

The continuation of the current international legal system through a second commitment period of the Kyoto Protocol, under which developed countries commit to greenhouse gas cuts and which enshrines existing accounting rules and models of international cooperation that may inform future efforts.

ii) Launch of new platform of negotiations

The launch of a new platform of negotiations under the Convention to deliver a new and universal greenhouse gas reduction protocol, legal instrument or other outcome with legal force for the period beyond 2020. This new negotiation critically includes finding ways to further raise the existing level of national and international action and stated ambition to bring greenhouse gas emissions down.

iii) Global Review

To scope out and then conduct a fresh global Review of the emerging climate challenge, based on the best available science and data, first to ensure whether a maximum two-degree rise is enough or whether an even lower 1.5-degree rise is required, and then to ensure that collective action is adequate to prevent the average global temperature rising beyond the agreed limit.

5) Rio Plus 20 Summit

The United Nations Conference on Sustainable Development (UNCSD), also known as Rio 2012 or Rio+20 or Earth Summit 2012 was the third international conference on sustainable development aimed at reconciling the economic and environmental goals of the global community. Hosted by Brazil in Rio de Janeiro from 13 to 22 June 2012, Rio+20 was a 20-year follow-up to the 1992 United Nations Conference on Environment and Development (UNCED) held in the same city, and the 10th anniversary

of the 2002 World Summit on Sustainable Development (WSSD) in Johannesburg. The objective of the Rio plus 20 conference was to secure renewed political commitment for sustainable development addressing new and emerging challenges, with a focus on two key themes:

i) Green Economy in the context of sustainable development and poverty eradication

The Green economy is based on six main sectors:

- Renewable energy (solar, wind, geothermal, marine including wave, biogas, and fuel cell)
- Green buildings (green retrofits for energy and water efficiency)
- Clean transportation (alternative fuels, public transit, hybrid and electric vehicles, car sharing and carpooling programs)
- Water management (Water reclamation, low-water landscaping, water purification, storm water management)
- Waste management (recycling, municipal solid waste management)
- Land management (organic agriculture, habitat conservation and restoration, urban forestry)

ii) The institutional framework for sustainable development

6) The Paris Agreements

The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at the UN Climate Change Conference (COP21) in Paris, France, on 12 December 2015. It entered into force on 4 November 2016. Its overarching goal is to hold "the increase in the global average temperature to well below 2°C above pre-industrial levels" and pursue efforts "to limit the temperature increase to 1.5°C above pre-industrial levels." With the Paris Agreement, countries established an enhanced transparency framework (ETF). Under ETF, starting in 2024, countries will report transparently on actions taken and progress in climate change mitigation, adaptation measures and support provided or received. It also provides for international procedures for the review of the submitted reports. The information gathered through the ETF will feed into the Global stocktake which will assess the collective progress towards the long-term climate goals.

7) Carbon Credits and Carbon Trading

Kyoto Protocol (1992) introduced the concept of carbon credits as per which a country gets credits to reduce carbon emissions in the atmosphere. It was signed in 1997 in Kyoto, Japan. Carbon credits work like most commodities – they're tradable units or certificates. To be more specific, they are a permit that gives its holder the right to emit certain amounts of carbon dioxide or its equivalent (CO_2), such as nitrous oxide, methane, etc. One carbon credit represents 1 metric ton of CO_2 prevented from entering the atmosphere. Individuals and companies buy them to compensate for their unavoidable emissions. They're

from projects or activities that reduce or remove carbon emissions from the air. Carbon credits traded in an ETS (Emissions Trading System) are from various projects certified and verified by carbon standards such as Verra, Gold Standard, Puro earth and American Carbon Registry, among others. For developing nations, carbon credits are issued in the form of Certified Emission Reductions (CERs). Each CER is awarded for each ton of GHG that a project reduces, avoids, or removes. These carbon credits, measured in Mt of CO_2, are issued by UNFCCC. Anyone can buy these carbon credits on this platform to offset their emissions or they can do so just to support or finance the carbon reduction or removal projects. In addition to this, the trade has led to using carbon accounting to measure the impact made by companies, individuals, and governments on greenhouse gas reduction.

CONCLUSION

Global warming refers to the gradual rise in overall temperature of the earth's atmosphere. Though this warming trend has been going on for a long time, its pace has significantly increased in the last hundred years due to erroneous human activities which has resulted in climate change (long-term shifts in atmospheric weather patterns). Strategies and binding targets defined on a planetary scale were mandatory to effectively combat global warming and climate change. Various summits were held; treaties and agreements were signed on a global level to reduce greenhouse gas emissions and combat climate change. Carbon credits and carbon trading were introduced as well; as novel initiatives to cut down greenhouse gas emissions. Carbon credits are tradable units or certificates that gives its holder the right to emit certain amounts of carbon dioxide or its equivalent, *viz*. as nitrous oxide, methane, *etc*. A single carbon credit is equivalent to one metric ton of CO2 that is kept out of atmosphere. A carbon market allows investors and corporations to trade carbon credits. This acts as a mitigating measure to combat climate change, while creating new market opportunities as well.

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