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Greenhouse Gases: Effect and their Impact on Life

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ABSTRACT

The greenhouse effect is one of the primary reasons for the continuous warming of the planet. It stops some of the planet's heat from escaping through the atmosphere into space. Without the greenhouse effect, life as we know it would not exist on Earth. As a blanket, greenhouse gases such as CO_2, nitrous oxide, water vapor, and methane absorb infrared light and prevent it from escaping into space. This document provides an overview of current projections for physical and biological impacts, their potential societal costs, and the anticipated costs of abatement. At least in the developed world, the consequences are likely to be within the "affordable" range under the "most favorable" scenario. In the "third world," where the idea of affordability is scarcely relevant, quantitative evaluation is practically impossible

Keywords: Greenhouse Effect, Greenhouse Gases, Global Warming

1. INTRODUCTION

Because it is between the freezing and boiling points of water, the planet's average surface temperature is perfect for human life. It cannot be explained by the Earth orbiting the sun at the exact angle needed to absorb the greatest solar radiation. The moderate temperature is also influenced by the specific type of environment. [1]Additionally, a section of Earth's atmosphere serves as shielding with the ideal thickness and solar energy to keep the average global warming temperature within a ludicrous range. The troposphere of Mars would leave Earth shivering in a deep cold similar to that of Mars, whereas the atmosphere of Venus would create a hellish, Venus-like environment on Earth. These gases are all excellent global insulators. UV rays can easily enter a greenhouse through its glass walls, where they are absorbed by the plants and hard surfaces. The greenhouse overheats as a result of weaker infrared radiation being trapped behind the glass walls and having a harder time passing through. As a result, even during extremely harsh winters, tropical plants may flourish indoors. The greenhouse effect causes the Earth's temperature to rise by trapping heat in our atmosphere. This keeps the Earth's temperature higher than it would be if the Sun's direct heating were the only source of warming.[2]

Climate scientists blame the warming of the earth on human activities like burning fossil fuels and deforestation that emit carbon dioxide and other "greenhouse gases" into the atmosphere. However, human activity has altered the chemical composition of the atmosphere and made the Earth habitable by accumulating greenhouse gases, primarily carbon dioxide, methane, and nitrous oxide. There was compelling evidence that the primary cause of the temperature increase was the release of carbon-based molecules from burning fossil fuels to create power, a process commonly known as the "greenhouse effect." Greenhouse gases, mostly chlorofluorocarbons, or CFCs, have been introduced to the atmosphere in significant amounts in recent years due to the known rise in concentrations of carbon dioxide, methane, and nitrous oxide.[3] Joseph Fourier initially hypothesized the presence of the greenhouse effect in 1824. While Claude Pouillet in 1827 and 1838 offered more proof and support for the theory, John Tyndall in 1859 based his reasoning on experimental facts. The impact was initially measured in greater detail by Svante Arrhenius in 1896.[4], but it wasn't until 1901 that Nils Gustaf Ekholm used the term "greenhouse" to describe it. In 1917, Alexander Graham Bell wrote. Bell persisted in promoting the growth of renewable energy sources, such solar power, arguing that "the unchecked burning of fossil fuels would have a sort of greenhouse effect" and that "the net result is the greenhouse becomes a sort of hot-house." [5]

2. FOUNDATIONS OF GREENHOUSE EFFECT

The interaction of solar radiation with greenhouse gases found in the Earth's atmosphere, including carbon dioxide, methane, nitrous oxide, and fluorinated gases, is the primary cause of the greenhouse effect. The greenhouse effect is brought on by these gases' capacity to retain heat. [6]The most prevalent greenhouse gases in the Earth's atmosphere are carbon dioxide (CO_2, 9–26%), methane (CH_4, 4-9%), nitrous oxide (N_2O), ozone (O_3, 3-7%), water vapor (H_2O, 36-70%), and chlorofluorocarbons (CFCs). The equilibrium between sources and sinks determines these gases' concentrations. Since the bands for each gas's emission and absorption overlap, it is technically impossible to give each one a specific percentage. The "airborne fraction" (AF) is the proportion of an emission that is still in the atmosphere after a given amount of time. For example, studies of the net greenhouse effect of farming systems should consider the high specific greenhouse potential of site- and management-related N2O emissions in addition to CO_2 and CH_4 emissions.8 Model approaches have been developed for emission inventories on the farm level that take into account all relevant outputs, but on the basis of partially

simplified model algorithms.[9] CH_4 emissions: Methane is released during the production and transportation of coal, natural gas, and oil. The annual AF is more specifically defined as the ratio of the atmospheric increase in a given year to the total emissions of that year. [7]Additionally, from municipal solid trash, animal husbandry, agriculture, and the breakdown of organic waste in landfills. A variety of criteria, including animal species, performance, and nutrition, were considered in order to determine the metabolic methane emissions from cattle husbandry. Conversion factors were used to determine methane outputs based on the input gross energy. [10] **N_2O emission**: N_2O emissions were computed during industrial and agricultural activities, as well as during the burning of solid waste and fossil fuels. The methane formation potential was computed using the excreta output (quantity, chemical components, and degradability) as the basis in order to measure the methane release from organic fertilizer during storage. The amount of methane produced in connection with the storage system was then determined. Although this was oversimplified, it was estimated that 1.25 percent of the nitrogen in the soils came from N_2 fixation, N2 deposition, and organic and mineral fertilization. Burning fossil fuels (oil, coal, and natural gas), solid waste, trees, and wood products, as well as some chemical processes (such those that occur during the production of cement), releases carbon dioxide (CO_2). When carbon dioxide is absorbed by plants as part of the biological carbon cycle, it is taken out of the atmosphere (or "sequestered").

3. REDUCTION AND CONTROL MEASURES OF GREENHOUSES GASES

International and regional cooperation is more sought after and has been strongly advocated in the comity of global atmospheric sanity because the problem is global in scope and no one country or group of countries can solve it alone.[11] The United Nations Framework Convention on Climate Change (UNFCCC) was recently put into effect in order to lower the dangerous concentration of anthropogenic greenhouse gases in the atmosphere. GHGs in the atmosphere. All gases can be reduced by following methods:

A. Clean development mechanism

Under the auspices of the UNFCCC, developing countries are increasingly developing renewable power generation in accordance with the clean development mechanism, which calls for the widespread deployment of renewable energy technologies for power generation and carbon dioxide sequestration to promote the idea of sustainable development.[12] The clean development mechanism is a key concept of the Kyoto Protocol.[12] In addition to the potential of renewable energy resources to mitigate greenhouse gas emissions, energy security is rapidly becoming a reality with the exploitation of various renewable energy resources. Nevertheless, the idea was for developed countries to fund emission reduction mechanisms and sponsor renewable energy programs in developing nations.[12] After ten years, there has been no successful implementation, and the global pace of renewable power exploitation is not keeping up with the realistic and anticipated level of developments.

B. Green energy portfolio standard

"Green energy." Also referred to as renewable energy, green energy is a kind of conventional energy generation that has less of an adverse environmental impact. The usage of renewable energy is one of the most crucial elements in the effort to reduce greenhouse gas emissions and raise the prospect of sustainable development. Many nations have backed and adopted green energy projects to produce and use electricity with the least amount of pollution. Regulations are used under the Green Energy Portfolio Standard (GEPS) to increase the production and use of energy from sources that are more ecologically friendly and have the lowest pollutant propensity rating. As a strategic step to cut emissions, electric power producing enterprises are required to supply a specific percentage of the nation's electricity consumption from renewable sources in certain nations where the green energy portfolio standard is broadly adopted. Countries are required to report their emissions from a variety of energy-related activities to the Intergovernmental Panel on Climate Change, or IPCC. GEPS proponents list several advantages, including innovation, pollution reduction, and the potential for competition to drive down the cost of renewable energy per unit. In addition to conserving fossil fuels for future generations, there are several other benefits to growing green energy responsibly.

C. Financing low carbon energy

A significant quantity of greenhouse gases, especially CO2, are released into the atmosphere when petroleum products are burned. Development is thought to depend on having safe access to contemporary energy. Since it is now generally accepted that energy-related emissions must be reduced, financing low-carbon energy can be a tactic to lower greenhouse gas emissions. Even if there are several funding programs for energy projects, it is imperative to promote low-carbon activities, particularly in nations where oil is the primary source of both energy and money. Low-polluting energy technologies lessen an economy's susceptibility to human environmental sustainability. By maximizing the potential of renewable energy sources, this low-carbon economy can be realized. There are several chances to build and improve the energy infrastructure using renewable energy sources because rural communities are diverse. To regulate and track emissions, a number of nations have already put in place emissions trading schemes (ETS) based on a carbon price.

The greenhouse effect can be reduced through a variety of strategies, including fuel price rises, energy saving, new energy generation, reforestation, methane recovery from waste, the ban on the production of CFCs, international conferences, national pollution standards, and anti-pollution campaigns.

4. GREENHOUSE EFFECT AND GLOBAL WARMING

In the late nineteenth century, atmospheric scientists coined the phrase "greenhouse effect." At the time, it had no negative connotations and was used to describe the naturally occurring roles of trace gases in the atmosphere. The term "greenhouse effect" was not coined to describe climate change concerns until the middle of the 1950s. Additionally, the greenhouse effect is frequently seen unfavorably in the modern era; these negative concerns are connected

to the potential consequences of a larger greenhouse effect. It is crucial to keep in mind that life as we know it would not exist on Earth if not for the greenhouse effect. The majority of greenhouse gas emissions, including those of carbon dioxide, methane, nitrous oxide, and halogenated chemicals, are caused by human activity, however some of these emissions do occur naturally. Greenhouse gases (GHGs) absorb infrared radiation and trap heat in the atmosphere, exacerbating the natural greenhouse effect, often known as global warming. Life on Earth is made possible by the heating of the atmosphere caused by this natural phenomenon. Without it, life on Earth would not be possible due to the low temperatures. The Earth's climate must change in some way to bring the incoming and outgoing radiation back into balance. The causes of GHGs

A. Global Warming*:* As the concentration of greenhouse gases rises and the amount of outgoing infrared radiation falls,[13] this "climatic change" will involve a "global warming" of the Earth's surface and lower atmosphere since heat is the simplest way for the climate to discharge excess energy. But even a slight increase in temperature will cause a host of additional changes, such as changes in wind and cloud cover. Feedback on some of these changes might be favorable, while feedback on others might be unfavorable. In its third assessment report, the "Intergovernmental Panel on Climate Change" predicted that by the end of 2100, the global mean surface temperature would have increased by 1.4°C to 5.8°C using sophisticated climate models. This model accounts for the delayed impacts of the oceans' enormous thermal capacity as well as the effects of particles, which have a tendency to lower the temperature. The magnitude of the ocean delay, future rates of greenhouse gas emissions, and climate feedbacks are some of the unknowns surrounding this prediction.

B. **Sea Level Rise***:* If global warming takes place, the ocean will be replenished by water from melting glaciers and the Antarctic and Greenland ice sheets, and saltwater will expand thermally as a result of the higher temperatures. Between 1990 and 2100, the average sea level is predicted to increase by 0.09 to 0.88 meters.

C. **Potential Impact on human life:**

1. **Economic Impact:** Islands and low-lying coastal communities will suffer economically from a discernible rise in sea level. [14]For example, more than half of the world's population resides within 100 kilometers of the ocean, and most of them reside in cities that also serve as seaports. Rising sea levels will force a large volume of fresh groundwater inland.

2. **Agricultural Impact:** The anticipated impacts on the biosphere are still uncertain because it is not obvious how local or regional temperature variations caused by global warming will impact agriculture. However, studies have demonstrated that plants can grow larger and quicker when exposed to increased CO_2 concentrations. The general circulation of the atmosphere may also be impacted by global warming, which could alter the precipitation patterns and soil moisture content on various continents.

3. **Effects on Aquatic systems:** Fish populations, especially shellfish populations, may be impacted by the degradation of coastal wetlands. While the exact effect on marine life is unknown, estuaries with increasing salinity may see an increase in marine life while freshwater species abundance declines. .

4. **Effects on Hydrological Cycle:** Although global precipitation is predicted to increase, regional rainfall patterns are anticipated to change. Higher temperatures are expected to increase evaporation, which will put additional strain on many water management systems.[15]

5. **Impact on Human Health:** Excess heat can cause stress which may lead to blood pressure and heart diseases. Global warming may also transfer various diseases to other regions as people will shift from regions of higher temperature to region of comparatively lower temperatures. Moreover, it is an established fact that warmer temperature leads to dehydration which is a major cause of kidney stones. Researchers have already noticed a rise in mosquito-borne disease like dengue fever and malaria due to warmer and longer summers. Lyme disease is another dangerous disease which is transmitted mainly through bites from certain tick species.

Can the Greenhouse Effect Be Overturned? Several scientists approve that the impairment of the Earth's atmosphere and climate is long-gone the point of no reoccurrence or that the destruction is near the point of no return. “I agree that we have passed the point of avoiding climate change,” Josef Werne, an associate professor at the department of geology and planetary science at the University of Pittsburgh.

5. CONCLUSIONS

One of the most significant silent processes in atmospheric sciences is the ability of certain proposed gases to be slightly transparent to incoming visible light from the sun yet opaque to energy radiated from the earth. The globe is made habitable by this process, which is known as the greenhouse effect. I suggest expanding study on greenhouse gases. This study discovered that energy and power generation-related activities have been linked to emissions that can affect greenhouse gas emissions, which are the primary cause of the upcoming global warming. Anthropogenic greenhouse gas emissions are really higher from energy-related activities than from other human efforts. In essence, the study also argued that in order to preserve the integrity of the global environmental difference for sustainable development and biodiversity interaction, a systematic decrease of GHGs is required. Lastly, it recognized that tackling issues related to energy security, energy management, and health requires a greater usage of renewable energy..

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