



GLOBAL WARMING



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Abstract: *Many researchers, engineers and environmentalists are expressing deep concerns about changes in the overall climate of the planet. Fossil fuels are being continuously used to produce electricity. The burning of these fuels produces gases like carbon dioxide, methane and nitrous oxides which lead to global warming. Deforestation is also leading to warmer temperatures. The hazard of global warming is continuously causing major damage to the Earth's environment. Most people are still unaware of global warming and do not consider it to be a big problem in years to come. What most people do not understand is that global warming is currently happening, and we are already experiencing some of its withering effects. It is and will severely affect ecosystems and disturb ecological balance. Because of the treacherous effects of global warming, some solutions must be devised. The paper introduces global warming, elaborates its causes and hazards and presents some solutions to solve this hot issue. Above all, alternative energy sources (solar, wind, hydro, geothermal, bio mass) need to be seriously pursued. Finding and using renewable sources of energy is one of the methods to combat the ever increasing global warming effectively*

Keywords: *carbon dioxide, fossil fuel, greenhouse effect, vapor, temperature, deforestation, climate.*



Introduction

Global warming is the long-term warming of the planet's overall temperature. Though this warming trend has been going on for a long time, its pace has significantly increased in the last hundred years due to the burning of fossil fuels. As the human population has increased, so has the volume of fossil fuels burned. Fossil fuels include coal, oil, and natural gas, and burning them causes what is known as the “greenhouse effect” in Earth's atmosphere.

The greenhouse effect is when the sun's rays penetrate the atmosphere, but when that heat is reflected off the surface cannot escape back into space. Gases produced by the burning of fossil fuels prevent the heat from leaving the atmosphere.

These greenhouse gasses are carbon dioxide, chlorofluorocarbons, water vapor, methane, and nitrous oxide. The excess heat in the atmosphere has caused the average global temperature to rise overtime, otherwise known as global warming.

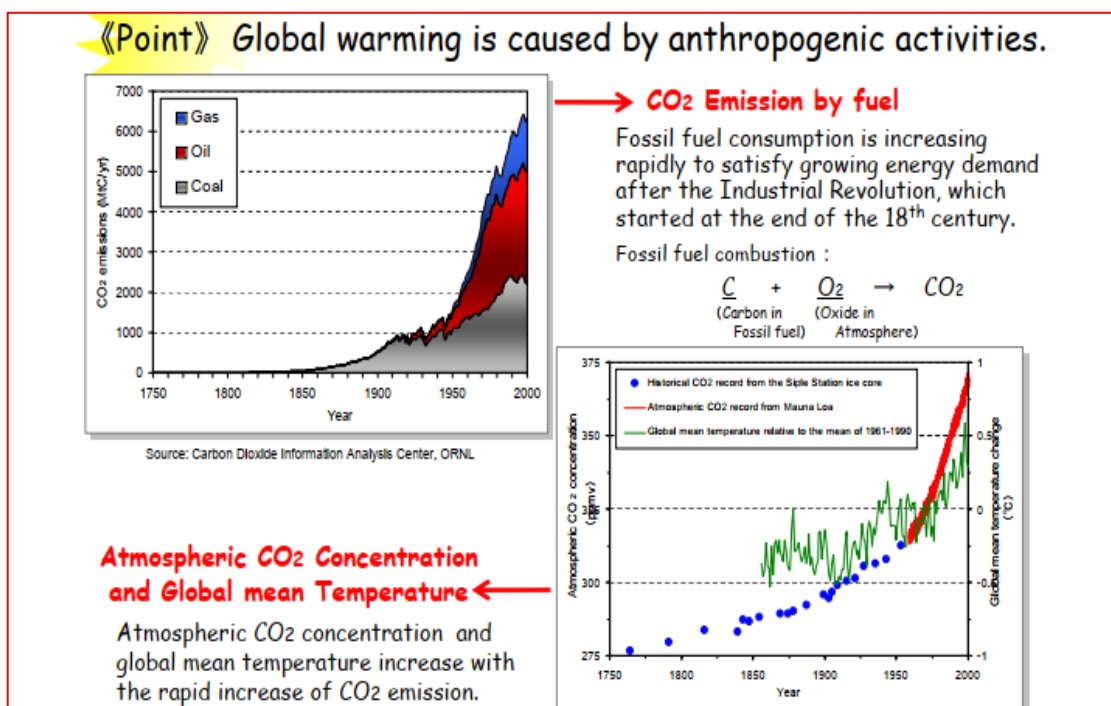
Global warming has presented another issue called climate change. Sometimes these phrases are used interchangeably, however, they are different. Climate change refers to changes in weather patterns and growing seasons around the world. It also refers to sea level rise caused by the expansion of warmer seas and melting ice sheets and glaciers. Global warming causes climate change, which poses a serious threat to life on Earth in the forms of widespread flooding and extreme weather. Scientists continue to study global warming and its impact on Earth.

Main part:

Global warming, the phenomenon of increasing average air temperatures near the surface of Earth over the past one to two centuries. Climate scientists have since the mid-20th century gathered detailed observations of various weather phenomena (such as temperatures, precipitation, and storms) and of related influences on climate



(such as ocean currents and the atmosphere's chemical composition). These data indicate that Earth's climate has changed over almost every conceivable timescale since the beginning of geologic time and that human activities since at least the beginning of the Industrial Revolution have a growing influence over the pace and extent of present-day climate change.



Cause of Global Warming

Giving voice to a growing conviction of most of the scientific community, the Intergovernmental Panel on Climate Change (IPCC) was formed in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Program (UNEP). The IPCC's Sixth Assessment Report (AR6), published in 2021, noted that the best estimate of the increase in global average surface temperature between 1850 and 2019 was 1.07 °C (1.9 °F). An IPCC special report produced in 2018 noted that human beings and their activities have been responsible for a worldwide average temperature increase between 0.8 and 1.2 °C (1.4 and 2.2 °F) since preindustrial times,



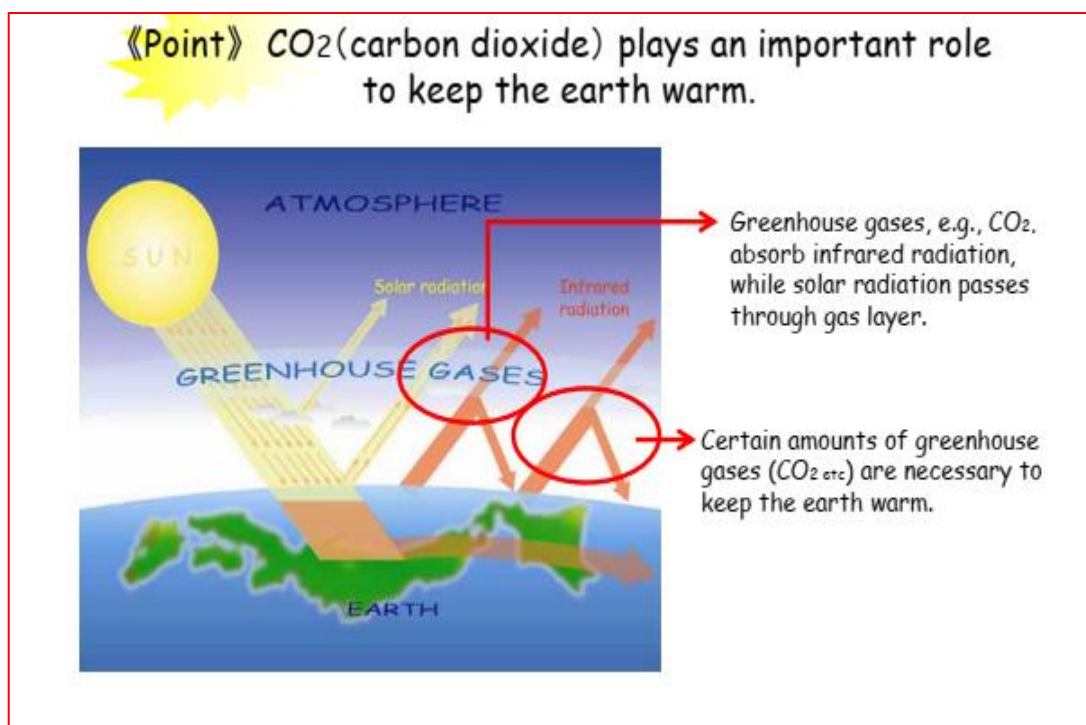
and most of the warming over the second half of the 20th century could be attributed to human activities.

AR6 produced a series of global climate predictions based on modeling five greenhouse gas emission scenarios that accounted for future emissions, mitigation (severity reduction) measures, and uncertainties in the model projections. Some of the main uncertainties include the precise role of feedback processes and the impacts of industrial pollutants known as aerosols, which may offset some warming. The lowest-emissions scenario, which assumed steep cuts in greenhouse gas emissions beginning in 2015, predicted that the global mean surface temperature would increase between 1.0 and 1.8 °C (1.8 and 3.2 °F) by 2100 relative to the 1850–1900 average. This range stood in stark contrast to the highest-emissions scenario, which predicted that the mean surface temperature would rise between 3.3 and 5.7 °C (5.9 and 10.2 °F) by 2100 based on the assumption that greenhouse gas emissions would continue to increase throughout the 21st century. The intermediate-emissions scenario, which assumed that emissions would stabilize by 2050 before declining gradually, projected an increase of between 2.1 and 3.5 °C (3.8 and 6.3 °F) by 2100. Many climate scientists agree that significant societal, economic, and ecological damage would result if the global average temperature rose by more than 2 °C (3.6 °F) in such a short time. Such damage would include increased extinction of many plant and animal species, shifts in patterns of agriculture, and rising sea levels. By 2015 all but a few national governments had begun the process of instituting carbon reduction plans as part of the Paris Agreement, a treaty designed to help countries keep global warming to 1.5 °C (2.7 °F) above preindustrial levels in order to avoid the worst of the predicted effects.

Whereas authors of the 2018 special report noted that should carbon emissions continue at their present rate, the increase in average near-surface air temperature would reach 1.5 °C sometime between 2030 and 2052, authors of the AR6 report suggested that this threshold would be reached by 2041 at the latest. The scenarios referred to above depend mainly on future concentrations of certain trace gases, called



greenhouse gases, that have been injected into the lower atmosphere in increasing amounts through the burning of fossil fuels for industry, transportation, and residential uses. Modern global warming is the result of an increase in magnitude of the so-called greenhouse effect, a warming of Earth's surface and lower atmosphere caused by the presence of water vapour, carbon dioxide, methane, nitrous oxides, and other greenhouse gases. In 2014 the IPCC first reported that concentrations of carbon dioxide, methane, and nitrous oxides in the atmosphere surpassed those found in ice cores dating back 800,000 years. Of all these gases, carbon dioxide is the most important, both for its role in the greenhouse effect and for its role in the human economy. It has been estimated that, at the beginning of the industrial age in the mid-18th century, carbon dioxide concentrations in the atmosphere were roughly 280 parts per million (ppm). By the end of 2022 they had risen to 419 ppm, and, if fossil fuels continue to be burned at current rates, they are projected to reach 550 ppm by the mid-21st century—essentially, a doubling of carbon dioxide concentrations in 300 years.



Greenhouse Effect



A vigorous debate is in progress over the extent and seriousness of rising surface temperatures, the effects of past and future warming on human life, and the need for action to reduce future warming and deal with its consequences. This article provides an overview of the scientific background related to the subject of global warming. It considers the causes of rising near-surface air temperatures, the influencing factors, the process of climate research and forecasting, and the possible ecological and social impacts of rising temperatures. For an overview of the public policy developments related to global warming occurring since the mid-20th century, see global warming policy. For a detailed description of Earth's climate, its processes, and the responses of living things to its changing nature, see climate. For additional background on how Earth's climate has changed throughout geologic time, see climatic variation and change. For a full description of Earth's gaseous envelope, within which climate change and global warming occur, see atmosphere. Global warming is related to the more general phenomenon of climate change, which refers to changes in the totality of attributes that define climate. In addition to changes in air temperature, climate change involves changes to precipitation patterns, winds, ocean currents, and other measures of Earth's climate. Normally, climate change can be viewed as the combination of various natural forces occurring over diverse timescales. Since the advent of human civilization, climate change has involved an "anthropogenic," or exclusively human-caused, element, and this anthropogenic element has become more important in the industrial period of the past two centuries. The term global warming is used specifically to refer to any warming of near-surface air during the past two centuries that can be traced to anthropogenic causes.

To define the concepts of global warming and climate change properly, it is first necessary to recognize that the climate of Earth has varied across many timescales, ranging from an individual human life span to billions of years. This variable climate



history is typically classified in terms of “regimes” or “epochs.” For instance, the Pleistocene glacial epoch (about 2,600,000 to 11,700 years ago) was marked by substantial variations in the global extent of glaciers and ice sheets. These variations took place on timescales of tens to hundreds of millennia and were driven by changes in the distribution of solar radiation across Earth’s surface. The distribution of solar radiation is known as the insolation pattern, and it is strongly affected by the geometry of Earth’s orbit around the Sun and by the orientation, or tilt, of Earth’s axis relative to the direct rays of the Sun.

Worldwide, the most recent glacial period, or ice age, culminated about 21,000 years ago in what is often called the Last Glacial Maximum. During this time, continental ice sheets extended well into the middle latitude regions of Europe and North America, reaching as far south as present-day London and New York City. Global annual mean temperature appears to have been about 4–5 °C (7–9 °F) colder than in the mid-20th century. It is important to remember that these figures are a global average. In fact, during the height of this last ice age, Earth’s climate was characterized by greater cooling at higher latitudes (that is, toward the poles) and relatively little cooling over large parts of the tropical oceans (near the Equator). This glacial interval terminated abruptly about 11,700 years ago and was followed by the subsequent relatively ice-free period known as the Holocene Epoch. The modern period of Earth’s history is conventionally defined as residing within the Holocene. However, some scientists have argued that the Holocene Epoch terminated in the relatively recent past and that Earth currently resides in a climatic interval that could justly be called the Anthropocene Epoch—that is, a period during which humans have exerted a dominant influence over climate.

Though less dramatic than the climate changes that occurred during the Pleistocene Epoch, significant variations in global climate have nonetheless taken place over the course of the Holocene. During the early Holocene, roughly 9,000



years ago, atmospheric circulation and precipitation patterns appear to have been substantially different from those of today. For example, there is evidence for relatively wet conditions in what is now the Sahara Desert. The change from one climatic regime to another was caused by only modest changes in the pattern of insolation within the Holocene interval as well as the interaction of these patterns with large-scale climate phenomena such as monsoons and El Niño/Southern Oscillation (ENSO).

Conclusion

Global warming is a term you must have heard by now as it is very prevalent in today's world. Moreover, it has become a very dangerous environmental issue which we must resolve as soon as possible. If we do not prevent it now, soon we will find it hard to survive on this planet. Every person needs to contribute equally to help prevent global warming. Similarly, we must identify the causes that are contributing to this dangerous phenomenon and work hard to find solutions. Furthermore, we must immediately put a halt to all those activities which are causing global warming. There are many changes we can bring about in our life both big and small to prevent global warming and save our planet. Firstly, we must stop deforestation in all forms. Do not cut down more trees as it will only worsen the level of carbon dioxide in the air. Instead, encourage people to plant even more trees to create a fine balance in nature. Moreover, it reduces the usage of energy everywhere. It does not matter if you are at your home or at your office, the higher the energy used the more the carbon dioxide produced. Thus, do not waste electricity as it requires the burning of fossil fuels. As a result of the burning of fossil fuels, greenhouse gases in the atmosphere increase rapidly and contribute to global warming. Moreover, reduce the carbon footprint and do not travel through planes that often. Most importantly, replace all your ordinary bulbs with LED lights. It will help in reducing the use of energy by a massive amount. Similarly, do not waste that energy. Instead of becoming more dependent,



we need to reduce our dependence on fossil fuels and electricity right away. Opt for eco-friendly options like solar energy and wind power. Take up the habit of recycling and reusing. Do not throw away things instead learn to reuse them properly. Further, carpool with your neighbors and relatives to not contribute to automobile exhausts and emissions.

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