Global Warming and Climate Change

Renewable Energy Assignment 1

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ENER 104 Renewable Energy

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Contents

1 Introduction

This report will discuss the effects of global warming and climate change on the environment and the world. It will also discuss the causes of global warming and climate change and how they can be prevented.

Global warming is the increase in the average temperature of the Earth's surface. This is caused by the greenhouse effect, which is the process by which radiation from a planet's atmosphere warms the planet's surface to a temperature above what it would be without this atmosphere. Climate change is a change in the statistical distribution of weather patterns when that change lasts for an extended period of time. Climate change may refer to a change in average weather conditions, or in the time variation of weather around longer-term average conditions.

2 Causes of Global Warming and Climate Change

2.1 Greenhouse Gases

Greenhouse gases are gases that absorb and emit radiant energy within the thermal infrared range. Greenhouse gases cause the greenhouse effect on planets. The primary greenhouse gases in Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone. Without greenhouse gases, the average temperature of Earth's surface would be about $-18°C$ ($0°F$), rather than the present average of $15°C$ ($59°F$). The atmospheres of Venus, Mars and Titan also contain greenhouse gases.

2.2 Carbon Dioxide

Carbon dioxide is the primary greenhouse gas that is contributing to recent climate change. Carbon dioxide is naturally present in the atmosphere as part of the Earth's carbon cycle. Human activities are altering the carbon cycle both by adding more CO2 to the atmosphere and by influencing the ability of natural sinks, like forests, to remove CO2 from the atmosphere. While CO2 emissions come from a variety of natural sources, human-related emissions are responsible for the increase that has occurred in the atmosphere since the industrial revolution. The main human activity that emits CO2 is the combustion of fossil fuels (coal, natural gas, and oil) for energy and transportation, although certain industrial processes and land-use changes also emit CO2.

2.3 Methane

Methane (CH4) is a hydrocarbon that is a primary component of natural gas. Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills. Methane is also emitted from multiple industrial sources and is the primary ingredient in natural gas. Methane is emitted when coal is mined and transported, during natural gas extraction and distribution, and during oil extraction and transportation. Methane emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills.

2.4 Nitrous Oxide

Nitrous oxide (N2O) is a powerful greenhouse gas that is emitted from agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste. Nitrous oxide emissions occur naturally through microbial processes in soils and the ocean, as well as through human activities involving fertilizer use, fossil fuel combustion, nitric acid production, and biomass burning.

2.5 Fluorinated Gases

Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for ozone depleting substances in various applications, such as refrigeration and air-conditioning, aerosols, foams, and fire suppression. These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases").

3 Effects of Global Warming and Climate Change

3.1 Rising Sea Levels

Global sea level rose about 8 inches in the last century. The rate in the last two decades, however, is nearly double that of the last century and is accelerating slightly every year. As it warms, the water in the oceans expands. Warmer water also causes the ice on land to melt and flow into the oceans. The melting of the polar ice caps and glaciers due to global warming will lead to a rise in sea level. This will lead to flooding of low lying coastal areas and also cities. The flooding in these densely populated areas would lead to massive property losses and loss of life. In many cases, the effects of flooding can be devastating, and they can leave a lasting impact on the affected areas. Some of the most common effects of flooding are property damage, loss of agricultural lands, loss of lives, and diseases.

3.2 Melting of Glaciers

The melting of glaciers will create plethora of problems for human kind and the wildlife. The melting of glaciers will create water shortages in many parts of the world.

3.3 Wildfires

Wildfires are becoming more frequent and intense due to climate change and other factors. Wildfires are uncontrolled fires that burn forests and other wildlands, sometimes spreading to residential areas. Wildfires have occurred naturally ever since the first plants colonized the Earth, about 400 million years ago. Wildfires can be caused by natural factors such as lightning, but also by human activities, the most common of which is arson. Wildfires can cause extensive damage, both to property and human life, but they also have various beneficial effects on wilderness areas. They help to clear dead brush and trees from forests, allowing new growth to flourish. They also help to return nutrients to the soil, which helps to promote the growth of new plants. Wildfires can also help to control insect populations, which can be harmful to trees and other plants.

3.4 Droughts

Droughts are becoming more frequent and intense due to climate change and other factors. Droughts are periods of time when there is not enough water to meet the needs of people, animals, and plants. Droughts can be caused by natural factors such as lack of rainfall, but also by human activities, such as overuse of water resources. Droughts can cause extensive damage, both to property and human life, but they also have various beneficial effects on wilderness areas. They help to clear dead brush and trees from forests, allowing new growth to flourish. They also help to return nutrients to the soil, which helps to promote the growth of new plants. Droughts can also help to control insect populations, which can be harmful to trees and other plants.

3.5 Heat Waves

Heat waves are becoming more frequent and intense due to climate change and other factors. Heat waves are periods of time when the temperature is significantly higher than normal. Heat waves can be caused by natural factors such as lack of rainfall, but also by human activities, such as overuse of water resources. Heat waves can cause extensive damage, both to property and human life, but they also have various beneficial effects on wilderness areas. They help to clear dead brush and trees from forests, allowing new growth to flourish. They also help to return nutrients to the soil, which helps to promote the growth of new plants. Heat waves can also help to control insect populations, which can be harmful to trees and other plants.

3.6 Hurricanes

Hurricanes are becoming more frequent and intense due to climate change and other factors. Hurricanes are large, rotating storms that form over warm oceans. Hurricanes can be caused by natural factors such as lack of rainfall, but also by human activities, such as overuse of water resources. Hurricanes can cause extensive damage, both to property and human life, but they also have various beneficial effects on wilderness areas. They help to clear dead brush

4 Prevention of Global Warming and Climate Change

4.1 Renewable Energy

Renewable energy is energy that is collected from renewable resources, which are naturally replenished on a human timescale, such as sunlight, wind, rain, tides, waves, and geothermal heat. Renewable energy often provides energy in four important areas: electricity generation, air and water heating/cooling, transportation, and rural (off-grid) energy services. Based on REN21's 2017 report, renewables contributed 19.3% to humans' global energy consumption and 23.5% to their generation of electricity in 2015 and 2016, respectively. This energy consumption is divided as 8.9% coming from traditional biomass, 4.2%

4.2 Energy Efficiency

Energy efficiency is the goal to reduce the amount of energy required to provide products and services. For example, insulating a home allows a building to use less heating and cooling energy to achieve and maintain a comfortable temperature. Installing LED lighting, fluorescent lighting, or natural skylight windows reduces the amount of energy required to attain the same level of illumination compared to using traditional incandescent light bulbs. Improving energy efficiency reduces energy cost per unit of service, and can reduce greenhouse gas emissions depending on how electricity is generated. Energy efficiency and renewable energy are said to be the twin pillars of sustainable energy policy and are high priorities in the sustainable energy hierarchy. In many countries energy efficiency is also seen to have a national security benefit because it can be used to reduce the level of energy imports from foreign countries and may slow down the rate at which domestic energy resources are depleted.

5 Conclusion

Global warming and climate change are very serious issues that need to be addressed as soon as possible. The effects of global warming and climate change are already being felt around the world, and they will only get worse if we do not take action now. The causes of global warming and climate change are primarily due to human activities, such as the burning of fossil fuels and the clearing of forests. The effects of global warming and climate change

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