**GLOBAL WARMING**

**Meaning to Global Warming:**

The term “global warming” refers to the increase in the average temperature of global surface air and oceans since about 1950, and to continuing increases in those temperatures.

Another term for “global warming” is “climate change”. The Intergovern­mental Panel on Climate Change (IPCC) concludes that greenhouse gases are responsible for most of the observed temperature increase since the middle of the twentieth century, and that natural phenomena such as solar variation and volcanoes probably had a small warming effect from pre-industrial times.

Climate change is any substantial change in Earth’s climate that lasts for an extended period of time. Global warming refers to climate change that causes an increase in the average temperature of the lower atmosphere. Global warming can have many different causes, but it is most commonly associated with human interference, specifically the release of excessive amounts of greenhouse gases.

Greenhouse gases, being lighter than air, naturally rise up the outer limits of the earth’s atmosphere and then settle there, creating an impenetrable barrier that traps heat from being able to escape into space and warming the temperature.

Greenhouse gases are defined as **“gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of thermal infrared radiation emitted by the Earth’s surface, the atmosphere itself and by clouds”.**

Gases, such as carbon dioxide (CO2), methane (CH4), water vapour, and fluorinated gases, act like a greenhouse gases around the earth. This means that they allow the heat to come from the Sun into the atmosphere, but do not allow the heat to escape back into space. The more the greenhouse gases, the larger the percentage of heat that is trapped inside the earth’s atmosphere.

The earth could not exist in its present state (that is, with life) without the presence of some naturally occurring greenhouse gases, such as CO2, CH4 and water vapour. Without any greenhouse gases no heat would be trapped in atmosphere, so the earth would be extremely cold.

Naturally occurring greenhouse gases (non-fluorinated gases) are good in naturally occurring amounts; it’s when people start contributing excessive amounts of them that greenhouse gases become a problem. With excessive greenhouse gas buildup, the earth’s atmosphere warms to unnatural temperatures which causes, sea surface temperatures to rise, precipitation patterns to change etc.

Global warming is one of the most important issues of modern times and if not taken seriously, it is all set to annihilate all life forms from the surface of the earth. It is continuous increase in the average temperature of the air near the surface of earth and that of the oceans.

**Origin of Global Warming:**

Global warming is the process, which started long and long ago. In order to understand when global warming began, we should look back for many and many years ago — in the times much earlier before human’s devised international treaties and even much earlier before we learned to burn first fossil fuel, which was wood.

It was about the second half of the 20th century, when the global warming had become a talk of the town. In year 1997, the problem of global warming, or to be more exact the problem of human contribution into this natural phenomenon, was addressed officially, when the world’s largest industrialized countries agreed to reduce greenhouse gases emissions as the effort to stop the rapid progression of the global warming.

**(i) Methane:**

CO2 is not the only “Greenhouse Gas”. While carbon dioxide may be primary greenhouse gas, methane actually is 20 times more effective as CO2 at trapping heat in the Earth’s atmosphere. Emissions of methane released into our atmosphere have risen 145% in the last 100 years.

Methane naturally occurs as part of the biological processes behind everything from bovine flatulence to the organic bacteria and sulfur’s commonly found in bogs, springs and wells. Methane is a natural form of gas that is released in rice paddies as well as the composting and decomposition of organic matter. However, methane gas is also released during the processing and preparation of fossil fuels.

**(ii) Water Vapour:**

Water vapour is responsible for 2/3 of the heat currently trapped in the Earth’s atmosphere by all greenhouse gases. The hotter the atmosphere gets, the higher the level of “relative humidity” which holds the heat in even better.

**(iii) Nitrous Oxide:**

Nitrous oxide (N2O) is a colourless, non-flammable gas with a slightly sweet odour. Most commonly known as “laughing gas” and used as a medical anesthetic. Nitrous oxide is naturally produced by oceans and rainforests. Nitrous oxide is naturally broken down in the atmosphere through chemical reactions that occur with sunlight. Some of the most prevalent “man-made” sources of nitrous oxide are agriculture fertilizers, nylon, catalytic converters and nitric acid, along with the burning of organic matter.

**Causes of Global Warming:**

Over the past century, our planet has slowly been warming up. Since the beginning of the 20th century, the average temperature around the world has gradually risen by one degree Fahrenheit. Though this minimal warming might not seem so significant, but the over-all impact will most certainly prove to the devastating if this continual warming process is not somehow abated.

The issue of global warming is most often blamed on human beings’ ecologically irresponsible practices and technologies. In fact, global warming is quite a complex phenomena brought about not only by us but also by nature itself. So, the Global warming may cause by both naturally and anthragogenically.

**(i) Forest Fires:**

Among the most common and most significant contributors to global warming is deforestation caused by forest fires. Fires are natural occurrences in many forests as it is nature’s way to clear to up old growth to encourage new ones. The fires also cause much carbon-filled smoke to rise from the forests to the atmosphere. Both results have dramatic effects on the rate at which global warming is currently occurring. Forest fires started by man, whether intentionally or not, pose even greater dangers to the atmosphere.

**(ii) Oceans:**

Oceans are also significant contributors to global warming as it naturally contains much polluting carbon due to the ecosystems they support. The top layers of oceans contain more pollution than the Earth’s atmosphere and much of that pollution rises. The amount of pollution and number of pollutants are also worsened by man, making oceans even greater contributors to global warming.

**(iii) The north and south poles:**

Both the North and South poles also contribute a lot to global warming. It is in those areas where permafrost contains large amounts of carbon that have frozen over time. Disturbances to these areas cause the permafrost to melt and release the pollutants into the atmosphere. The carbon held within these lands have been out of the carbon cycle for thousands of years and so releasing them would cause an imbalance to natural processes.

**(iv) Power plants:**

Nearly 40% of our carbon dioxide emissions come directly from the process of burning “fossil fuels” in order to generate electricity. Coal emits 25% more carbon per **“unit of energy”** than oil and 70% more carbon than natural gas.

**(v) Automobiles:**

Approximately 1/3 of the carbon dioxide emissions released into our environment comes from the burning of gasoline in internal- combustion engines of automobiles, buses, motorcycles, recreational vehicles, trucks and motor sports.

As motor sports (racing) continue to grow in popularity, the huge amount of fuel being used continues to grow annually. Just NASCAR alone, which is only one of numerous racing associations, admits that it burns over 1 million gallons of gas per year which is used for the racing, trials, practice runs, etc.

**(vi) Airplanes:**

The United Nation’s Inter governmental Panel on Climate Change estimates that aviation currently is responsible for just under 5% of global warming and that the figure could very well rise to approximate 15% by the year 2050.

**(vii) Deforestation:**

Deforestation is the 2nd most common cause of atmospheric CO2 influx. Deforestation is responsible for nearly 1/4 of all carbon emissions entering the atmosphere. The planet cuts and burns nearly 34 million acres of trees each year, including millions of acres of “rainforests”.

The process of deforestation is “doubly” dangerous for the planet, because not only millions of tons of carbon dioxide is added into the atmosphere each year, but also wiping out the most effective cleansers of that deadly CO2 gas, the trees and plants that naturally “thrive” by consuming the carbon dioxide and offering up pure, clean, breathable oxygen as a free byproduct of the plant life cycle.

**(viii) Melting permafrost:**

Permafrost is the frozen soil throughout the Arctic and sub-arctic regions, that contain all kinds of organic matter such as all kinds of frozen plants and animals that have been frozen solid and held inert for 30,000 years. Approximately 25% of the land mass of the Northern Hemisphere is “permafrost”, or soil with a temperature of 32 degrees Fahrenheit or less.

Permafrost has acted like a jail cell for carbon, methane and other greenhouse gases for several thousand years. As glacial regions and permafrost begin to melt, the 50 billion tons of carbon, that held inactive, under the frozen surface of the tundra, will begin and continue to be released into our atmosphere, creating a greenhouse effect that would make the residents of the hottest and most humid tropical islands faint in mere minute.

**Effects of Global Warming:**

**(i) Effects of Global Warming on Polar Ice Caps:**

The effects of global warming are strongest at the poles. Ice all over the world melting. This includes the ice of mountain glaciers, Arctic sea ice and ice sheets covering West Antarctica and Greenland. The melting ice increases the sea level and this causes flooding of low-lying areas. When snow and ice melts, their ability to reflect sunlight lost this accelerate the global warming even further.

**(ii) Shortage of water in summer**

Less glacier melt-water in summer means the drying up of rivers and streams which are needed for drinking water, irrigation and many other processes. Just imagine the effects from an accelerated melting of Himalayan glaciers. The Ganges and other major rivers are the lifeblood for the huge populations of India, China and other parts of Asia. Fisheries will be affected, rely on the cold water for breeding and food.

**(iii) Effects of Global Warming on Weather:**

Precipitation in the form of rain and snow has on average, increased across the whole world. Irregular weather patterns have an effect on humans. Rain is not only an inconvenience for humans, but also damage human property. The increase in heat will increase evaporation which is why there will be more rain. Animals and plants cannot easily adapt to increased rainfall or snowfall and many animals migrate to other areas. Plants can die as a result and this can cause an ecosystem to collapse as plants are the main source of food in the ecosystem.

**(iv) Reason for Hurricanes**

Hurricanes and other storms are likely to become stronger. Hurricanes form from simpler tropical storms oceans. The water from the warmer ocean evaporates and it heats the surrounding air, creating hurricanes. Higher temperatures mean that more water will evaporate creating stronger hurricanes.

**(v) Effects on transportation**

Transport will be affected by cracking road surfaces, rupturing pipelines, railway lines and runways. Melting permafrost presents risks of road and rail- track subsidence.

**(vi) Effects on Food Production:**

As temperatures around the world will increase, plants will find it harder to cope and they will die. Some of the plants are used by humans for food and so a food shortage may occur. Plants make their own food through the process called photosynthesis.

The enzymes that are needed for photosynthesis die when exposed to high temperatures. Pests may also migrate to new areas and destroy the crops there. Pests may migrate from tropical countries to temperature countries.

Agriculture would be severely affected because there is no water for plants to grow (due to higher temperature). When there are no plants, humans have nothing to eat. There are also no plants to feed animals and so humans cannot eat animals either.

**(vii) Effects on Ecosystems:**

Animals have been migrating to adapt to new conditions. Some butterflies, foxes and alpine plants have moved north to cooler areas. This migration destroys ecosystems and their biodiversity. As parts of the food chain are lost from an ecosystem the whole ecosystem can easily collapse. Ecosystems and their biodiversity are important to humans. Humans get food, employment, raw materials and pharmaceutical products from the environment.

**(viii) Effects on Humans:**

Rising temperatures have an effect on the health of humans. The world glimpsed this in 2003 when Europe was struck by heat waves and people died. Heat strokes are likely to increase as temperature gets hotter.

Diseases such as malaria are likely to spread. Parasites that originate in tropical regions may migrate to temperate regions as become warmer. Mosquitoes are an example and it is predicted that malaria will spread around world. It is also predicted that asthma will increase around the world as allergens that cause asthma will become more common. Hurricanes have divesting effects on humans and their properties. Such as, destroying structures, killing people and displacing.

**(ix) Effects on Oceans:**

Between 1880 and 2000 a 20 cm. rise in ocean levels has been recorded — now occurring at 0.2 mm per year. This is due to ocean water expansion through its warming and water from melting glaciers and polar ice. Oceans have absorbed about half the human-made CO2emissions since 1800. A higher CO2 content makes the oceans more acid. This has adverse effects on coral, fish and plankton.

The melting ice increases the sea level and this causes flooding of low-lying areas. When snow and ice melts, their ability to reflect sunlight lost this accelerate the global warming even further. The effects include landslides, glacial lake overflow and flash floods as regular, seasonal patterns of snowfall and some melting are destroyed.

**(x) Effects of Global Warming on Further Global Warming:**

Melting glaciers and permafrost may be at a stage where there is no turning back. As they contribute their fresh water to the oceans and as methane gas is released these events will further accelerate global warming. This is called the positive feedback effect.

“Tipping points” is a delicate threshold where a slight rise in the Earth’s temperature can cause a dramatic change in the environment that itself triggers a far greater increase in global temperatures.Huge deposits of methane are trapped in ice crystals under the oceans. If these would be released the atmosphere would experience sudden and significant further warming.

**(xi) Effects of Global Warming on Animals:**

As global warming causes climate change, many great deserts like the Sahara are no longer able to sustain their animal population. The melting glaciers have caused water levels to rise in Many oceans, threatening to drown many tropical islands and forests that have animal life. Studies now indicate a change in the hibernation, breeding, and migration patterns of animals.

**Control of Global Warming:**

Global warming has become one of the most serious issues in current affairs, politicians and environmentalists due to the various risks and effects associated with it. Despite the fact that global warming is increasing at an alarming rate and it might be too late to restore the damage it has caused, it is believed that developing an aggressive plan of action can help to reduce its negative impact.

**Some suggestions to reduce global warming are:**

**(i) Lighting:**

Use Compact Fluorescent Light (CFL) bulbs. These use 60% less energy than incandescent bulbs. By using CFLs, we can save around 140 kg of CO2 each year.

**(ii) Proper Heating, Cooling and Ventilation:**

Use programmable thermostats, lowering thermostat by 2°C during the winter. Proper thermostat setting will keep from emitting over 900 kg of CO2 each year. Up-to 160 kg of CO2 can be saved annually by cleaning air conditioning and furnace filters regularly.

Using double-glazed windows and insulating ceilings and walls properly will not only reduce energy bill by around 25% but also reduce annual CO2 emissions by over 900 kg. Weather-stripping and caulking will also reduce from emitting up to 800 kg. of CO2 a year.

**(iii) Appliances, Fixtures and Equipment:**

Use energy efficient appliances. This can help in reducing yearly CO2 emissions by 160-320 kg. If you have a water heater, wrap it with an insulation blanket and set its thermostat to a maximum of 50°C. These can help us to reduce our yearly CO2 emissions by 700 kg.

**(iv) Bathroom, Kitchen and Laundry Practices:**

Dry your laundry outdoors rather than using a dryer. Doing this can help you keep from emitting up to 635 kg of CO2 each year. Use the least possible amount of hot water in bathroom, kitchen and laundry room. By using warm or cold water to wash clothes up to 230 kg of CO2 could be saved per year.

**(v) Waste Management:**

Send all recyclables to recycling plants. Recycle at least half of household’s waste can save up to 1,100 kg of CO2 per year. Also, compost organic waste to reduce methane emissions.

**(vi) Transportation:**

Transportation sector is second largest contributor of carbon dioxide emissions into the atmosphere. Drive less, take bikes, walk or carpool whenever possible.

**(vii) Maintenance:**

If only 1% of all car owners maintained their cars properly can reduce huge CO2emissions. Also properly inflated tires at all times as tire pressure greatly affects gas mileage 9 kg of CO2can be saved from being emitted into the atmosphere by saving just 1 gallon of gasoline.

**Some more suggestions to reduce global warming are:**

1. Consider investing in a hybrid or electric vehicle to help prevent against further global warming.

2. Clean or replace your filters monthly.

3. Choose energy-efficient appliances when it’s time to buy new ones.

4. Decrease your air travel.

5. Wash clothes in cold water and line-dry whenever possible.

6. Cut down on your garbage-buy fewer packaged materials to prevent further global warming. Composting is another efficient option that an significantly reduce landfill spaces.

7. Unplug electronics when they are not in use, because they still take up energy. At the very least, turn items off when they’re not being used.

8. Run the dishwasher and clothes washer only when you have a full load, and if available, use the energy-saving setting.

9. Buy recycled paper products and recycle as much of your waste as possible.

10. Plant a tree. Trees can be an effective solution in countering this serious problem.

11. Use non-toxic cleaning products that are environment friendly.

12. Eat less meat and more organic foods in your diet to do your part in preventing global warming. This is one of the most effective ways to reduce our personal carbon footprint and to generally reduce our personal negative impact on the environment.