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Green house effect, climate change and adoption of green technologies

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Abstract
Earth's greenhouse effect is manifested as the difference between thermal infrared radiation emitted at the Earth surface and that emitted to space at the top of the atmosphere. This difference is due mainly to absorption and downward emission of radiant energy by atmospheric trace gases. The greenhouse effect is an essential feature of Earth's climate system that results in global mean surface temperature about 32 K greater what it would otherwise be for the same planetary absorption of solar radiation. Increases in atmospheric carbon dioxide, methane, nitrous oxide, and chlorofluorocarbons due to human activities over the past 200 years have increased the greenhouse effect by about 1% relative to the radioactive fluxes that drive the climate system. The resultant increase in global temperature and other changes in climate are of great societal concern. This article introduces the physics of the greenhouse effect and more broadly of Earth's climate system and of climate change and provides resources for further study. It reviews the processes responsible for the greenhouse effect, the anthropogenic increase in the greenhouse effect, and the response of the climate system to this increase. Developing prognostic capability to determine this response to an accuracy that would be useful to inform policymaking is the major challenge facing climate scientists today
This was not actually verified until 1987; in 1988 it was finally acknowledged that the climate was warmer than any period since 1880. The greenhouse effect theory was named and the Intergovernmental Panel on Climate Change (IPCC) was founded by the United Nations Environmental Programme and the World Meteorological Organization. This organization tries to predict the impact of the greenhouse effect according to existing climate models and literature information. But this is just the beginning. We need to act to avoid catastrophic climate change. While not all regional effects are knows yet, here are some likely future effects if we allow current trends to continue. So barriers to technology access by 2020 will "compromise". The ability of developing countries to take ambitious climate change action. Thus a significant portion of green technology will be from clean energy sources, given our commitments towards humanity to rapidly expand wind power, solar power and nuclear energy. Hear my paper clearly explains the ill effects of climate and its prevention thought adoption of green technology.

Keywords: Green technologies, climate change, wind power, solar power and nuclear energy

Introduction
India is the world's third largest carbon emitting nation after china and the us, but its emissions are well below the global average on per capital basis. Unlike China, India has not committed to a peak emissions target, and has instead pledged to cut own the rate at which it emits green house gases by a third over the next 15 years.
As the world faces the challenges of climate change, new green technologies and sustainable design are helping to reduce the impact of human activity on our world and build a sustainable future. Climate change issue is increasing the demand for technologies that produce cleaner fuels and increase energy efficiency.
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The Greenhouse Effect

The greenhouse effect is the rise in temperature that the Earth experiences because certain gases in the atmosphere (water vapor, carbon dioxide, nitrous oxide, ozone, methane, for example) trap energy that comes from the sun. These gases are usually called greenhouse gases since they behave much like the glass panes in a greenhouse. The glass panels of the greenhouse let in the light but keep heat from escaping and this is similar to the effect these gasses have on earth. Sunlight enters the Earth's atmosphere, passing through the greenhouse gases. As it reaches the Earth's surface, land, water, and biosphere absorb the sunlight's energy. Once absorbed, this energy is sent back into the atmosphere. Some of the energy passes back into space, but much of it remains trapped in the atmosphere by the greenhouse gases.

This is the completely natural process and without these gases all the heat would escape back into space and Earth's average temperature would be about 30 degrees Celsius (54 degrees Fahrenheit) colder.

The greenhouse effect is very important process, because without the greenhouse effect, the Earth would not be warm enough for humans to live. But if the greenhouse effect becomes stronger, it could make the Earth warmer than usual. Even a little extra warming may cause problems for humans, plants, and animals.

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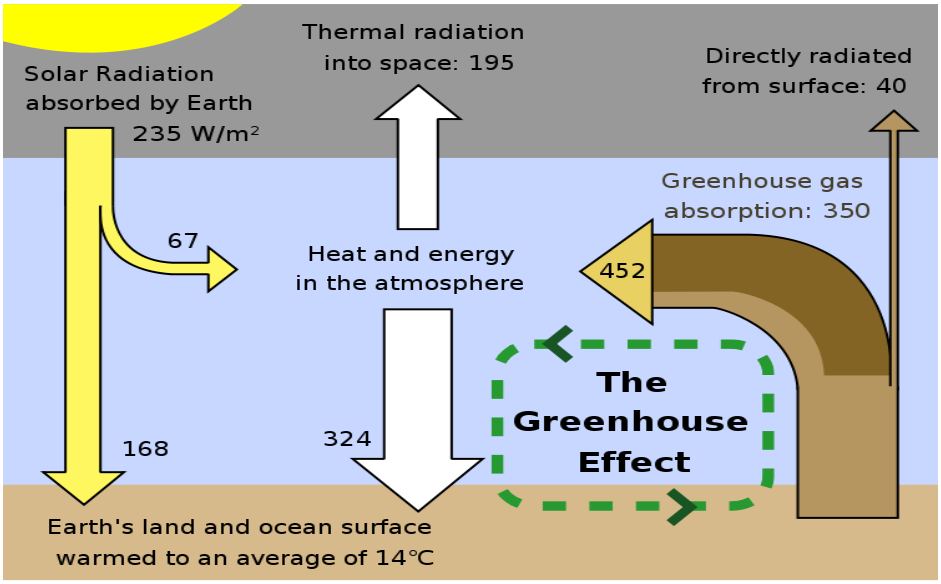
The Enhanced Greenhouse Effect

Some human activities also produce greenhouse gases and these gases keep increasing in the atmosphere. The change in the balance of the greenhouse gases has significant effects on the entire planet. Burning fossil fuels - coal, oil and natural gas - releases carbon dioxide into the atmosphere. Cutting down and burning trees also produces a lot of carbon dioxide. A group of greenhouse gases called the chlorofluorocarbons have been used in aerosols, such as hairspray cans, fridges and in making foam plastics.

Since there are more and more greenhouse gases in the atmosphere, more heat is trapped, which makes the Earth warmer. This is known as global warming. A lot of scientists agree that man's activities are making the natural greenhouse effect stronger. If we carry on polluting the atmosphere with greenhouse gases, it will have very dangerous effects on the Earth. Today, the increase in the Earth's temperature is increasing with unprecedented speed.

To understand just how quickly global warming is accelerating; consider that during the entire 20th century, the average global temperature increased by about 0.6 degrees Celsius (slightly more than 1 degree Fahrenheit). Using computer climate models, scientists estimate that by the year 2100 the average global temperature will increase by 1.4 degrees to 5.8 degrees Celsius (approximately 2.5 degrees to 10.5 degrees Fahrenheit).



Greenhouse Gases

Many greenhouse gases occur naturally in the environment, such as water vapor, carbon dioxide, methane, nitrous oxide, and ozone. Others such as hydro fluorocarbons (HFCs), per fluorocarbons (PFCs), and sulfur hexafluoride (SF6) are created and emitted solely through human activities. Human activities also add significantly to the level of naturally occurring greenhouse gases. The principal greenhouse gases that enter the atmosphere because of human activities are:

- **Carbon Dioxide (CO2):** Carbon dioxide enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement). Carbon dioxide is also removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle.
- **Nitrous Oxide (N2O):** Nitrous oxide is emitted during various agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.
- **Methane (CH4):** Methane is emitted during the production and transport of coal, natural gas, and oil. Methane is also emitted when organic waste decomposes, whether in landfills or in connection with livestock farming.
- **Fluorinated Gases:** Hydro fluorocarbons, per fluorocarbons, 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 (i.e., CFCs, HCFCs, and halons). 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").

Greenhouse gases vary in their ability to absorb and hold heat in the atmosphere. HFCs and PFCs are the most heat-absorbent, but there are also wide differences between naturally occurring gases. For example, nitrous oxide absorbs 270 times more heat per molecule than carbon dioxide, and methane absorbs 21 times more heat per molecule than carbon dioxide.

However, carbon dioxide contributes the most, since its level in the atmosphere is the highest.

Estimates of future emissions and removals depend in part on assumptions about changes in underlying human activities. For example, the demand for fossil fuels such as gasoline and coal is expected to increase greatly with the predicted growth of the U.S. and global economies.

Many, but not all, human sources of greenhouse gas emissions are expected to rise in the future. This growth may be reduced by ongoing efforts to increase the use of newer, cleaner technologies and other measures. Additionally, our everyday choices about such things as commuting, housing, electricity use, and recycling can influence the amount of greenhouse gases being emitted.

Climate Change and Global Public Health

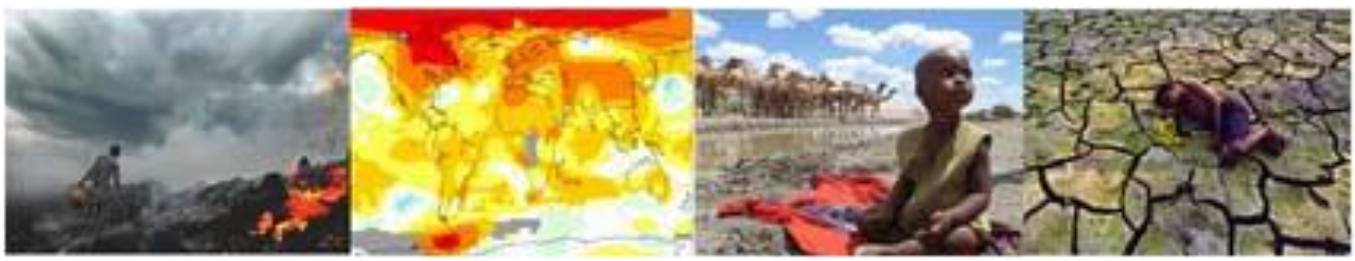
Consensus exists among scientists all over the globe that the world's climate is changing and that these changes can affect human health. The more direct health effects of climate change can include injuries and illnesses from severe weather, floods, and heat exposure; increases in disease caused by allergies, respiratory problems, and illnesses carried by insects or in water; and threats to the safety and availability of our food and water supplies. Less direct effects can include worry, depression, and the negative impacts of mass migration and regional conflicts.

To a large extent, public health depends on safe drinking water, sufficient food, secure shelter, and good social conditions. A changing climate is likely to affect all of these conditions. Warming climate as a result of the greenhouse effect is likely to bring some localized benefits, such as decreased winter deaths in temperate climates, and increases in food production in some regions.

However, the health effects of a rapidly changing climate are likely to be overwhelmingly negative, particularly in the poorest communities, which have contributed least to greenhouse gas emissions. Some of the health effects include increase in frequencies of heatwaves, shortages in supplies of freshwater, rise in temperatures followed by variable precipitation, which are likely to decrease the production of staple foods in many of the poorest regions, rising sea levels, and prolongation of seasons for transmission of important vector-borne disease, as well as the alteration of their geographical range. All these events may lead to increased risks of:

- water-borne disease,
- malnutrition,
- coastal flooding,
- huge population displacement, and
- New diseases moving into the regions which lack either population immunity or a strong public health infrastructure.

Measurement of health effects from climate change can only be very approximate. Nevertheless, a WHO quantitative assessment, taking into account only a subset of the possible health impacts, concluded that the effects of the climate change that has occurred since the mid-1970s may have caused over 150,000 deaths in 2000. It also concluded that these impacts are likely to increase in the future.



Causes and effects of climate change

Many factors have causes earth’s climate to change many times, both natural and human, can causes changes in earth’s energy balance, including:

- Variation’s in the sun’s energy reaching earth
- Changes in the reflectivity of earth’s atmosphere and surface
- Changes in the greenhouse effect, which affects the amount of heat retained by berths atmosphere.
- Both natural and human factors change earth’s climate.
- Before humans, changes in climate resulted entirely from natural causes such as changes in earth’s orbit, changes in solar activity, or volcanic eruptions.

- Since the industrial ear began, humans have had an increasing effect on climate, particularly by adding billions of tons of heat-trapping greenhouse gases to the atmosphere.
- Most of the observed warming since the mid-20th century is due to human-caused greenhouse gas emissions.

Many places have seen change in rainfall, resulting in more floods, droughts, or intense rain, as well as more frequent and severe heat waves. The planet's oceans and glaciers have also experienced some big changes- oceans are warming and becoming more acidic, ice caps are melting, and sea levels are rising. As these and other changes become more pronounced in the coming decades, they will likely presents challenges to our society and our environment.

- Rise in sea level due to melting glaciers and the thermal expansion of the ocean as global temperature increases.
- Massive release of greenhouse gases from melting permafrost and dying forests.
- A high risk of more extreme weather events such as heat waves, droughts and floods. The global incidence of drought has already doubled over the past 30 years.
- Sever regional impacts. Example: in Europe river flooding will increase and in coastal areas the risk of flooding, erosion and wetland loss will increase substantially.
- Natural systems, including glaciers, coral reefs, mangroves, arctic ecosystems, alpine ecosystems, boreal forests, tropical forests, prairie wetlands and native grasslands, will be severely threatened

Global warming

Global warming refers to the recent and ongoing rise in global average temperature near earth's surface. It is caused mostly by increasing concentrations of greenhouse gases in the atmosphere. Earth's average temperature has risen by 1.5 F over the past century, and is projected to raise another 0.5 to 8.6F over the next hundred years. Small changes in the average temperature of the planet can translate to large and potentially dangerous shifts in climate and weather.

Facts about climate change

The earth's climate has changes throughout history. Just in the last 650,000 years there have been seven cycles of glacial advance and retreat, with the abrupt end of the last ice age about 7,000 years ago marking the beginning of the modern climate ara – and of human civilization. Most of these climate changes are attributed to very small variations in earths orbit that change the amount of solar energy our planet receives. Scientific evidence for warming of the climate system is unequivocal.

The current warming trend is of particular significance because most of it is very likely human-induced and proceeding at a rate that is unprecedented in past 1,300 years

- Global sea level rose about 17 centimeters (6.7 inches) in the last century. The rate in the last decade, however, is nearly double that of the last century
- The oceans have absorbed much of this increased heat, with the top 700 meters (about 2300 feet) of ocean showing warming of 0.302 degrees Fahrenheit since 1969.
- The Greenland and Antarctic ice sheets have decreased in mass. Data from NASA'S gravity recovery and climate experiment show Greenland lost 150 to 250 cubic kilometers
- Glaciers are retreating almost everywhere around the world--- including in the alps, Himalayas, Andes, Rockies, Alaska and Africa
- The number of record Hugh temperature events In the united states has been increasing, while the number of record low temperature events has been decreasing
- Satellite observations reveal that the amount of spring snow cover in the northern hemisphere has decreased over the past five decades and that the snow is melting earlier.

Solution to climate changes

Many and varied solutions to climate change have been proposed, including individual frugality, energy conservation measures, renewable energy, and carbon sequestration.

- Energy conservation will show the earliest payback in terms of CO2 reduction- in many cases an investment in energy conservation made this year will show CO2 reductions this year.
- Renewable energy including energy from wind, solar, wave, bio-fuels, etc., substitutes directly for fossil fuels and eliminates CO2 emissions entirely. A small note of causation is needed –in few causes, most notoriously certain bio-fuels, a large amount of energy input is required to create renewable energy.
- Sequestration or the long- term trapping of carbon dioxide before it enters the atmosphere, is an intermediate step along the way, but is not a solution in and of it. Carbon dioxide can be sequestered as a gas by pumping it underground or into the ocean, or it can be sequestered by plants.
- There are many way that you can make a difference, such as driving less, insulating your house better, changing your voting priorities, buying organic food, eating less meat, buying fuel efficient appliances and vehicles.
- Reducing greenhouse gas emissions is the key tip solving global climate change.

Adoption of Green Technologies

There is several green technology area adopted throughout the globe including India. Some are as listed below.

1. Solar, wind, and battery technology

Every hour the sun beams onto earth more than enough energy to satisfy global energy needs for an entire year. Solar energy is the technology used to harness sun energy. Solar energy is the cleanest, most abundant renewable energy source available. India's prime minister has launched an international solar alliance of over 120 countries with the French president, François Hollander, at the Paris COP21 climate summit.

- It is a collective ambition to undertake innovative and concerted efforts aimed at reducing the costs of financing and urgent technological deployment for competitive solar facilities. Throughout our country.
- It adds that the alliance will "pave the way for production technologies and stronger of solar energy, adapted to the specific needs of our country".

2. Wind Energy

- Wind turbines are used to generate electricity from the kinetic power of the wind. Historical they were more frequently used as a mechanical device to turn machinery.
- Stand- alone wind turbines are typically used for water pluming or communications. How're, homeowners, farmers, and ranchers in windy areas can also use wind turbines as a way to cut their electric bills.
- Lithium-ion batteries are becoming cost-effective in niche applications such as maintaining voltage and frequency on transmission lines, and can help defer high-cost projects such as substations

3. Hydroelectric dams

Hydropower is also a renewable energy source and produces no air pollution or toxic byproducts. Dams are built for a number of uses in addition to producing electricity, such as irrigation, shipping and navigation, flood control or to create reservoirs for recreational activities. Devices at dams can help fish and other wildlife move freely around dams and between sections of rivers. Fish ladders and fish elevators are just some of the techniques used.

- Once a dam is constructed, electricity can be produced at a constant rate.
- If electricity is not needed, the sluice gates can be shut, stopping electricity generation. The water can be saved for use another time when electricity demand is high.
- Dams are designed to last many decades and so can contribute to the generation of electricity for many years / decades.

4. Wave farm technology

- Wave power is a relatively unknown solution as a clean energy source, yet its uninterrupted and continuous source of energy has the potential to be among the most enduring suppliers of the worlds future needs if some obstacles can be overcome.
- Atlantis resources corp. plans a tidal power farm with a capacity of 50 MW with the possibility to increase it to more than 200 MW. When complete, this farm will be the first of its type, not just within the country, but also in Asia.

5. Hybrid car technology

Conventional vehicles use gasoline or diesel to power an internal combustion engine. Hybrids also use an internal combustion engine—and can be fueled like normal cars- but have an eclectic motor and battery, and can be partially or wholly powered by electricity. The most advanced hybrids have large batteries and can recharge their batteries from an outlet, allowing them to drive extended distances on electricity before switching to gasoline or diesel.

- **Environmentally friendly:** One of the biggest advantage of hybrid car over gasoline powered car is that it runs cleaner and has better gas mileage which makes it environmentally friendly. A hybrid vehicle runs on twin powered engine (gasoline engine and electric motor) that cuts fuel consumption and conserves energy.
- **Financial benefits:** Hybrid cars are supported by many credits and incentives that help to make them affordable. Lower annual tax bills and exemption from congestion changes comes in the form of less amount of money spent on the fuel
- **Less dependence on fossil fuels:** A hybrid car is much cleaner and requires less fuel to run which means less emissions and less dependence on fossil fuels. This in turn also helps to reduce the price of gasoline in domestic market.

Conclusion

Both renewable energy and recycling cannot improve our environment in short term. It implies that green technology is not able to improve our environment or solve the problems that we are facing like, global warming in short. What green technology brings us in short term are inconvenience, high cost, low efficiency and etc. that's why people start to criticize whether we should keep investing in the green technology, and rely on it for solving the problems that we are facing. So we focus on renewable energy and sustainability. Like wise

- Energy storage methods (Batteries, utility scale)
- Smart grid (T&D), Sensor networks, smart cities
- Green building (LEED, LED, Biomimicry)
- Green transportation (EV,HSR)
- Clean Air, Water.

Let's hope we conserve, protect our environment and save natural resources like water, food and other important elements of nature for better future of our kids.

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