



**IMPACT OF GREENHOUSE GAS ON CLIMATE CHANGES AND STRATEGIES THAT
NEED TO BE ADOPTED BY THE GLOBAL HOSPITALITY INDUSTRY
FOR ITS MINIMIZATION**

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Abstract: *Industrialisation transformed the world at an astonishing speed with its new industries of manufacturing, transportation and power. However, this progress has been achieved at a cost, i.e. natural resources and the environment. Activities such as deforestation and the burning of fossil fuels like coal, oil, and gas during transportation and power generation have resulted in the release of Carbon dioxide (CO₂) - a greenhouse gas (GHG). Since the beginning of the industrial revolution, the levels of carbon dioxide increased in the atmosphere from 280ppm to 390ppm. Increasing level of Greenhouse gases greatly affect the temperature of the Earth causing Global Warming and Climate change. Climate change has become a big issue and several schemes were adopted to reduce global carbon emissions. The travel and tourism sector is also a contributor of GHG emissions as it includes transport, accommodation and activities that tourists indulge in. This article studies the effect of Global warming and the strategies adopted by Hospitalities Industry in reduction of GHG emissions.*

Keywords: *Greenhouse, Carbon dioxide, Global Warming, Climate change, Hospitality*

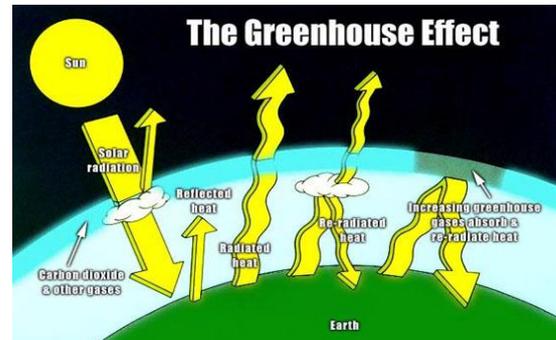
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OVERVIEW OF GLOBAL WARMING AND CLIMATE CHANGE

The earth has been a silent witness to the march of civilisation. Humanity has indeed made great strides in conquering the skies, the moon and even space. However, all this has been possible with the industrial revolution primarily after the seventeenth century. But since the beginning of the Industrial revolution, the burning of fossil fuels has increased the levels of carbon dioxide in the atmosphere from 280ppm to 390ppm.

The Earth receives energy from the Sun in the form of visible light. This light is absorbed at the Earth's surface, and re-radiated as thermal radiation back into outer space. Some of this thermal radiation is absorbed by the atmosphere, and re-radiated both upwards and downwards; that radiated downwards is absorbed by the Earth's surface.

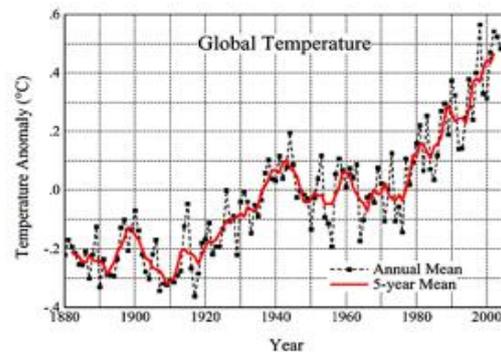
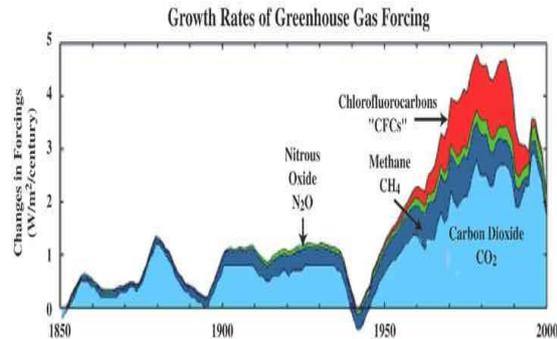


Our atmosphere is a layer surrounding the earth held in place by gravity and primarily made up of Nitrogen (78%), Oxygen (21%), water and greenhouse gases. A greenhouse gas (GHG) is a gas in an atmosphere that absorbs and emits radiation within the thermal infrared range. The primary greenhouse gases in the Earth's atmospheres are carbon dioxide, methane, nitrous oxide, chlorofluorocarbons and ozone. These gases, during the day absorb heat from the sun, although much of this is radiated back out into space. The atmosphere surrounding our earth contains these gases, and acts like a blanket keeping some of the heat in. If there weren't an atmospheric 'blanket' we would freeze during the night, like some of the other planets. Industrialisation transformed the world at an astonishing speed with its new industries of manufacturing, transportation and power. However, this progress has been achieved at a cost, i.e. natural resources and the environment. Moreover, activities such as deforestation and the burning of fossil fuels like coal, oil, and gas during transportation and power generation have resulted in the release of Carbon dioxide (CO₂) - a greenhouse gas (GHG). Other GHGs include methane, nitrous oxide and chlorofluorocarbons (CFCs). Greenhouse gases greatly affect the temperature of the Earth; without them, Earth's surface would be on average about 33 °C (59 °F) colder than at



present. Scientists now realise that the proportion of these gases has increased significantly over a few hundred years.

The real increase began around the time of the Industrial Revolution. Increase in GHGs resulting in increased global temperatures and climate change. GHG emissions have grown since pre-industrial times with an increase of 70% between 1970 and 2004. Human activity is responsible for releasing 7 billion tonnes of carbon a year into the atmosphere and is expected, that rate doubles to 14 billion tonnes a year over the next 50 years, the concentration of CO₂ in the atmosphere will reach a level that may cause irreversible changes to the environment. Such changes will affect not only the geography of the earth but also have social, environmental and economic implications.



Graph compiled from NASA

EFFECTS OF GLOBAL WARMING

Some of the effects of Global Warming are:

- Land and ocean temperatures rise
- North and South Poles (Arctic and Antarctic) ice melts
- Glaciers melt
- Ocean currents change
- Weather patterns change
- Sea levels rise (due to oceans warming the water 'swells' and from increased water as polar regions melt)

Heatwaves associated with land temperature increase and thousands of people will die through future heatwaves. (In the 2003 heatwaves in France over 20,000 people died). Droughts will become more prolonged and be even more devastating than anything we



have experienced. This is because higher temperatures evaporate water from the land, which will also give rise to more wildfires, Agriculture and food crops will be devastated in some regions and diseases like malaria and dengue will increase as conditions favourable to these diseases spread.

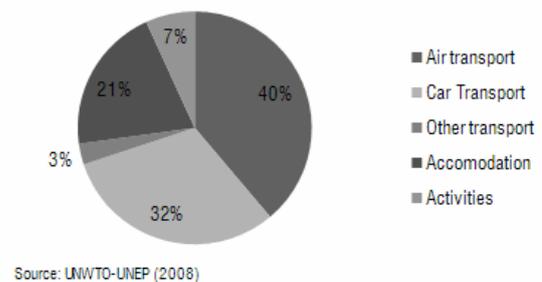
Higher ocean temperature increase the power in cyclones and hurricanes (stimulating more tornadoes) and will increase frequency of severe storms (like Hurricane Katrina) and associated flooding that will do extraordinary damage to infrastructure, and destroy houses, towns and villages.

Rising sea levels will displace millions of people, (already on some Islands people are being moved off due to rising seas) and the geography of the land will change dramatically, with millions needing to be relocated along with loss of buildings.

GLOBAL WARMING AND TRAVEL AND TOURISM INDUSTRY

Travel and tourism is considered to be a highly climate sensitive economic sector as it has close connection to the environment and climate. The sector is highly vulnerable to the effects of global warming and climate change.

At the same time, the travel and tourism sector is also a contributor of GHG emissions as it includes transport, accommodation and activities that tourists indulge in. The hospitality sector relies heavily on such activities that result in GHG emissions. The percentage contribution of emission in travel and tourism are shown in the figure.



AFFECT OF CLIMATE CHANGE IN TOURISM AND HOSPITALITY SECTOR

- Loss of tourism as mangroves, coral reefs, and the general aesthetic appeal of natural environments is degraded.
- Closure of many locations as weather changes; e.g. lack of snow in Scotland and across the Alpine resorts during the winter of 2006 / 07 damaged that ski season's profitability.
- Exploration of alternative activities to survive as dominant activity changes.



- Shift in traditional tourism demand patterns as the northern hemisphere gets a more temperate climate.
- Seaside property subsidence due to retreating shorelines and coastal flooding.
- Erosion in tourist hot spots - such as Venice

STRATEGIES FOR REDUCING GHG EMISSIONS FROM THE HOSPITALITY SECTOR

Global Warming and Climate change has become a big issue and a great deal of debate continues about the solutions. One approach being considered to reduce global carbon emissions is the idea of contraction and convergence. Under this approach all countries would participate in a global emission reduction with quantified emission targets. The Hospitality sector consists of hotel, resorts, Restaurants, Bar & Pub etc. They are one of the contributors of GHG emissions. The major area that participate in GHG emissions are:

- A. Energy
- B. Solid Waste
- C. Water

GHG Emissions in the Hospitality Industry: Sources and Reduction Strategies

GHG Emission in Hotels	Source	Reduction Strategies
Carbon	<ul style="list-style-type: none">- stationary combustion (boilers, stoves)- electricity generation- Transport including food and drink items from foreign countries- Paper/cardboard products- Plastic products	<ul style="list-style-type: none">- Improve electrical efficiency through technical standards- End the huge amounts of waste energy via cooling towers- Use large-scale renewable resources of energy available locally like wind, sun or geothermal- Burn less fossil fuel- Reduce imports- Increase community development- Reduce paper/plastic wastage- Reuse, Recycle paper/plastic
Methane	<ul style="list-style-type: none">- Kitchen waste- Yard waste- Sewage water- Food processing	<ul style="list-style-type: none">- Compost kitchen waste- Compost yard waste- Reduce landfills- Reduce reliance on processed foods
Nitrous Oxide	<ul style="list-style-type: none">- Combustion- Sewage water treatment	<ul style="list-style-type: none">- Use less energy- Burn less fossil fuel- Engineered water treatment



A. Energy

The hospitality sector is a huge consumer of energy and thus adds GHG emissions directly through carbon emissions. Carbon is mainly contributed from burning of fossil fuels in such processes as energy generation, heating and cooling, electricity, transportation, and importing products over long distances. Burning of fuel at high temperatures also releases Nitrous oxide, a powerful GHG (300 times more powerful than carbon dioxide) due to its efficiency at trapping infrared radiation. CFCs the life blood of refrigeration and air conditioning equipment also contribute to the 'greenhouse' effect because they absorb infrared radiation from the earth's surface. Some methods for attaining energy efficiency in Hospitality sector are:

- Reduction in energy consumption by exploiting all technical potential for electrical efficiency via technical standards; for example replacement of incandescent bulbs by compact fluorescent lights (CFLs), which use less energy and last eight times longer (8000 hrs instead of 1000hrs)
- Replacement of old equipment with energy efficient ones.
- Reduction in cogeneration of energy that usually goes waste such as in operations of cooling towers
- Replacement of fossil energy sources with renewable ones available locally such as wind or Sun.
- Sequestering of Carbon for example through planting of trees, which absorb and store Carbon.

B. Solid Waste Management

The hospitality sector produces large amount of waste. An average restaurant produces 22,727 kg of garbage a year. Every night, the average dinner produces about 1 kg of waste, mostly composed of beverage and paper products, accounting for 65% of all hotel waste. About 95% of this can be recycled or composted, but most is simply thrown away. Logging and burning of tropical forests for making paper and clearing land for agriculture creates about 20% of GHG emissions, more than that emitted from the world's transportation. Hotels also use large quantities of plastic in packaging and amenities, which poses a problem in disposal as this takes up landfill space and takes hundreds of years to break down. Since waste has to be paid for twice - once in the form of packaging and again for disposal- it



makes good business sense to create as little as possible in the first place. Not treating waste and diverting it to landfills produces methane emissions; methane is 21 times more powerful than CO₂ as a GHG. Specific methods for a good waste management plan in Hospitality sector include:

- Reduction in use of virgin paper/paper products and increased use of recycled paper. Twenty cases of recycled paper substituted for non-recycled paper save 17 trees, 390 gallons of oil, 7,000 gallons of water, and 4,100 kWh of energy.
- Reduction in use of virgin plastic / products and increased use of recycled plastic / other packaging material.
- Recycling all waste material in the hotel including paper, glass, metal, plastic, and textiles. An aluminium can saves energy to run a television set for three hours
- Composting yard and kitchen waste, this can then be used as manure or gas

C. Water Management

Water is a very expensive commodity in Hotels as a large amount of it is obtained from private tankers and thus paid for. It is estimated that by 2010, water use will increase to approximately 475 gallons per day for each room in high luxury facilities. At the same time, water availability is projected to decrease by 30% of the world's rivers as climate change leads to reduced availability of freshwater (less than 3% of the world's water) and groundwater. With reduced water supplies and increased water demand, water conservation becomes a must.

Compounding the issue of water conservation is the release of GHGs such as methane (CH₄) and nitrous oxide that are emitted during wastewater transport and sewage treatment.

Water management methods in Hospitality sector include:

- Water efficient technology, like low-flow showerheads and taps fitted with flow restrictors, which reduce water wastage.
- Rainwater harvesting, this utilises the rainwater coming from roofs to supply toilets, laundry and watering the garden and thus reduces wastage of rainwater.
- Greywater system, which treats water with low pollutants from sources like the laundry room, sinks and showers and then diverts it for other uses like watering the gardens.
- Engineered waste water treatment, which reduces production of GHGs.



CONCLUSION:

Global Warming has become a very serious issue as it effects climate changes. Due to climate changes, lot of environmental changes is being observed around the world in the recent years. In many cities temperature recorded is highest of the century. Untimely rain and flood were observed in many parts of the world. Protecting the global climate is an important issue in today's world. Initiative is taken to cut down on GHG emissions by all sectors globally. Efforts are being taken up for mitigating the harmful impact upon the environment at the national as well as at the international level. The Kyoto Protocol was introduced in 1997 as a means of assisting the countries in protecting the global climate. In India's environment policy, under the stewardship of Jairam Ramesh, Indian environment and forests minister, is gearing towards substantial cuts in its Carbon emissions anywhere between 20-25% by 2020.

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