

# THE IMPACT OF INDUSTRIAL POLLUTION ON GLOBAL WARMING: FACTS, CAUSES AND EFFECTS

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## Abstract

Pollution may be defined as any direct or indirect alteration of the physical, thermal, biological or radioactive properties of the environment that creates an actual or potential hazard to the health safety or welfare of any living species. Also pollution may be said to be inserting of any foreign matter in the wrong place and in quantities that are too large which eventually cause harm human and other living organism. Environment pollution comprises in different forms; air water soil radioactive noise and light pollution. With the coming of the industrial revolution, humans were able to advance further into the 21<sup>st</sup> century. Technology developed rapidly, science became advanced and the manufacturing age came into view. With all of these came one more effect, industrial pollution. Pollution has reached its peak giving rise to global warming. With the rise in industrial pollution global warming has been increasing at a steady pace. Smoke and greenhouse gases are being released by industries into the air which causes increase in global warming. Melting of glaciers, extinction of polar bears, floods, tsunamis, hurricanes are few of the effects of global warming.

## Introduction:

A good environment helps all round development of one's personality and a bad environment inhibits its development. It affects living beings both directly and indirectly. Right from mother's womb, one needs unpolluted air to breath, unpolluted water to drink, nutritious food to eat and hygienic condition to live in. These elements are Sine Qua non for sound development of human personality.

According to Justice V. R. Krishna Iyer "man's existence on planet earth is very much dependent on his relationship with nature which could be said to be one of the most precious gifts that he has inherited".<sup>2</sup> Man in order to survive adopt himself to its environment but he rarely pays due attention for its improvement. On the contrary, in the name of the development and progress through agricultural and industrial revolutions environment is being affected adversely day by day. It is rather difficult to define what environment means. It is an expression of very wide amplitude as it takes into account all those factors which directly or indirectly have bearing upon natural surroundings of human beings.

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<sup>2</sup> V.R. Krishna Iyer, "Environmental pollution and the Law" (Vedpoa, Indore, Bhopal, 1984)

The environment Protection Act 1986, defines environments follows:

“Environment includes water, air and land and the inter relationship which exists among and between water, air, and land and human beings, other living creatures, plants, micro-organism and property”<sup>3</sup>

Statutory definition of environmental pollution is provided in Environmental (protection) Act, 1986 is an exhaustive form. According to the Act, environmental pollution “Mean the presence in the environment of any environmental pollutant”<sup>4</sup>

Pollution may be defined as any direct or indirect alteration of the physical, thermal, biological or radioactive properties of the environment that creates an actual or potential hazard to the health safety or welfare of any living species. Also pollution may said to be any inserting of any foreign matter in the wrong place and in quantities that are too large which eventually cause harm human and other living organism.

Till Eighteenth century the World was clean and happy without pollution. The nature maintained the ecological and environmental balance. However, the Industrial revolution started in the Middle of Nineteenth Century in Great Britain and later spread the entire World. Industrial pollution is one of the main causes of environmental pollution.

Environmental pollution occurs when pollutants contaminate the natural surroundings. Pollutants are the key elements or components of pollution which are generally waste materials of different forms. Pollution disturbs our ecosystem. Pollution has reached its peak giving rise to global warming and human illness.

Environment pollution comprises in different forms; air water soil radioactive noise and light pollution. With the coming of the industrial revolution, humans were able to advance further into the 21<sup>st</sup> century. Technology developed rapidly, science became advanced and the manufacturing age came into view. With all of these came one more effect, industrial pollution. Earlier industries were small factories that produced smoke as the main pollutant. But when these factories became full scale industries and manufacturing units the issue of industrial pollution started to take on more importance. Industrial pollution takes on many faces. It contaminates many sources of drinking water, releases unwanted toxins into the air and reduces the quality of soil all over the world. Major environmental disasters have been caused due to industrial mishaps’. It was the

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<sup>3</sup> Sec 2(9)

<sup>4</sup> Sec2(c)

industrial revolution that gave birth to environmental pollution as we know it today resulted in the implication of pollution on a planetary level with the issue of global warming.

Any form of pollution that can trace its immediate source to industrial practices is known as industrial pollution. In fact the issue of industrial pollution has taken on grave importance for agencies trying to fight against environmental degradation. Countries facing sudden and rapid growth of such industries are finding it to be a serious problem which has to be brought under control immediately.

According to the Environmental Protection Agency (EPA), it has been estimated that industrial pollution is responsible for almost 50% of the pollution worldwide. There are various wide ranging effects as well as serious consequences of industrial pollution on the ecological balance of the atmosphere. The emission of various greenhouse gases such as CO<sub>2</sub>, Methane (CH<sub>4</sub>) Sulphur, and Nitrogen among others from various industries increases the overall temperature of the earth, resulting in global warming.<sup>5</sup>

### **Effects of Industrial Pollution**

The effects of industrial pollution are far reaching and liable to affect the eco system for many years to come. Industrial pollution of the environment may be divided into the following:-

- Water pollution
- Soil pollution
- Air pollution
- Noise pollution

Industrial pollution as stated above is one of the major causes of air pollution. With the increase in the number of industries and factories due to the industrial revolution air pollution also has increased significantly. Air pollution has led to a steep increase in various illnesses and it continues to affect us on a daily basis. With so many small, mid and large scale industries coming up, air pollution has taken toll on the health of the people and the environment.

The main cause of water pollution is the discharge of solid or liquid waste products containing pollutions on to the land or into surface or coastal water. The sources that contribute for the generation of such wastes by domestic, commercial, industrial and agricultural wastes as well as solid air pollutants and a few other miscellaneous.

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<sup>5</sup> National research council. Ecological impacts of climate change Washington DC: National academies press 2008

Pollution emitted from the industries is also one of the major factors contributing towards water pollution. The water comes into contact with heavy metals, harmful chemicals radioactive waste and even organic sludge. Dumping of various industrial waste products into water sources and improper contamination of industrial wastes often result in polluting the water. Such water pollution disturbs the balance of the ecosystem inside resulting in the death of various animal and plant species present in the water. The pollutants discharged by various industries and factories are often considered to be one of the prime factors contributing to air water and soil pollution. Soil pollution is defined as a phenomenon in which the soil loses its structure and fertility due to various natural and artificial reasons. Dumping of industrial wastes is one of the prime factors towards soil pollution. Industrial wastes contain large amounts of various chemicals which get accumulated on the top layer of the soil resulting in loss of fertility of the soil. Such loss of fertility ultimately results in changes in the ecological balances of the environment due to reduction in plant growth.

Wildlife is getting affected in a severe manner. Habitats are being lost, species are becoming extinct and it is harder for the environment to recover from each natural disaster. Major industrial accidents like oil spills, fires, leak of radioactive material and damage to property are harder to clean up as they have a higher impact in a shorter span of time.

## **Global Warming**

Global warming is a term used to describe a gradual increase in the average temperature of the earth's atmosphere and its oceans, a change that is believed to be permanently changing the earth's climate. Average temperature around the world has increased by 0.75 degree Celsius (1.4 F) over the last 100 years. About two third of this occurred since 1975<sup>6</sup>.

The earth's atmosphere is made up of five layers' of gases that act as a blanket covering the earth. This blanket keeps in some of these gases to keep the planet warm. It is called the greenhouse effect. This is because it acts like greenhouse windows by letting in sunlight to warm the surface and air and hold in most of the solar generated heat. The greenhouse gases are carbon dioxide, methane, oxygen, nitrogen, ozone and water vapor as well as other atmospheric gases. These greenhouse gases cause the greenhouse effect by capturing and absorbing solar energy.

In the past when the earth experienced increase in temperature it was the due the effect of nature but today it is being caused by the accumulation of greenhouse gases in the atmosphere produced

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<sup>6</sup> "Global temperature" <http://www.metoffice.gov> UK| climate change

by human activities<sup>7</sup>. The reason for increase in earth's average surface temperature is due to the effect of greenhouse gases such as carbon dioxide, probably the best known greenhouse gas, but methane, nitrous oxide and fluorinated gases also play a role in driving climate change<sup>8</sup>. The emissions from burning fossil fuels and deforestation which trap heat that would otherwise escape from earth are also playing a vital role in climate change.

Previously scientists have been skeptical of blaming increasing temperatures on global warming. As we head into future ventures of technology and ingenuity the science community has steadily stepped on board with the environmental protection agency and other believers in global warming to do something about it. Global warming does not just mean the earth's getting warmer. Its massive impact on social, economic, and physical health are areas for great distress.

Global warming is one of the most common and serious consequences of industrial pollution. The industries have boomed very swiftly during the last few decades. These industrial sectors use fossil fuels, which increases greenhouse gases. These gases are the major reason for global warming. With the rise in industrial pollution, global warming has been increasing at a steady pace. The earth's rising carbon dioxide levels have been tested as unsafe. Before industrial revolution, carbon dioxide has never been higher than it is now, compared to past millions of years.

Since the industrial revolution human activities have significantly enhanced the green house effect causing the earth's average temperature to rise by almost 1 degree Celsius. A long series of scientific research and international studies have shown with 90% certainty that this increase in overall temperature is due to the greenhouse gases produced by humans.<sup>9</sup> Smoke and greenhouse gases are being released by industries into the air which causes increase in global warming. Melting of glaciers, extinction of polar bears, floods, earthquake, tsunamis, hurricanes are few of the effects of global warming.

Global warming is changing our economy, health and communities in diverse ways. It is already affecting the human kind, plant and animals in number of ways through increased ocean levels, droughts and changed weather patterns. It is well recognized by the scientists around the world as a serious public health environmental concern. Smog congestion and poor air quality are the leading causes of respiratory symptoms in the world's heavily populated countries like china, Italy and other countries.

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<sup>7</sup> UK met office global warming: a guide to climate change.

<sup>8</sup> David Anderson article titled 'what causes pollution that leads to global warming' in Demand media.

<sup>9</sup>"Global response to climate change" the royal society.<https://royal.society.org/policy/publications/2005>.

Industrial pollutants are collecting in the atmosphere like a thickening blanket, trapping the sun's heat and causing the planet to warm up. Earth's temperature has warmed 0.6 degrees in just nine years alone. In the last decade Earth's climate has doubled that of 100 years ago<sup>10</sup> although local temperatures fluctuate naturally, over the past 50 years the average global temperature has increased at the fastest rate in recorded history.

Activities such as deforestation and the burning of fossil fuels are the main sources of these emissions. These findings are recognized by the national science academies of all the major industrialized countries<sup>11</sup>.

Green house gases such as carbon dioxide, methane, nitrous oxide and fluorinated gases increase the temperature of the planet by not allowing the heat to escape through it. When the temperature starts to change rapidly, it becomes more concerning. The earth is wrapped by the layer of the heat trapping gases. Whenever these gases enter the atmosphere, it acts similar to a blanket; traps heat into the atmosphere and then alter climate conditions globally<sup>12</sup>. The greenhouse gases are released into the atmosphere as follows:

Carbon dioxide releases from burning fossil fuels such as coal and oil<sup>13</sup>. Carbon dioxide represents 85% of all the greenhouse gases emitted from human sources. Globally the largest source of carbon emissions is the combustion of fossil fuels like coal, natural gas and oil for energy.

By the end of this year more than half of all industrial emissions of carbon dioxide since the dawn of the industrial revolution will have been released since 1988-the year it became widely known that these emissions are warming the climate<sup>14</sup>(ex: cement production in industries).

Methane is created by fossil fuel production and use<sup>15</sup>. Methane a potent greenhouse gas is even more effective at trapping heat in the atmosphere than carbon dioxide. Methane emissions come from a number of human sources, including coal mining, landfills, natural gas and petroleum production, waste water treatment and even rice cultivation.

Nitrous oxide emissions are mainly caused by fossil fuel combustions, contained in soil can be released by agricultural activities, live stock manure and acid production. Nitrous oxide is 300 times more effective at trapping heat in the atmosphere than carbon dioxide.

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<sup>10</sup> IPCC (Intergovernmental panel on climate change comprised of 2500 scientists)

<sup>11</sup> Al Gore in his documentary titled "An Inconvenient Truth"

<sup>12</sup> [www.conserveenergyfuture.com](http://www.conserveenergyfuture.com)

<sup>13</sup> Houghton .R.A "How well do we know the flux of co2 from land use change" Tell us B62 5(2010)337-351

<sup>14</sup> Peter frumhoff, director of science and policy in ucsusa.org on dec 15<sup>th</sup> 2014.

<sup>15</sup> Brunke" contribution of anthropogenic and natural sources to atmospheric methane variability" 2006:439- 443

Fluorinated gases like Hydroflourocarbons, Perflourocarbons and sulfur Hexafluoride are synthetic gases released in small quantities, but are nonetheless known as high global warming potential gases due to their potency. These gases are emitted by a number of industrial activities, including the production of aluminum, semiconductors, magnesium and used in refrigeration and air-conditioning systems

According to United States Global change research programme Global warming is posing unique challenges to human health such as:

- Significant increase in the risk of illness and death related to extreme heat and heat waves are very likely
- Rise in temperature and water level<sup>16</sup>
- Certain groups including children the elderly and the poor are most vulnerable to a range of climate related health effects.
- Desertification (causing water shortage)
- Melting of snow and ice<sup>17</sup>
- Sea level rise<sup>18</sup>
- Stronger hurricanes and cyclones.

Industries caused two third of man made global warming emissions<sup>19</sup>oil coal and gas companies are contributing to most carbon emissions causing climate change. The vast majority of firms were in the business of producing coal or gas<sup>20</sup> half of the estimated emissions were produced just in the past 25 years. Many of the same companies are also sitting on substantial reserves of fossil fuel which if they are burned puts the world at even greater risk of dangerous climate change.

The 90 companies on the list of top emitters produced 63% of the cumulative global emissions of industrial carbon dioxide and methane from 1751 to 2010 amounting to about 914 gigatonne CO2 emissions according to the research. All but seven of the 90 companies were energy companies producing oil gas and coal. The remaining seven companies were cement manufacturers.<sup>21</sup>

## Prevention

Global warming has become a major problem as we move on to 21st century and beyond. Global warming is one of the environmental challenges that entire world facing today. The level of green

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<sup>16</sup> “Environmental essay on global warming” 123helpme.com 12<sup>th</sup> July 12, 2015

<sup>17</sup> “the consequences of global warming on glaciers and sea levels” <http://www.nrdc.org>

<sup>18</sup> Church, john a and neil j.white” sea level rise from the late 19<sup>th</sup> to the early 21<sup>st</sup> century”(2011)585-602

<sup>19</sup> Suzanne Goldenberg, “greenhouse gas emissions” 3<sup>rd</sup> Oct 2014 US environment correspondent [www.theguardian.com](http://www.theguardian.com)

<sup>20</sup> Richard Heede, researcher and author, climate accountability institute, Colorado

<sup>21</sup> ibid

house gases is increasing at an exorbitant rate in the atmosphere. Unlike we keep a tab on our actions and reduce our dependence on fossil fuels, the problem of global warming is not going to end any time sooner.

Like the old say goes, prevention is better than cure. We have done enough damage, knowingly and unknowingly we have contributed to global warming. Our efforts and determined contribution to reduce global warming and spare the ecosystem to recover thereby cautiously working restore the balance of nature is very urgent.

The only way to help prevent global warming is to work together. The whole world has to take action in order to succeed. The first thing that needs to be done is cut the amount of carbon dioxide by half the amount. The other greenhouse gases like methane also need to be reduced in the atmosphere. Pollution of the atmosphere has to be checked and anything related to the release of the greenhouse gases should be monitored. Deforestation should be stopped as it causes the concentration of carbon at a greater extent. It has been said that it takes roughly 19 trees to make one ton of paper and that the usage of one ton of recycled paper will save approximately 17 trees. The burning of wood should be reduced to a greater extent as it releases oxidizable carbon to the atmosphere whose presence in greater amount causes the elevation of temperature. LPG stoves can replace the fire wood burning. Bio gas plants can be encouraged in village units. Composting will help you to dispose of biodegradable waste.

The use of CFCs is a major reason for depletion of the ozone layer causing global warming. The discharges and exhaust from automobiles also causes global warming. We could reduce it by identifying fuel-efficient cars, use bio-fuels, correct the engine design, or using an electric car.

By not wasting energy at home we can avoid to some extent the global warming. This includes shutting down the systems when not in usage and also buying energy efficient equipments. Solar energy, wind energy and hydro-electricity can be used that reduces the pollution of the atmosphere to a greater extent.

Global warming is mainly due to the ignorance of the people and the 'don't care attitude' of few. Even at a younger stage it is wiser to educate the children to be efficient consumers and be responsible users of energy and resources remembering that the global warming is slowly destroying the earth and its natural habitat.

People should be reminded that they share the earth and its resources with the other species that keep the ecosystem balanced, if the balance is gone then the life of every single species is threatened and even humans will not be spared from this.

Media can play a role in educating the people of the phenomenon of global warming that has already taking a huge toll. This won't disappear overnight. As we thoughtfully practice ways of preventing the causes that causes global warming one day the earth will be restored.

Planting trees is a very good start that can help diluting the carbon dioxide in the atmosphere. A single tree will absorb approximately one ton of carbon dioxide during its lifetime.

The issue of industrial pollution concerns every nation on the planet. As a result many steps have been taken to seek permanent solutions to the problem<sup>22</sup>. Better technology is being developed for disposal of waste and recycling as much polluted water in the industries as possible.

### **Conclusion:**

Organic methods are being used to clean the water and soil, such as using microbes that naturally uses heavy metals and waste as feed. Policies are being pushed into place to prevent further misuse of land. The industrialized countries such as the United States, Japan and European Union want to set ways to reduce the amount of greenhouse gases we put into the atmosphere<sup>23</sup>.

They want the major developing countries of china, Brazil, Indonesia and Mexico to also cut the amount of greenhouse gases emitted. For hundreds of years humans have brought huge changes in the environment. In our effort to improve the quality of our lives we have polluted the waters, the land and the air.

The nature of our atmosphere has been irreversibly changed by our own hands. The greenhouse effect may be the most serious environmental problems the human race has ever experienced. Never before in recorded history have people been faced with the possibility of such dramatic and rapid environmental changes occurring on a global scale. However industrial pollution is still rampant and will take many years to be brought under control. If global warming continues over the course of many years human life might not be enjoyable, comfortable, or even sustainable and it may affect many future generations to come.

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<sup>22</sup> [www.conserveenergyfuture.com](http://www.conserveenergyfuture.com)

<sup>23</sup> "Kyoto conference:a curtain raiser"global warming 18<sup>th</sup> feb 2001.