



EFFECT OF GREENHOUSE GASES EMISSION AND GLOBAL WARMING: THE SCENARIO OF INDIA

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Abstract

This study has focused on the effects of greenhouse gas and set out the impact of global warming in several sectors of India and across the globe. Thorough implementation of technology to reduce the effects of greenhouse gas emissions has been describe in details. The term, "Greenhouse gas emission" or GHGs can be coined as the process of elimination several gasses that can temperature of this earth through trapping of atmospheric heat. Greenhouse gases that transpire both from human activities and naturally include carbon dioxide (CO₂), water vapor, nitrous oxide (N₂O), ozone (O₃) and methane (CH₄). The research has discussed the factors associated with Greenhouse gases and their emissions. Widest burring rate of carbon gasses and emerging rates of carbon footprints has affected atmosphere and generated negative impact on environment nu 67%. In respect to other harmful gas emissions has detoxicated normal habitat in much consolidated basis creating distress in environment. Wider pollutant rate has reaches to 98% in India and all over the globe due to widest industrial sector that are related to manufacturing and transportation.

The overall purpose of this research has been based on determination of impact of carbon emission on "global warming" and "Green House Gas" elevation level that have the capability to hinder green sustainability. This study has adopted a "secondary qualitative" data collection method in order to complete this study. This study has selected relevant journal an important tool of this research strategy. Also, these important data are collected from

“Google scholar” through using key words. This current research has adopted “secondary qualitative data analysis” measure through analysis of relevant data and descriptive statistics of collected data in order to interpret this research interest.

Findings: Nitrous-Oxide has contributed about 25% towards “Green House gas” in this recent context through capturing this radiation heat from the surface of this earth. Therefore, this gas has the major contribution towards development of “Global warming” in the significant manner. “Global Green Growth Institute” has been supported by several national institute that for the implementation of “Green Sustainable Economy” in near future.

Suggestion: Moreover, carbon flourished gases from refrigerants play an outsized role in total human emissions. The activity principle to the territory that produced the emissions. These two principles result in different totals when measuring, for example, electricity importation from one country to another, or emissions at an international airport.

Key words: “Green House Gas emission”, emission of “Nitrous-Oxide”, emission of CO₂, Emission of Methane, Global warming, Climate Change.

Introduction

“Greenhouse gas (GHG) can be described as a gas that emits and absorbs radiant liveliness in “thermal infrared range”, instigating greenhouse effect. Without “greenhouse gases”, Earth's average surface temperature would be almost “-18 °C (0 °F)”, “15 °C (59 °F)” above current average temperatures. The most significant GHG are water vapour, methane and Carbon dioxide. Notwithstanding making up a segment of entirely atmospheric gases, GHG has a reflective consequence on the energy inexpensive of Earth system. GHG emissions from human practices effectively reinforce the effect of greenhouse, contributory toward climate change.

The human action, industrial function, manufacturing functions are likely to be responsible for elevation of these gasses in atmosphere as well as also responsible assisting climate change. The impact of each GhG on the climate of Earth relies on “chemical nature and its relative concentration in the atmosphere”. Global warming is caused by various gases which are methane (CH₄), nitrous oxide (N₂O), trifluoromethane (CHF₃), tetrafluoroethane (CF₃CH₂F), carbon tetrafluoride (CF₄), sulfur hexafluoride (SF₆), hexafluoroethane (C₂F₆). However, determined rate of gas emissions has been seen to uplift by 89% effecting environment at large. Some of the factors responsible for the increase in "Global Warming Level" are energy or power generation from burning of fossil fuels, production of various products, rapid and unplanned construction, reduction of "green environment". The emission of GhG cause climate change and develop respiratory sicknesses from air and smog pollution. There are various effects of GhG emissions such as “desertification of fertile areas”, “migration of species”, “melting of glaciers” and more.

Compounds of greenhouse gas emission

| Compound | Pre-industrial concentration (ppmv*) | Concentration in 2020 (ppmv) | Atmospheric lifetime (years) | Main human activity source | GWP* |
|--|--------------------------------------|------------------------------|------------------------------|--|--------|
| Carbon dioxide (CO ₂) | 278 | 413 | Variable | “Fossil fuels, cement production, land use change” | 1 |
| Methane (CH ₄) | 0.722 | 1.889 | 12 | “Fossil fuels, rice paddies, waste dumps, livestock” | 28 |
| Nitrous oxide (N ₂ O) | 0.27 | 0.333 | 121 | “Combustion industrial processes” | 265 |
| HFC 23 (CHF ₃) | 0 | 0.000024*** | 222 | Refrigerants, electronics | 12,400 |
| HFC 134a (CF ₃ CH ₂ F) | 0 | 0.000062*** | 13 | Refrigerants | 1,300 |
| HFC 152a (CH ₃ CHF ₂) | 0 | 0.0000064*** | 1.5 | Industrial processes | 138 |
| Perfluoromethane (CF ₄) | 0.00004 | 0.000079*** | 50000 | “Aluminum production” | 6,630 |
| Perfluoroethane (C ₂ F ₆) | 0 | 0.0000041*** | 10000 | “Aluminum production” | 11,100 |
| Sulphur hexafluoride (SF ₆) | 0 | 0.0000073*** | 32000 | “Electrical insulation” | 23,500 |

*ppmv = parts per million by volume, **GWP = 100-year global warming potential

Table 1: Different Green House Gasses and 100-year global warming potential

The above tabular structure illuminates the several compounds of greenhouse gas emission of several gasses. Different human activities have a huge effect on the emission of GhG gasses. There are multiple chemical compounds associated with “greenhouse gas emission” are “Ground-level ozone”, “Carbon tetra fluoride”, “Sulfur hexafluoride” and “Carbon dioxide”. The wider impact of greenhouse gas emission has affected industry likewise manufacturing, transportation, energy production and so on. At times the wider percentage rate of industrial effects due to nonstop greenhouse emission has been counted to 98%. The effects have been highly severe destroying wide number of habitats and setting generative basis. GHG emissions have fuelled the increasing trend in atmospheric concentrations to increase the natural greenhouse effect. CO₂ emissions are the main responsible for global

warming change, Global warming has affected the environment and it has also affected human beings on a large basis. As per the statement by Shearer *et al.* (2017), it has been highlighted that “coal-fired power plants” in this country are responsible for evaluation of their implications in the aspect of emissions as well as “energy production” in near future. By comparison, it has enhanced greenhouse gas and affected a human being. Ocean emissions, respiration, and decomposition are major components of carbon emissions, and human activities such as deforestation, respiration, and other components of natural gas release carbon that can affect humans and the atmosphere downstream. Carbon-di-oxide is considered as most common as well as “worrysome” range of greenhouse gas that can be emitted by burning of fossils, fuels, coals, oil as well as natural gasses. This is also considered as the largest contribute towards changes of climate in this recent time.

Coinciding the fact, it has been seen that wider rate of effects has been reigned in the year 2021 and created distress in vulnerable basis. On behalf of the facts Middle East countries has been seen to get hurdles with the emission of greenhouse gas termed to be 78%. Analysis of the data shows that the demand for electricity has increased so much that the burning of fossil fuels has increased to a changing extent, causing vulnerability to the atmosphere. Nitrous-Oxide has contributed about 25% towards “Green House gas” in this recent context through capturing this radiation heat from the surface of this earth. Therefore, this gas has the major contribution towards development of “Global warming” in the significant manner. As remarked by Jacobs, (2012), “Global Green Growth Institute” has been supported by several national institute that for the implementation of “Green Sustainable Economy”.

In the segment of GhG in India, the country is well below the “world average at 2.4 tCO₂e (tonne carbon dioxide equivalent)”. The largest source of GhG emission in the country is Energy sector which accounts for almost 70%. India's CO₂ emissions in 2021 from coal were almost “1.8 billion metric tons”. India's largest growing coal mine which produces large amounts of carbon emissions in India. According to the opinion of Gull *et al.* (2020), this Methane emission has been growing day by day since the year 2015. Methane emissions in India increased by 41% in 2015 due to coal burning. This enhancement in Carbon emissions happened to be increased by 2015 by 70%. Various global treaties have been signed between countries in order to make this Carbon emission lower than the specific level so that climate change tactics can be managed through temperature change ideas and remarks.

The study is to find out the extent of the harmfulness of greenhouse gas emissions especially methane and **Nitrous oxide**. This “annual growth rate” has been increased by 7.67%. Moreover, “annuals growth rate” of this power production has been annuals grown by “629.12 billion kWh in 2000 to 935.27 billion kWh” and this “production rate” is only 5.78% (Edgar, jrc.ec.europa.eu 2022). Lowering altering ranges of good way emissions of greenhouse gases has been stated to be firm equitable that helps to comprehend the production level by 67%. In 2021, highest modes of solar panel construction helps to bring down non feasible aspects of greenhouse gasses and are correspondent to positive aspects in atmosphere. The solar panel has been termed to be clean renewable energy resources that helps to capture sun’s energy and mobilize in firm competency of energy creations.

Objectives

- To analyse the effects of greenhouse gases emission in global spheres and India context
- To illustrate the impact of global warming on different industries in India
- To identify several issues of greenhouse emission countered by business sectors in India
- To develop different methods in order to decrease the issue of global warming

Research questions

- What are the effects of greenhouse gas emission in global sphere and India context?
- What is the main impact of global warming upon several industries of India?
- What are issues countered by business sectors in India due to wider emission of greenhouse gases?
- How the issues can be mitigated associated with global warming?

Research variables

The “dependent variable” of this research is global warming. Along with this, the “independent variables” are air pollutants, ration of emissions. The variable has been developed based on the research articles in order to evaluate the research findings more critically. It has assisted in evaluating the factors associated with Co₂ emissions. The variables have been developed to develop the findings of the research.

Literature review

GhG can be described as somewhat gas that has “property of absorbing infrared radiation (net heat energy)” discharged from surface of the Earth and dispersion it vertebral to surface of Earth, subsequently conducive to the effect of greenhouse. There are multiple reasons associated with GhG emissions such as manufacturing, forestry, transportation, agriculture as well as “electricity and heat. GhG plays a crucial part in the segment of maintaining suitable temperature in the planet. The significant of GhG are water vapour, methane, and Carbon dioxide. Eide rate of carbon emissions has a significant and critical impact on various sectors including health, society, employment, international relations and economy.

Peters *et al.* (2021), in the article “**Carbon dioxide emissions continue to grow amidst slowly emerging climate policies**” states that wider rate of greenhouse gas emission rate has been listed to be higher and has acquainted to value of 10.9% in global basis. India can be marked as “world's third largest carbon emitter” and one of the five nations that have experienced “high exposure to heat” over almost past five years. There are multiple causes associated with GhG emissions such as fossil fuels burning, “farming and livestock production”, and deforestation.

Other reasons include vehicles, industrialization, oil drilling, power plants, and waste. Food supply disruptions, increased wildfires and extreme weather can be marked as the impacts associated with climate change due to greenhouse gases. It effectively warms the climate of the planet.

Carbon-dioxide is considered the most common and "worrisome" range of greenhouse gases that can be emitted by burning fossil fuels, coal, oil, as well as natural gas. On the other hand, half magnitude of burning fossil fuel has declined long term perspective and creates several distress emitters in Japan as well as US. The burning of coal for energy can be marked as a significant source of "carbon dioxide (CO₂) emissions", accounting for almost 41% in the segment of entire "CO₂ emissions" in 2015. The proportion of carbon in India's climate is more than 50% and it continues to challenge this climate of India with many problematic situations. Wider rate of carbon emission has a significant and critical impact on different sectors that accompanies health, society, employment, International Relationship and Economy. GHG emissions have fuelled the increasing trend in atmospheric concentrations to increase the natural greenhouse effect. Greenhouse gases are created as infrared radiation affects the Earth's surface atmosphere. The continued enrichment of CO₂ radiation in the prevailing warm climate is leading to a large reduction in national production in warm years in India.

Shearer *et al.* (2017), in his article, called "***Future CO₂ emissions and electricity generation from proposed coal-fired power plants in India***" has talked about climate change, and this carbon emission problem in India due to coal production process in India. This journal article has variedly talked about carbon emission globally as well as in India context. Further compared and contrast them both on global basis. In this article further discussion contributed towards the process of temperature holding globally as well as on Indian general basis. A significant mechanism to reduce these carbon emissions was signed in 2017 in the "Paris Climate Agreement". This humidity has been raised because of carbon emission, raising of coal mine and of electricity in India. The article enforces the reliability, independence as well as completeness of carbon emission and generate complex global scientific mitigation of climatic distress. At times engaging several tracking progresses and implementing several GHG emissions schemes that are enrolled with budget, interpret satellite data has replicated wider rate of emission uncertainties.

Mittal *et al.* (2012), in his article named "***Estimates of emissions from coal fired thermal power plants in India***" has shown concern about this same topic of CO₂ emission and climate changes that has taken place due to this CO₂ emission. This article further mentioned about coal production strategies and how those coal production strategies has been hampering this climate of India. This CO₂ is the primary source of electricity in India and people uses lots of coal revert day to generate this electricity. This production of Coal has equated by production of CO₂ every day in India. This study has further mentioned about electricity plants and their usage of Coals every day. Global warming primarily happened because of this daily increment of coal in Indian electricity plant.

Haseebet *al.* (2020), in his research study named "*Asymmetric impact of textile and clothing manufacturing on carbon-dioxide emissions: Evidence from top Asian economies*" has discussed about electricity production in India and how this electricity production has been increasing day by day. Rapid economic growth and rapid industrial world is one of the many reasons behind this electricity generation production in India. GHG emissions have powered the growing trend in atmospheric absorptions to increase the natural greenhouse effect. Industrialization has increased the emission of greenhouse gasses. The consequences of GhG emission includes rising sea levels, intense drought, melting glaciers, warming oceans, storms and more.

Method of data collection

This study used a "secondary qualitative" data collection method in order to complete this study. Secondary qualitative data collection method is the method applied by researcher to engage this study with lots of previous research data. Standard derivation has been used for this study. The sources of this secondary qualitative data collection method included newspaper, journal article, websites and magazines. In order to make these research outcomes better and enhanced this researcher has done a secondary research method to complete the study. The analysis has been integrated through collecting several data enclosed with global spheres and redeem favourable value of effectivity of greenhouse emission.

Data Analysis and interpretation

Carbon dioxide emission in ten nations as per 5 years basis (in million metric tons)

| Sl.no | Country | 2018 | 2019 | 2020 | 2021 | 2022 |
|-------|---------------|----------------|------------|------------|------------|------------|
| 1 | China | 10,432,751,400 | 10,733,438 | 10,018,290 | 10,756,730 | 10,494,234 |
| 2 | United States | 5,734,531 | 5,535,789 | 5,569,456 | 5,859,198 | 5,894,791 |
| 3 | India | 2,533,638 | 2,171,233 | 2,342,432 | 2,647,332 | 2,721,321 |
| 4 | Russia | 1,670,531 | 1,763,405 | 1,830,830 | 1,778,561 | 1,705,346 |
| 5 | Japan | 1,569,543 | 1,298,983 | 1,630,469 | 1,846,761 | 1,714,125 |
| 6 | Germany | 775,752, | 765,922 | 765,522 | 781,345 | 791,943 |
| 7 | Iran | 710,034 | 710,543 | 711,540 | 711,432 | 711,320 |
| 8 | Saudi Arabia | 618,92 | 601,047 | 601,985 | 601,765 | 601,123 |
| 9 | South Korea | 611,234 | 611,636 | 611,875 | 611,456 | 611,924 |
| 10 | Canada | 601,345 | 601,456 | 601,458 | 601,984 | 601,885 |

Table 2: Carbon dioxide emission as per 5 years basis (in million metric tons)

Analysis

The above tabular structure brings out confining 5 years data of carbon emission in ten countries across the globe. A wide influence has been poured into the country of India which sets unlimited artefacts and affects a wide range of spears to 2,721,321. Therefore, the main sources of this greenhouse gas emission are such *as transportation, electricity, industrialisation as well as manufacturing* has been highly interrupted with the emission of carbon gasses and effected global sphere in disguised rate.

Methane emission value as per 5 years basis (in million metric tons)

| Sl.no | Country | 2018 | 2019 | 2020 | 2021 | 2022 |
|-------|---------------|---------|--------|--------|--------|---------|
| 1 | China | 1396.71 | 912.66 | 812.05 | 956.12 | 1238.95 |
| 2 | United States | 637.18 | 496.25 | 481.88 | 502.01 | 623.77 |
| 3 | India | 698.28 | 592.33 | 510.03 | 617.42 | 669.34 |
| 4 | Russia | 871.62 | 842.31 | 746.93 | 807.16 | 853.00 |
| 5 | Japan | 26.22 | 19.78 | 11.62 | 18.96 | 21.12 |
| 6 | Germany | 57.92 | 46.31 | 39.11 | 48.72 | 53.37 |
| 7 | Iran | 12.58 | 10.62 | 8.33 | 8.56 | 12.07 |
| 8 | Saudi Arabia | 45.73 | 39.27 | 29.00 | 39.26 | 44.17 |
| 9 | South Korea | 26.00 | 24.59 | 18.69 | 21.36 | 25.53 |
| 10 | Canada | 98.88 | 76.41 | 71.28 | 84.55 | 95.53 |

Table 3: Methane emission value as per 5 years basis (in million metric tons)

Analysis

The above tabular structure illuminates the wider data rate of methane emission that hampered atmospheric ranges in consolidated basis. Altering the fact, China, US, Russia, India has equipped higher rate of methane gas that effected nature in global sphere. Listing the countries, it has been seen that South Korea, Canada, Saudi Arabia has faced limited emission of methane gas and are being counted to be specific.

Nitrous oxide emission as per 5 years data (in million metric tons)

| Sl.no | Country | 2018 | 2019 | 2020 | 2021 | 2022 |
|-------|---------------|---------|---------|---------|---------|---------|
| 1 | China | 590,961 | 589,945 | 588,841 | 590,561 | 590,967 |
| 2 | United States | 299,093 | 301,961 | 302,145 | 302,760 | 302,981 |
| 3 | India | 241,744 | 240,986 | 241,156 | 245,450 | 244,650 |
| 4 | Brazil | 214,529 | 210,435 | 211,560 | 211,113 | 210,958 |

| | | | | | | |
|----|--------------------------|---------|---------|---------|---------|---------|
| 5 | Central African Republic | 100,752 | 101,345 | 101,970 | 102,451 | 102,981 |
| 6 | Indonesia | 96,753 | 98,560 | 98,398 | 98,959 | 99,786 |
| 7 | Sudan | 87,540 | 88,984 | 88,378 | 89,346 | 89,981 |
| 8 | Dem. Rep. Congo | 68,987 | 68,213 | 67,451 | 68,491 | 69,321 |
| 9 | Russia | 67,234 | 67,546 | 67,897 | 67,812 | 68,231 |
| 10 | Australia | 56,747 | 61,345 | 60,971 | 60,765 | 61,345 |

Table 4: Nitrous oxide emission as per 5 years data (in million metric tons)

Analysis

The above tabular structure focuses towards the percentage rate of nitrous oxide emission in several countries across the globe. In line with reality, the annual rate of NO₂ gas is seen to be higher in 2022 than in previous years

CO₂ emission in the different sectors of India (in million metric tons)

| Country | Sectors | Compound | 2018 | 2019 | 2020 | 2021 | 2022 |
|---------|-----------------------------|-----------------|------------|----------|----------|----------|----------|
| India | Power Industry | CO ₂ | 166745 | 180645 | 175809.5 | 159422.8 | 152459.3 |
| | Other Industrial combustion | | 69285.9 | 67488.3 | 65681.78 | 59559.75 | 56958.22 |
| | Buildings | | 80914.7 | 80914.7 | 78748.78 | 71408.82 | 68289.72 |
| | Transport | | 117757.2 | 117459.2 | 114315 | 103660 | 99132.2 |
| | Non-Combustion | | 15613.85 | 15509.41 | 15902.34 | 16352.4 | 16106.98 |
| | Sub Total | | | 450316.7 | 462016.6 | 450457.4 | 410403.8 |
| | Total | | 2166140.85 | | | | |

Table 5: CO₂ emission in the different sectors of India (in million metric tons)

Analysis

The above table has described the affected industries of India based on the component of CO₂. It has assisted in understanding the impact of CO₂ emission in the sectors of transport, building, Power Industry and more.

CO₂ emission in the different sectors in global context (in million metric tons)

| Sectors | 2018 | 2019 | 2020 | 2021 | 2022 |
|-----------------------------|----------|----------|----------|----------|----------|
| Power Industry | 166745 | 180645 | 175809.5 | 159422.8 | 152459.3 |
| Other Industrial combustion | 69285.9 | 80914.7 | 65681.78 | 59559.8 | 56958.22 |
| Buildings | 80914.7 | 67488.3 | 78748.78 | 71408.82 | 68289.72 |
| Transport | 117757.2 | 117459.2 | 114315 | 103660 | 99132.2 |

| | | | | | |
|------------------|-------------|-------------|----------|----------|----------|
| Non-Combustion | 15613.85 | 15509.41 | 15902.34 | 16352.4 | 16106.98 |
| Sub Total | | | | | |
| Total | 450316.65 | 462016.61 | 450457.4 | 410403.8 | 392946.4 |
| | | | | | |
| | 56358.56867 | 777271.0036 | 59503.94 | 53359.06 | 50884.21 |

Table 6: CO₂ emission in the different sectors in global context (in million metric tons)

Analysis

The above tabular framework plots the annual CO₂ emissions of different sectors in a global context. Industries such as buildings, transport, non-combustion has been pointed to be highest that has emerged indicative figures on 5 years basis. However, 2021-year figures are being seen consistently high than the previous enrolled years.

Standard deviation calculation 10 different countries (in million metric tons)

| <i>Emission countries</i> | | <i>Best case leaks termed as 1% based on the variables</i> | <i>Worst case leaks ranges to 0.5</i> | <i>Standard deviation</i> |
|---------------------------|--|--|---------------------------------------|---------------------------|
| <i>India</i> | Produced consumed emission | 1.84 0.02 | 0.06 1.87 | 0.5 |
| | Production of emitted consumption | 3.67 0.04 | 0.11 3.6 | 0.5 |
| China | Decomposition of “carbonic acid gas” | 2.24 0.03 | 1.04 1.01 | 0.5 |
| | Fossil CO ₂ emissions | 3.84 0.01 | 2.14 1.02 | 0.5 |
| United States | Industrial combustion | 1.89 0.05 | 2.89 0.04 | 0.5 |
| | Application of “Non-ferrous metals” | 3.04 0.02 | 2.79 0.03 | 0.5 |
| Russia | Decarbonization to tackle climate change | 3.89 0.02 | 4.47 0.01 | 0.5 |
| | “Anthropogenic greenhouse gasses” | 2.98 0.01 | 2.15 0.02 | 0.5 |
| Japan | “Higher feed-conversion efficiency” | 4.08 0.01 | 4.34 0.01 | 0.5 |
| | “Land-use change” | 3.10 0.02 | 3.87 0.01 | 0.5 |

| | | | | |
|--------------|------------------------------------|--------------|--------------|-----|
| Germany | “Global carbon emissions” | 4.14 0.03 | 4.09 0.02 | 0.5 |
| | “Trucking and haulage” | 3.34 0.02 | 3.55 0.01 | 0.5 |
| Iran | “Global transport CO2 emissions” | 2.74 0.02 | 2.94 0.03 | 0.5 |
| | “Restricting truck CO2 emissions” | 2.54 0.01 | 3.41 0.02 | 0.5 |
| Saudi Arabia | “Green building practices” | 3.59 0.03 | 4.55 0.04 | 0.5 |
| | “Cellulose fiber insulation” | 3.71 0.03 | 3.95 0.02 | 0.5 |
| Korea | “Polyethylene terephthalate (PET)” | 4.04 0.03 | 4.12 0.02 | 0.5 |
| | “Reduction in consumption” | 3.89 0.02 | 3.98 0.05 | 0.5 |
| Canada | “Embedded emissions” | 4.29 0.03 | 2.79 0.02 | 0.5 |
| | “Greenhouse gas intensity” | 3.87 0.03 | 2.89 0.02 | 0.5 |

Table 7: Standard deviation calculation irrespective of emission countries and effectively of greenhouse gas.

Analysis

The above tabular structure rebounds indefinite formulae of standard deviation and has been measured as “ $\sigma = \frac{\sum (X - \mu)^2}{n}$ ”. Alternatively, out of wider formulae “ $s = \frac{\sum (X - \bar{X})^2}{n - 1}$ ”. The outcome in the above table has been analysed based on the comparison of variables that involves air pollutants, ratio of emissions of Nitrous oxide and CO₂ of ten nations. Initiation of favourable outcomes in the emission protocol included specific and specific rate and yield index results of 0.5. “ $s = \frac{\sum (X - \bar{X})^2}{n - 1}$ ” has been used to get the result based on the ten nations. Best case leaks have been termed to be 1.84 and the ranges has induced to wider and componential basis indicated to be $2n-1 = (2*0.5-1) = 0$. The decimal figure that has been imputed in the study has ranged from 0.2 keeping the favourable value of 0.5 constant and upgraded wider rate of production forth going aspect has 3.67.

Identification of minimum median and maximum value of technology (in million metric tons)

| Alternative power generation sources | Minimum value | Median value | Maximum value |
|--|---------------|--------------|---------------|
| Wind onshore aspects | 7.0 | 11 | 56 |
| Hydropower | 0.5 | 8.0 | 1.0 |
| Concentrated desirability of solar power | 8.8 | 0.5 | 6.0 |
| Geothermal | 2.6 | 4.8 | 16.0 |
| Solar PV | 0.5 | 49.87 | 65.34 |
| Biomass | 56.89 | 5.1 | 22.45 |
| Gas combined cycle | 37.20 | 12.67 | 19.78 |

Table 8: Alternative power generation sources for lessening greenhouse gas emission**Analysis**

The above tabular structure has discussed alternative power generation sources for lessening greenhouse gas emission. Limiting the wide gradient channel, it is observed that the wind rate on the sea coast is characterized as 7.0% with a maximum value of 56%. The calculation framed has been labelled to be as $65.34 \text{ g (Diesel)/MJ.} 11/8.49.87/5.1=12.67\text{gm}$. After state affiliation of hydrogen atoms helps to estimate favourable carbon emission that ranges to 1MJ and the energy rate has been weighted to be 12.67g. The values based on minimum, maximum and median segment has been depicted based on alternative power generation sources.

Direct emission percentage rate in economic sectors

| Economic sectors | Direct emission percentage rate (in metric tons) |
|------------------|--|
| Industry | 10% |
| Land usage | 10% |
| Building | 20% |
| Transport | 30% |
| Other energies | 40% |

Table9:Direct emission percentage rate in economic sectors**Analysis**

The above tabular structure depicts the percentage emission rates of various greenhouse gases in India and affects economic sectors related to building, transportation as well as other energy. At times the highest rate has been explored to be as 40% that has been counted to be valuable and authentic. The definite percentage rate effects environment in subjugate basis and explores non consistence global distress due to emission of greenhouse gas.

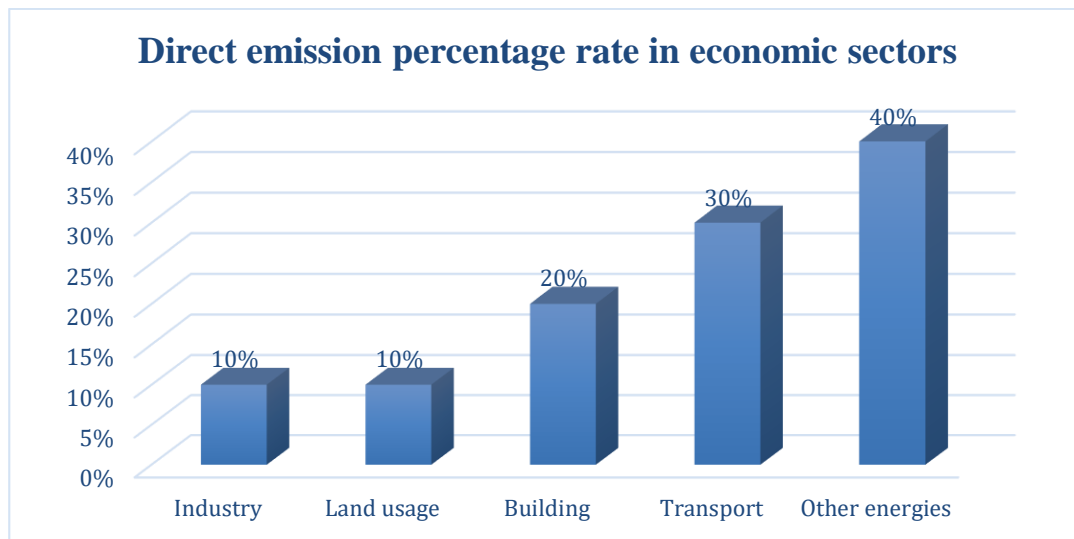


Figure1: Emission rate in economic sectors in India

Analysis

The above bar graph determines the suitable emission rate of greenhouse gas effecting several economic sectors in India. It has depicted the emission rate GHG in different economic sectors in India that includes land usage, industry, building, transport and more. It has shown the requirements of sustainability in different industries in India. Corresponding to which other energy sector has been affected by 40% and the counted industry rate has been labelled to be 0%. The effects of greenhouse gas have been calculated with data spread in respect to mean value.

Greenhouse gas emission percentage in different sectors globally

| Sectors | Emission rate |
|--------------------------------|---------------|
| Energy industry | 4.4% |
| Transport(shipping) | 5.6% |
| Transport (road) | 7.89% |
| Transport(aviation) | 9.86% |
| Residential | 1% |
| Commercial | 34.9% |
| Unlocated combustion | 2.98% |
| Agricultural | 10.96% |
| Land usage change and forestry | 3.45% |
| Waste | 2.78% |
| Industrial process | 3% |
| Fugitive emission | 4.90% |

Table10: Greenhouse gas emission percentage in different sectors globally

Analysis

The above tabular framework clarifies the emission rates of greenhouse gases that affect different sectors and the gas is calculated to span 9.86% in the transportation channel of the aviation rate. The gas emission efficiency calculated for the commercial sector is 2.98%. On the other hand, industrial process emission rate has been counted to be 3% and generated poor explorable data in subjugated basis. The percentage in the segment of “unlocated combustion” includes almost 2.98%.

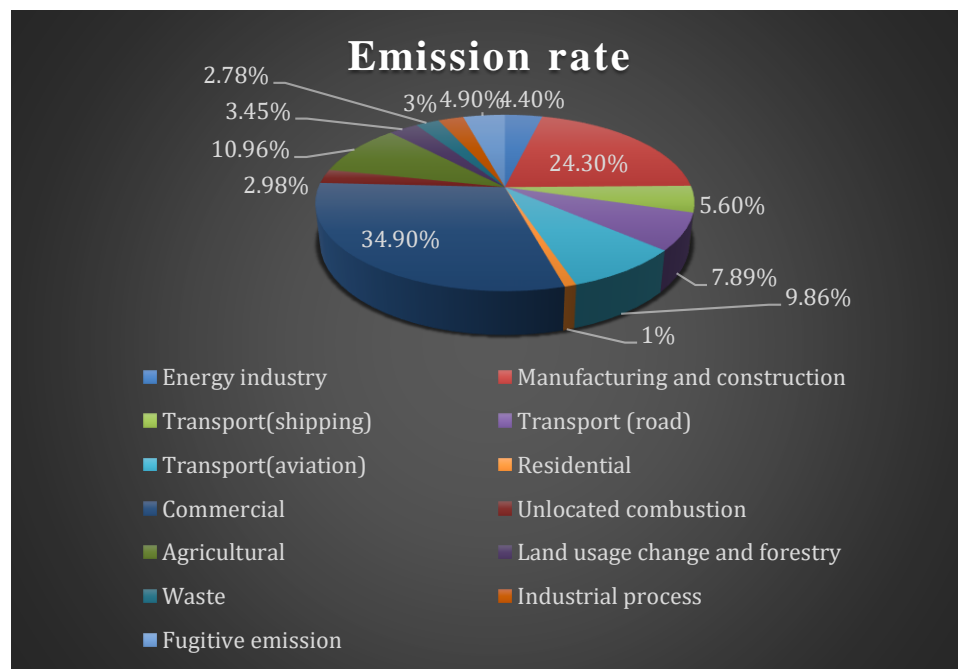


Figure2: Emission rate of greenhouse gasses in different sectors

The graph above demonstrates the impact of the larger emission rate and highlights the favourable outcome of certain manufacturing and construction outcomes which are rated at 5.6%. On the other hand, while methane contributes “about 76 percent of total greenhouse gas emissions” and methane “16 percent of greenhouse gas emissions”, nitrous from industry contributes 7 percent to "global emissions" in various commercial industrial channels. Total contribution of all gases has expressed in “co2 equivalents”. The graph that has mentioned below states that wider and indicative growth process helps to ascertain favourable outfit of desirable content that serves carbon emission in considerable basis. There is a significant effect of GhG emission in the climate changes of the planet. In addition, the increased rate of industrialization has affected the climate of the planet.

Carbon dioxide emission from different sources in global spheres and India

| Carbon dioxide emission from different sources | Percentage (in metric tons) |
|--|-----------------------------|
| Coal | 65% |
| Oil | 45% |
| Gas | 57% |
| Cement | 75% |
| Others | 55% |

Table3: Carbon dioxide emission from different sources in global spheres and India

Analysis

The table structure above shows the carbon dioxide emissions from different sources. The percentage rate from the source of coal is 65%, from oil is 45%, from gas is 57%. Along with this, the percentage rates from others in the emission of carbon dioxide is 55%.

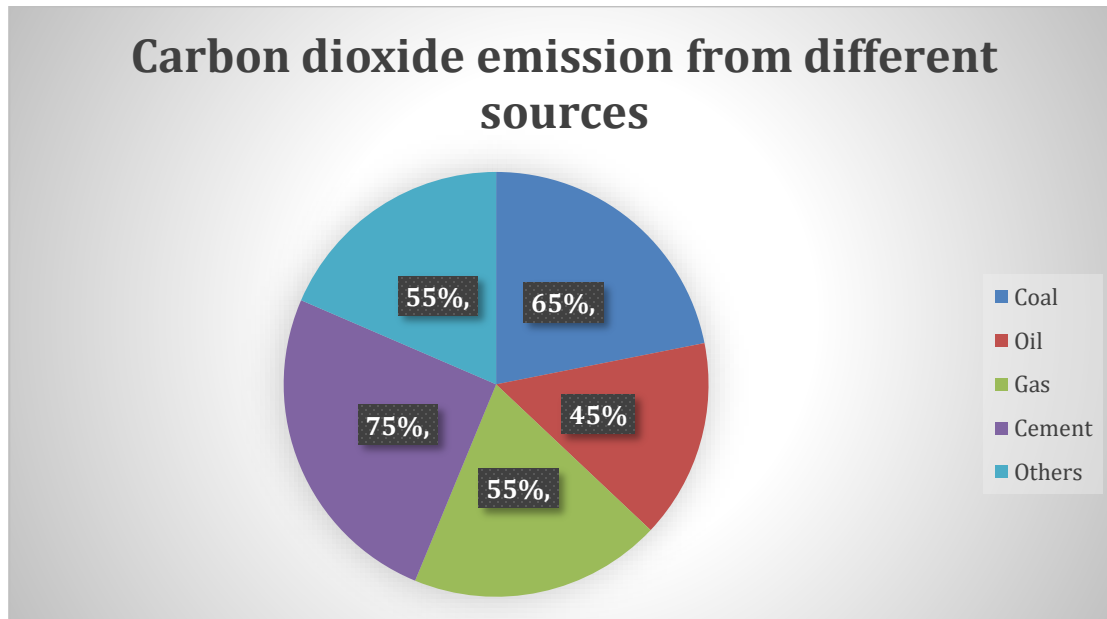


Figure6: Carbon dioxide emission from different sources in global spheres and India

Analysis

The above figure indicates the favourable percentage in the segment of carbon dioxide. It shows the emission percentage of 65% from coal sources, 45% from oil, 57% from gas. Alternatively, the facts and indicative fuel alteration has sublimed the most enrolled sectors listed to be coal, oil, cement.

Conclusion

In conclusion, it can be said that carbon emission, and global warming in India is related to each other. Electricity production and consumption in India has been varied by many tendencies level. The production of electricity is much lower than consumption level. Therefore, when electricity consumption is rising in accordance with global warming is rising also. 34.2% of carbon emission and 27.7% of “greenhouse gas emission in India comes from transportations. 32.9% of total CO₂emission happened from “fossil fuels to generate electricity”. This is the second largest amount of Methane in India.

Reference

Choudhary, A., Kumar, A. and Kumar, S., 2021. Erratum for “National Municipal Solid Waste Energy and Global Warming Potential Inventory: India” by AnkurChoudhary, Ashish Kumar, and Sudhir Kumar. *Journal of Hazardous, Toxic, and Radioactive Waste*, 25(1), p.08220001.

climate.nasa.gov, 2022, Carbon Dioxide, Available at: <https://climate.nasa.gov/vital-signs/carbon-dioxide/#:~:text=Carbon%20dioxide%20in%20the%20atmosphere,in%20less%20than%20200%20years>.

[Accessed on: 18.01.2022]

Elavarasan, R.M., Shafiullah, G.M., Padmanaban, S., Kumar, N.M., Annam, A., Vetrichelvan, A.M., Mihet-Popa, L. and Holm-Nielsen, J.B., 2020. A comprehensive review on renewable energy development, challenges, and policies of leading Indian states with an international perspective. *IEEE Access*, 8, pp.74432-74457.

Gull, R., Bhat, T.A., Sheikh, T.A., Wani, O.A., Fayaz, S., Nazir, A., Saad, A.A., Jan, S. and Nazir, I., 2020. Climate change impact on pulse in India-A review. *Journal of Pharmacognosy and Phytochemistry*, 9(4), pp.3159-3166.

Haseeb, M., Haouas, I., Nasih, M., Mihardjo, L.W. and Jermstiparsert, K., 2020. Asymmetric impact of textile and clothing manufacturing on carbon-dioxide emissions: Evidence from top Asian economies. *Energy*, 196, p.117094.

iea.org, 2022, Methane and climate change, Available at: <https://www.iea.org/reports/global-methane-tracker-2022/methane-and-climate-change>[Accessed on: 18.01.2022]

Jacobs, M., 2012. *Green growth: Economic theory and political discourse* (Vol. 108). London: Grantham Research Institute on Climate Change and the Environment.

Lse.ac.uk, 2023. *Green Growth: Economic Theory and Political Discourse*. <https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2012/10/WP92-green-growth-economic-theory-political-discourse.pdf>

Mittal, M.L., Sharma, C. and Singh, R., 2012, August. Estimates of emissions from coal fired thermal power plants in India. In *2012 International emission inventory conference* (pp. 13-16).

Orlov, A., Sillmann, J., Aunan, K., Kjellstrom, T. and Aaheim, A., 2020. Economic costs of heat-induced reductions in worker productivity due to global warming. *Global Environmental Change*, 63, p.102087.

ourworldindata.org (2023), *Emissions by sector* Available at: <https://ourworldindata.org/emissions-by-sector>[Accessed on 14-101-23]

Peters, G.P., Andrew, R.M., Canadell, J.G., Friedlingstein, P., Jackson, R.B., Korsbakken, J.I., Le Quéré, C. and Peregón, A., 2020. Carbon dioxide emissions continue to grow amidst slowly emerging climate policies. *Nature Climate Change*, 10(1), pp.3-6.

Ruggiano, N. and Perry, T.E., 2019. Conducting secondary analysis of qualitative data: Should we, can we, and how?. *Qualitative Social Work*, 18(1), pp.81-97.

Shearer, C., Fofrich, R. and Davis, S.J., 2017. Future CO2 emissions and electricity generation from proposed coal-fired power plants in India. *Earth's Future*, 5(4), pp.408-416.

Statista.com (2020). “World's Biggest Economies Ramp Up Their Emissions”. Available At: <https://www.statista.com/chart/19882/annual-percentage-change-in-greenhouse-gas-emissions/>, [Accessed On:27/1/2023]

Statista.com (2022). “Carbon dioxide emissions from energy worldwide from 1965 to 2021, by region”. Available At: <https://www.statista.com/statistics/205966/world-carbon-dioxide-emissions-by-region/>, [Accessed On:27/1/2023]

