The Greenhouse Effect and Its Impacts on Environment

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***Abstract*—The buildup of so-called "greenhouse gases" in the atmosphere - CO_2 in particular-appears to be having an adverse impact on the global climate. This paper briefly reviews current expectations with regard to physical and biological effects, their potential costs to society, and likely costs of abatement. For a "worst case" scenario it is impossible to assess, in economic terms, the full range of possible non-linear synergistic effects. In the "most favorable" (although not necessarily "likely") case (of slow-paced climate change), however, it seems likely that the impacts are within the "affordable" range, at least in the industrialized countries of the world. In the "third world" the notion of affordability is of doubtful relevance, making the problem of quantitative evaluation almost impossible.**

Keywords— Greenhouse gases, Histroy of Greenhouse gases,sources of Greenhouse Gases,Impacts,and How to reduce Greenhouse effect, conclusion

I. INTRODUCTION

Climatologist believe that increasing atmospheric concentration of carbon dioxide and other "greenhouse gasses" released by human activities, such as burning of fossil fuels and deforestation, are warming the Earth. The mechanism is commonly known as the "greenhouse effect" is what makes the Earth habitable. These gasses in the atmosphere act like the glass of a greenhouse, letting the sunlight in and preventing heat from escaping. But the human activities have altered the chemical composition of the atmosphere through the buildup of greenhouse gases-primarily carbon dioxide, methane, and nitrous oxide.

Rise in environmental temperature and changes in related processes are directly connected to increasing anthropogenic greenhouse gas (GHG) emissions in the atmosphere .This rise in temperature was vehemently argued to be generally triggered by the emission of carbon based compound from fossil fuels consumption for power generation. The concentrations of carbon dioxide, methane, and nitrous oxide are all known to be increasing and in recent year, so their greenhouse gases, principally chlorofluorocarbons (CFCs), have been added in significant quantifies to the atmosphere.

II. HISTORY OF GREENHOUSE GASES

The existence of the greenhouse effect was argued for by Joseph Fourier in 1824. The argument and the evidence was further strengthened by Claude Pouillet in 1827 and 1838, and reasoned from experimental observations by John Tyndall in 1859. The effect was more fully quantified by Svante Arrhenius in 1896. However, the term "greenhouse" wasn't used to describe the effect by any of these scientists; the term was first used in this way by Nils Gustaf Ekholm in 1901. In 1917 Alexander Graham Bell wrote. The unchecked burning of fossil fuels] would have a sort of greenhouse effect", and "The net result is the greenhouse becomes a sort of hot-house." Bell went on to also advocate the use of alternate energy sources, such as solar energy.

III. LITERATURE REVIEW

Bjorn Ulsterman et al. (2007), has published paper on Modeling carbon cycles and estimation of greenhouse gas emissions from organic and conventional farming systems. It gives information on carbon (C) and nitrogen (N) fluxes in the system soil–plant–animal–environment. The model couples the balancing of C, N and energy fluxes with the target to estimate the climate-relevant CO_2, CH_4 and N_2O sources and sinks of farming systems. For the determination of the net greenhouse effect, calculations of C sequestration in the soil, CO_2 emissions from the use of fossil energy, CH_4 emissions from livestock keeping and N_2O emissions from the soil have been made. The results were converted into CO_2 equivalents using its specific global warming potential (GWP)

Y.S. Mohammed, et al. (2012) has published paper on (A Synopsis on the Effects of Anthropogenic Greenhouse Gases Emissions from Power Generation and Energy Consumption).It gives information about Despite the looming difficult energy context in the majority of countries in the world, global change in environmental dignity resulting from power generation and energy consumption scenario is rapidly becoming a globally disturbing phenomenon. Stakeholders and environmental activists alike have been clamouring for adoption of reduction procedures using sustainable means because ignominious environmental practices have associated disastrous

consequences. Therefore, this article presents an overview of the effects of anthropogenic energy generation and consumption practices capable of ejecting emissions of greenhouse gases into the atmosphere. It also endeavors to identify some greenhouse gas emission reduction and control measures.

Scott Canonico, et al, (2009) has published paper on reducing the Greenhouse Gas Emissions of Commercial Print with Digital Technologies. It gives information about Paper is an exquisite technology that offers a durable, high contrast, high resolution and low power color display surface at very low cost. Despite this low cost and low environmental impact during use, paper has significant embedded Greenhouse Gas (GHG) emissions resulting from other phases of paper's life cycle. In fact, in most print applications, including those mentioned above, paper is the dominant contribution to GHG emissions. Although alternatives to paper such as e-books, e-paper and erasable ink have been proposed, it is not clear that these will succeed or that they will reduce emissions; it would certainly be unwise to rely on them as the sole route to abatements. This article quantifies the GHG emissions due to inefficiencies in current commercial and office print applications and describes improved business models built on digital print and distribution technologies to conserve paper and enable GHG reductions

Y.R.Dhumal et al; (2013) has published paper on (Green House Automation using Zigbee and Smart Phone). In this paper we have discussed about Greenhouse Monitoring and Control System Based on Zigbee Wireless Senor Network using ARM controller and is accessible to the user through the Internet. They have discussed about Green House environment monitor technology implementation based on android mobile platform, which uses android mobile phone as the monitoring terminal. In this paper parameters in the greenhouse are monitored on the PC as well as the android mobile phone from anywhere in the world as it is connected to the internet through the team viewer software.

Marco Aurelio dos Santosa,c, Luiz Pinguelli Rosaa, et al ;(December 2004) has published paper on (Gross greenhouse gas fluxes from hydro-power reservoir compared to thermo-power plants). This paper presents the findings of gross carbon dioxide and methane emissions measurements in several Brazilian hydro reservoirs, compared to thermo power generation. The term 'gross emissions' means gas flux measurements from the reservoir surface without natural preimpoundment emissions by natural bodies such as the river channel, seasonal flooding and terrestrial ecosystems. The net emissions result from deducting pre-existing emissions by the reservoir. A power dam emits biogenic gases such as CO_2 and CH_4. However, studies comparing gas emissions (gross emissions) from the reservoir surface with emissions by thermo-power generation technologies show that the hydro-based option presents better results in most cases analyzed. In this study, measurements were carried in the Miranda, Barra Bonita, Segredo, Tres Marias, Xingo´,and Samuel and Tucurui´ reservoirs, located in two different climatological regimes. Additional data were used here from measurements taken at the Itaipu and Serrada Mesa reservoirs

IV. SOURCES OF GREENHOUSE GASES

The most abundant greenhouse gases in Earth's atmosphere are:

- Water vapor (H_20),
- Carbon dioxide (CO_2),
- Methane (CH_4),
- Nitrous oxide (N_20),
- Ozone (O_3),
- Chlorofluorocarbons (CFCs).

Atmospheric concentrations of greenhouse gases are determined by the balance between sources (emissions of the gas from human activities and natural systems) and sinks (the removal of the gas from the atmosphere by conversion to a different chemical compound).The proportion of an emission remaining in the atmosphere after a specified time is the "airborne fraction" (AF). More precisely, the annual AF is the ratio of the atmospheric increase in a given year to that year's total emissions. For CO_2 the AF over the last 50 years (1956–2006) has been increasing at 0.25 ± 0.21%/year [5].

By their percentage contribution to the greenhouse effect on Earth the four major gases are: water vapor, 36–70% carbon dioxide, 9–26% methane, 4–9%ozone, 3–7% .It is not physically realistic to assign a specific percentage to each gas because the absorption and emission bands of the gases overlap (hence the ranges given above). The major nonages contributors to the Earth's greenhouse effect, clouds, also absorbs and emit infrared radiation and thus have an effect on radioactive properties of the atmosphere.

In studies of the net greenhouse effect of farming systems, not only are CO_2 and CH_4 emissions important, but, due to their high specific greenhouse potential, also the site- and management-related N_20 emissions8. Model approaches have been elaborated for emission inventories on the farm level, which consider all relevant outputs2, 9; however, on the basis of partly simplified model algorithms. An overall view of the net greenhouse effect of farming systems must take into account, beside the biological C fluxes, also technical C fluxes, i.e., all CO_2 emissions involved by the input of fossil energy.

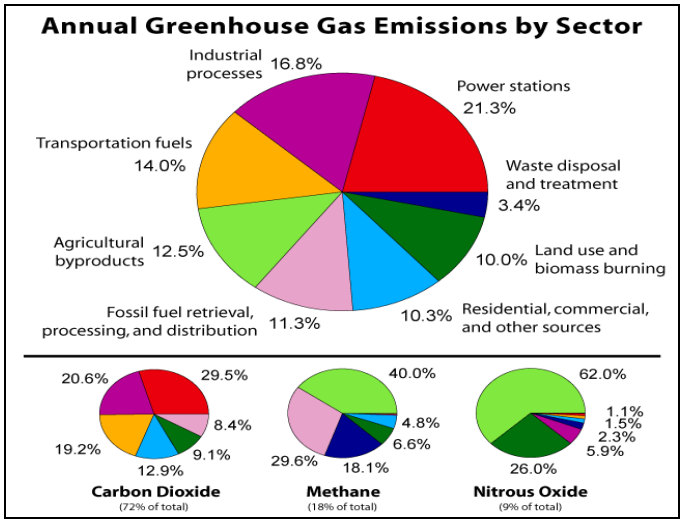

Fig. 1. Emission of greenhouse gases

CH_4 emissions: Methane is emitted from the production and transport of coal, natural gas, and oil. Methane emission also takes place from the decomposition of organic wastes in agriculture, in municipal solid waste, landfills and the raising of livestock. The metabolic methane emissions from livestock keeping were estimated with regard to animal species, performance and feeding. On the basis of the feed gross energy, methane releases were estimated by means of conversion factors. For quantifying the methane release from organic fertilizer during storage, the excreta output (quantity, chemical components, degradability) was chosen as the basis for calculating the methane formation potential; the amount of produced methane was then determined with regard to the storage system24.

N_2O emission: N_2O emissions were estimated during agriculture and industrial activities, as well as during combustion of solid waste and fossil fuels. It was assumed, albeit very simplified, that 1.25% of the nitrogen supplied to the soils by organic and mineral fertilization, N2 fixation and N deposition is emitted in the form of N_20–N. Alternatively, a N_20–N emission factor of 2.53% of the total N input as obtained in numerous measurements at the experimental farm8 was applied. The indirect N_20 emissions from gaseous NH_3 and NOx losses as well as from N losses via reaching were quantified using emission factors.

Carbon dioxide (CO_2): Carbon dioxide enters the atmosphere through burning fossil fuels (coal, natural gas and oil), solid waste, trees and wood products, and also as a result of certain chemical reactions (e.g., manufacture of cement). Carbon dioxide is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle

V. THE GREENHOUSE EFFECT

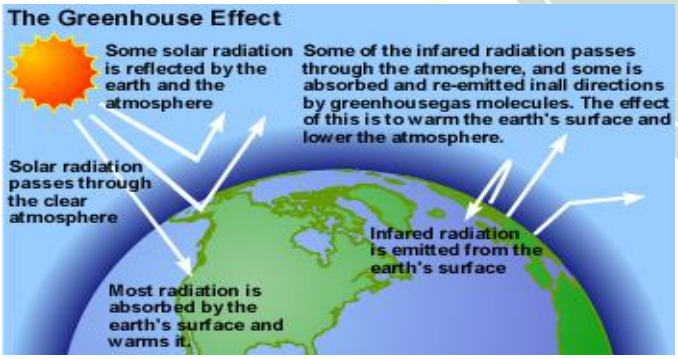

Fig. 2. The Greenhouse Effect

Definition Radiation: energy that is propagated in the form of electromagnetic waves.

- Incoming solar energy is called solar radiation
- Solar radiation warms the earth
- The warmed earth radiates heat. However, this is not called 'heat', but rather in scientific terms it is energy. The correct term is infrared radiation
- The atmospheric 'blanket' is gas molecules in the atmosphere.
- Solar energy reaches the Earth's surface ,The earth surface absorbs the energy and warms up
- The warm earth surface radiates infrared radiation (IR), Greenhouse gases absorb IR leaving the surface
- Gases are energized, then emit more radiation (IR)
- Some of this IR returns to the earth surface, warming it further,
- This process is what we call the "GREENHOUSE EFFECT"

VI. IMPACT ON ENVIRONMENT OF GREENHOUSE EFFECT

A. Global Warming

Increase of greenhouse gases concentration causes a reduction in outgoing infrared radiation, thus the Earth's climate must change somehow to restore the balance between incoming and outgoing radiation. This "climatic change" will include a "global warming" of the Earth's surface and the lower atmosphere as warming up is the simplest way for the climate to get rid of the extra energy. However, a small rise in temperature will induce many other changes, for example, cloud cover and wind patterns. Some of these changes may act to enhance the warming (positive feedbacks), others to counteract it (negative feedbacks). Using complex climate models, the "Intergovernmental Panel on Climate Change" in their third assessment report has forecast that global mean surface temperature will rise by 1.4℃ to 5.8℃ by the end of 2100. This projection takes into account the effects of aerosols which tend to cool the climate as well as the delaying effects of the oceans which have a large thermal capacity. However, there are many uncertainties associated with this projection such as future emission rates of greenhouse gases, climate feedbacks, and the size of the ocean delay.

B. Sea Level Rise

If global warming takes place, sea level will rise due to two different processes. Firstly, warmer temperature cause sea level to rise due to the thermal expansion of seawater. Secondly, water from melting glaciers and the ice sheets of Greenland and the Antarctica would also add water to the ocean. It is predicted that the Earth's average sea level will rise by 0.09 to 0.88 m between 1990 and 2100.

C. Potential Impact on human life

1) Economic Impact: Over half of the human population lives within 100 kilometers of the sea. Most of this population lives in urban areas that serve as seaports. A measurable rise in sea level will have a severe economic impact on low lying coastal areas and islands, for examples, increasing the beach erosion rates along coastlines, rising sea level displacing fresh groundwater for a substantial distance inland.

2) Agricultural Impact: Experiments have shown that with higher concentrations of CO2, plants can grow bigger and faster. However, the effect of global warming may affect the atmospheric general circulation and thus altering the global precipitation pattern as well as changing the soil moisture contents over various continents. Since it is unclear how

global warming will affect climate on a regional or local scale, the probable effects on the biosphere remains uncertain.

3) Effects on Aquatic systems: The loss of coastal wetlands could certainly reduce fish populations, especially shellfish. Increased salinity in estuaries could reduce the abundance of freshwater species but could increase the presence of marine species. However, the full impact on marine species is not known.

4) Effects on Hydrological Cycle: Global precipitation is likely to increase. However, it is not known how regional rainfall patterns will change. Some regions may have more rainfall, while others may have less. Furthermore, higher temperatures would probably increase evaporation. These changes would probably create new stresses for many water management systems.

VII. Reduction And Control Measures Of Greenhouse Gases

Reduction of GHGs is central to all nations because the brunt of the problem is global and no one country or group of countries can provide its own remedy. This is why international and regional cooperation are more sought-after and have been well advocated for in the comity of global atmospheric sanity. In respect to this struggle, United Nations Framework Convention on Climate Change (UNFCCC) recently came into effect to deal with the global climate problem. This was executed in the form of international agreement comprising different countries across diverse regions to lower the dangerous concentration of anthropogenic GHGs in the atmosphere.

A. Clean development mechanism

Clean development mechanism involve massive deployment of renewable energy technologies for power generation and carbon dioxide sequestration to promote the concept of sustainable development. Beside the GHG mitigating potential of renewable energy resources, energy security guarantee is swiftly becoming a reality with the exploitation of different renewable energy resource. Clean development mechanism is a fundamental idea of Kyoto Protocol under the canopy of the United Nations Framework on Convention on Climate Change (UNFCCC). Developing countries are more actively involved in the development of renewable power generation in line with the proposed CDM. In 2009, developing countries hosted 53% of global RE power generation. Initial idea behind the institution of CDM is to strategically lower the level of emissions due to energy generation and consumption to a sustainable intensity. However, it was envisaged that emission reduction mechanisms will be financed by the industrialized nations whereby the fund will be given to developing countries as sponsorship for renewable energy programs. After a decade and more, a good implementation result is yet to be seen and gain in the global pace of renewable power exploitation is not in line with the realistic and expected level of developments.'

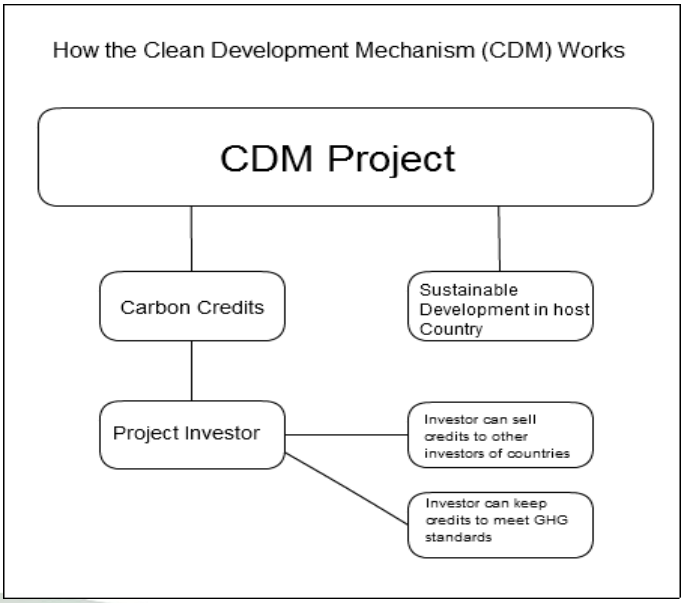

Fig. 3. Clean Developmental Mechanism

B. Green energy portfolio standard

Green energy is a type of energy produce conventionally with a reduced amount of negative environmental impact. Green energy is sometimes called renewable energy. Renewable energy application has become an essential ingredient with significant role in the expedition for GHG reduction and increasing the chance for sustainable development. Many countries have introduced and finance green energy programs to generate and consume power with minimum pollution. Green energy portfolio standard (GEPS) involves the uses of regulation to boost generation and consumption of energy from greener sources with the minimum rank of pollution propensity.

In some countries where green energy portfolio standard is strongly advocated, compulsions are placed on electric power generation companies to provide certain percentage of the national electricity demand from renewable sources as a strategic measure to lower emissions. Intergovernmental Panel on Climate Change (IPCC) direct countries to communicate their emissions from all sorts of energy related activities. Advocates of GEPS listed the benefits among which are innovation, pollution control and competition can eventually lower the per unit price of renewable power. Sustainable development of green energy can provide numerous environmental benefits alongside fossil resources conservation for far future generations.

C. Financing low carbon energy

CO_2 emission resulting from the combustion of petroleum products contributes substantial quantity of greenhouse gas to the atmosphere. As a critical factor towards development, a secure access to modern energy is essential for development. With the current global acknowledgement on the need to reduce emissions from energy, financing low carbon energy can be used as a strategy to reduce greenhouse gas emissions. Many financing initiatives exist for funding energy projects but financing low carbon projects is indispensable especially in countries where oils are the major source of income and energy

production. Driven an economy by a low-polluting energy technologies reduces the vulnerability of the human environmental sustainability. This envisioned low carbon economy can be harnessed by unlocking the untapped renewable energy resources potential. Optimization of renewable sources for energy application provides noteworthy opportunities to spread out and upgrade the energy infrastructure especially in the rural communities due to their diverseness. Via this strategic measure, the solution to energy poverty in developing regions can be provided by decentralization of the renewable energy systems. In some countries, emissions trading scheme (ETS) through carbon taxation is already implemented to control and monitor emissions.

- How to reduce greenhouse effect:
- Energy conservation
- Rising the cost of fuels
- Developing new energy production
- Forest protection/ Reforestation
- Recovery of methane from garbage
- Banning of CFC production
- International conferences
- National Standards of pollutants
- Anti-pollution measures

CONCLUSION

This study has shown that activities related to power generation and energy consumption has associated emissions with potential to influence greenhouse gas which is the main source of impending global warming. In reality, anthropogenic greenhouse gas emissions from energy activities are greater than the greenhouse gas emission from other human activities. Essentially, the study also advocated the need to strategically tackle GHG reduction to prevent the sanctity of the global environmental distinction for sustainable development and biodiversity interaction. Finally, it supported the need to increase renewable energy consumption to help in dealing with problems of energy security, energy control and health related problems.

A greenhouse is built of any material that passes sunlight, usually glass, or plastic. It mainly warms up because the sun warms the ground and contents inside, which then warms the air in the greenhouse. The air continues to heat because it is confined within the greenhouse, unlike the environment outside the greenhouse where warm air near the surface rises and mixes with cooler air aloft. This can be demonstrated by opening a small window near the roof of a greenhouse: the temperature will drop considerably. It was demonstrated experimentally (R. W. Wood, 1909) that a "greenhouse" with a cover of rock salt (which is transparent to infra-red) heats up an enclosure similarly to one with a glass cover. Thus greenhouses work primarily by preventing convective cooling.

More recent quantitative studies suggest that the effect of infrared radioactive cooling is not negligibly small, and may have economic implications in a heated greenhouse. Analysis of issues of near infrared radiation in a greenhouse with screens of a high coefficient of reflection concluded that installation of such screens reduced heat demand by about 8%, and application of dyes to transparent surfaces was suggested. Composite less reflective glass, or less effective but cheaper antireflective coated simple glass, also produced savings.

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