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OPTIONS AND OBSTACLES FOR REDUCING GREENHOUSE GAS EMISSIONS

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ABSTRACT:

Energy is significant as it is defined with social and financial development. If renewables energy help to reduce climate condition, it is a great approach. Gases that capture heat in the air are called greenhouse gases (GHG). A large amount of GHG produced from the activity of humans changes climatic conditions which harm human health, surroundings and economy Increasing GHG emissions changes the climate system in ways that affect our fitness, surrounding, and economy.

The release of GHGs is because of the burning of crude oil, resulting mainly from industrial activities and transportation, hence increase the quantity of CO₂ in the

environment. Loss of forests causes CO₂ to appear in the air. Increase levels of GHGs will raise the temperature thus affecting the schedule of melting ice on mountains, death of some marine and land animals, affecting agriculture and human health.

There are many obstacles in reducing GHG release like the request of coal is higher as it is a cheap product and is used by many industries, in production of electricity fossil fuels are used which in return produces low-cost electricity but increase CO₂ emission, people in undeveloped countries usually have a focus on the growth of the economy and short term benefits so uses cheap mean which will in return causes global warming, poverty, deforestation, and soil erosion.

For reduction of GHGs release, it is very important to take steps for the reduction and management of GHG release.

KEYWORDS:

Greenhouse gases, fossil fuels, forestry, policy implementation, carbon emission

INTRODUCTION:

Renewable energy is that type of energy which is obtained from an infinite origin. It is obtained from a natural process that is fill up continuously. It has different forms that are directly derived from rain, sun, ocean, wind, biofuel and renewable resources from the heat created inside the earth. The usage of energy resources in the right and better way is a hot discussion nowadays. It is very necessary and important to select which form of energy must be used and why.

It is a harsh reality that many industries around the globe are still depending on nonrenewable fuel sources for the generation of electricity. They are very beneficial in power production but in the long term, this activity is not advantageous. According to the United States Environmental Protection Agency (US EPA), important GHGs are released because of human activities from every sector (US EPA, 2014).

Energy plays a vital role in making tools for the development of mankind. As a result, there is an increase in demand for energy. The plants used for generating energy usually use fossil fuels. (Mashmool, E. et al. 2010). This fossil fuel results in the release of different gases and these gases are known as greenhouse gases (GHG).

Power and generation of heat have a greater share of GHG release (25%). Farming, forestry and other coast come after (24%). Other sectors includes manufacturing (21%), transportation (14%), other energy (10%), and buildings (6%) (IPCC, 2014). The key GHG is Carbon dioxide (CO₂). Approximately 76% of CO₂ was emitted by fossil fuel, industrial processes, forestry, and other coast use (EPA, 2014).

The world becoming a global village due to the increasing demand for energy by people across the world. Energy plays a vital role in the growth of society and the economy. If renewables energy help to reduce climate condition, it is a great approach. (Pattarawan Watcharaanantapong, 2016)

Radiations are absorbed by the gases available in the atmosphere and these types of gases are known as "greenhouse gases" (GHG. Greenhouse gases include carbon dioxide, nitrous oxide, methane,

hydrofluorocarbons (HFCs), and sulfur hexafluoride. These gases capture heat in the air that would otherwise move into space, and thus climatic conditions would vary. Because of the existence of these gases from natural resources, the earth is a place to live on otherwise no life will be seen here. A large number of GHG produced from the activity of humans. This activity changes conditions of climate and thus damages human health, surroundings, and economy (EPA, 2011).

In every single community, renewable energies are not adjustable because of two major factors, natural resources are distributed and it depends upon geographical locations and energy use in this respect depends upon culture. The second factor includes production rate and infrastructure.

LITERATURE REVIEW

This section gives the work in renewable energy which has been done so far.

Henrik Lund (2007) investigate the sample of Denmark, the author discusses the problems and view of transforming the present energy system into 100% renewable system. Important renewable sources are present today and can be improved further if technological advancement is achieved. The author discusses renewable energy such as wind, solar, waves, and biomass as required in making viable growth.

Nana Yaw Amponsah, Mads Troldborg, BethanyKington, IngeAalders, Rupert Lloyd Hough (2014) states that emission of the greenhouse is related to the manufacturing of electricity and heat.

The author includes 79 studies found on the life cycle of renewable energy technology (RETs). The results show that the release of GHG by fossil fuels' heat and electricity is higher.

J.P Painuly (2001) states that renewable energy plays an important part in providing continuous energy to mankind in developing countries. The author says that renewable sources are economically feasible for many uses but there are some barriers as well. The author develops a framework to identify these barriers and give suggestions to reduce them.

Kojo Menyah YemaneWolde-Rufael (2010) investigates the relationship between CO₂ emission, renewable, and nuclear energy utilization and GDP. The authors collect data for the period 1960 to 2007 in the USA. Granger causality test has been applied. The result shows that nuclear energy consumption reduces CO₂ emissions, but there is no significant reduction in CO₂.

Akhmat, G., K. Zaman, T. Shukui, .F. Sajjad, M. A. Khan, & M. Z. Khan (2014) investigate the relationship between climatic factors, air pollution, and energy sources. The data is taken from 35 developed countries new for 1975–2012. The authors use econometric techniques includes panel cointegration. The result shows that variables have a long term relationship. Nuclear energy decreases GHG and CO₂ emissions.

CAUSE OF GREENHOUSE GAS EMISSIONS:

Heat is captured by GHGs and thus makes the earth warmer. In the course of the most recent 150 years, an increase in GHGs in the air is because of the activities of humans. (IPCC, 2007)

Release of GHGs involves many practices like CH₄ (methane) is manufactured because of human activities in the agriculture sector while CO₂(carbon dioxide) production is the outcome of burning fossil fuels(coal, gas, oil) and deforestation.as trees produced carbon which is used for photosynthesis process. If trees are brought down to make goods and produce heat, then a greater portion of CO₂ will hang in the air. According to the 2010 Global Forest Resources Assessment, trees releases almost a billion ton of CO₂ into the environment every year which is the main component in the photosynthesis process. Forest cannot take all of CO₂ we release and for this certain measures should be taken to lessen the unnecessary proportion of CO₂. (EPA,2017)

In 2009, the innovation in the industries began and thus the proportion of CO₂ and CH₄ in the environment has increased up to 38% and 148% respectively. According to the World Meteorological Organization, 2016 was the hottest year on the record because of the increase in temperature. Global warming affects rainfall patterns throughout the world. As a result, it will create environmental changes that have adverse effects on human life. (WMO, 2018)

RELATION BETWEEN GLOBAL WARMING AND GREENHOUSE GASES:

An increase in temperature is mainly caused by the greenhouse effect. According to the Environmental Protection Agency (EPA), important GHGs are (H₂O), (CO₂), (CH₄) and (N₂O). Although oxygen is present in a huge amount in the environment it is not included GHGs as it does not absorb radiation. (EPA, 2011)

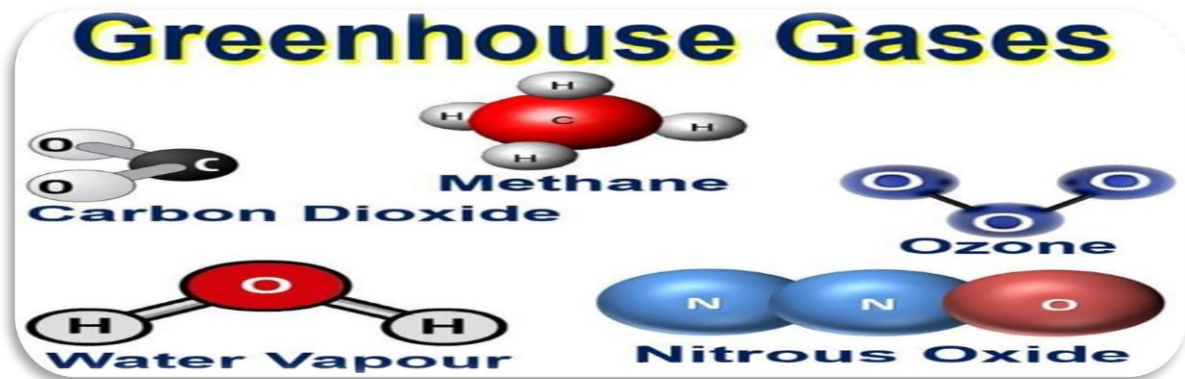


FIGURE 1(structure of greenhouse gases)

<https://marketbusinessnews.com/greenhouse-gas-definition/>

The release of GHGs is because of the burning of crude oil, resulting mainly from industrial activities and transportation, hence increase the quantity of CO₂ in the environment. Loss of forests causes CO₂ to appear in the air. Increase levels of GHGs will raise the temperature thus affecting the schedule of melting ice on mountains, death of some marine and land animals, affecting agriculture and human health.

Greenhouse gases will always appear in the atmosphere whereas the portion of these gases is increasing day by day. According to the National Oceanic and Atmospheric Administration (NOAA), the quantity of CO₂ after the innovation in the industrial sector has increased 100 times as compared to the quantity of CO₂ present before the revolution in industries. (NOAA)

There are certain gases which take part in the increase in temperature in the world. Such as:

1. Fluorinated gases:

There are some gases known as fluorinated gases as they contain fluorine in them like hydrofluorocarbons, perfluorocarbons and sulfur Hexafluoride. Industries produce greenhouse gases. These gases capture heat and thus result in global warming. These gases are included in global warming potential (GWP) gases.

2. Chlorofluorocarbons (CFCs):

They are previously used in refrigerators and aerosol propellants. After discovering these gases as GHGs, they were diminished by international agreement.

3. Carbon dioxide:

It is present in a greater amount in the environment so it has a greater effect on the temperature of the earth. In 2016, US greenhouse gas release about 7177 million tons of CO₂ which is equal to 81% of all greenhouse gases released by all humans. When CO₂ is released in the air, it remains there for 1000 years.

4. Methane:

Methane can absorb radiation about 21 times more than CO₂, thus CH₄ has a higher GWP rate. This gas can remain for 10 years in the air.

PROCESS OF GHGs EMISSION:

In 1896, Svante Arrhenius was first to estimate the contribution of CO₂ in increasing temperature around the world in his paper printed in the Philosophical Magazine and Journal of Science. In the greenhouse effect, the sun releases a different amount of radiation in the form of visible light. These radiations include ultraviolet rays, infrared rays, and other rays. 30% of rays are thrown back into space while 70% is absorbed by land, oceans, and air. (NASA).

These absorbed radiations are then emitted as IR thermal radiations. This outgoing and incoming radiation maintains the overall temperature of the earth to be at 15 degrees Celsius.

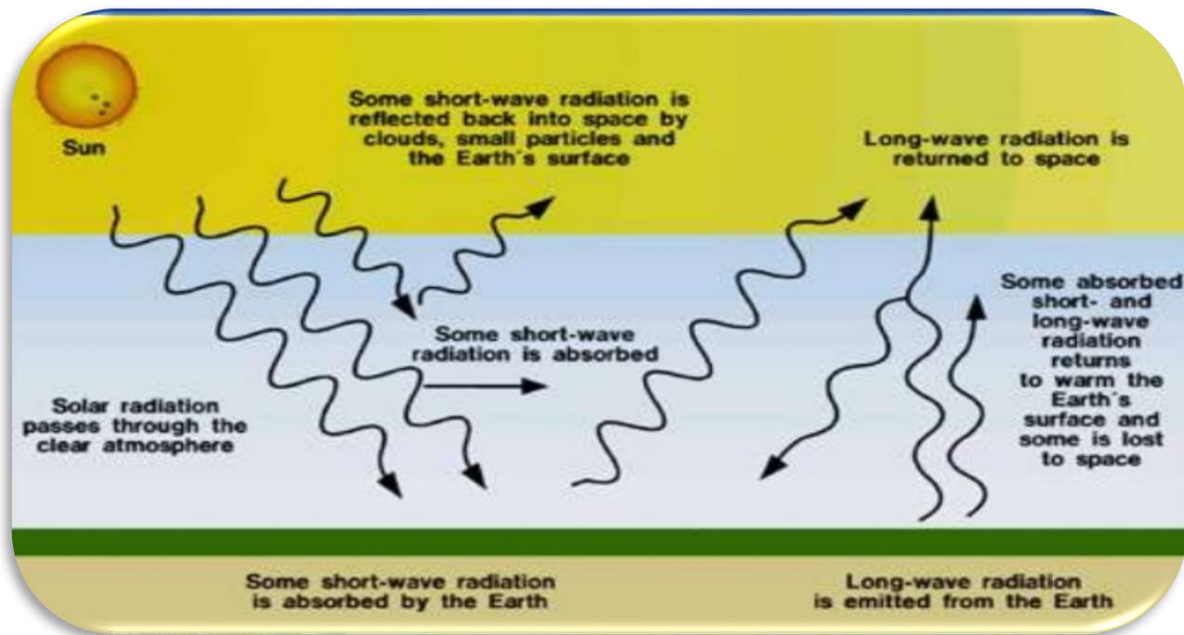


FIGURE 2(greenhouse gas emission process)

<https://www.slideshare.net/dsamkhan/green-house-gases-emissions>

HURDLES FOR REDUCING GREENHOUSE GAS EMISSIONS:

There are many factors due to which it is difficult to lessen the quantity of CO₂ in the atmosphere.

1. Huge demand for products that have low prices in a market for example in coal production, the producer has a great demand for it. This results in a low cost of charcoal and thus demand coal increases. Thus industries prefer to utilize coal.
2. Countries that produce gas and oil have a great interest in using fossil fuel and they also promote and give subsidy as well.

In the manufacturing of electricity, fossil fuels are used which in return produces low-cost electricity but increases CO₂ emission.

3. For undeveloped countries, the advantage of economic progress is real. Although people in these states have concerned about the increase in temperature around the globe when there comes economic growth it comes out last.
4. A reduction in GHGs has long term benefits. People always choose a procedure to get short-run advantages.
5. Poverty is also the main factor as in underdeveloped countries, people use old vehicles that produce gases that would also increase the quantity of CO₂ in the atmosphere.
6. Deforestation causes CO₂ emissions to increase. It also affects rainfall thus increase in temperatures around the globe. Deforestation can speed up the decomposition of wood and litter, and below-ground organic carbon.
7. Soil erosion can be an origin of carbon released as it involves the decomposition of sand particles and organic matter. (IPCC, 2000)

WAYS TO REDUCE GREENHOUSE GAS EMISSION:

Energy plants release almost 40% of total GHG whereas 22% of GHG releases by the industrial sector. To reduce global warming, it is very important to take steps for the reduction and management of GHG release. (Mashmool, E. et al. 2010). As Greenhouse gases entered into the atmosphere they did not remain in one place, as air particles diffuse from one place to another. Therefore, the proportion of CO₂ is the same everywhere.

Following steps can be taken to lessen GHGs emission:

1. To reduce GHG in air, many forest management implementation can be used. One approach is an increment in the amount of carbon (creation of a sink). The other approach is to reduce the amount of carbon already present in the pool. The first approach is important in the plantation of the forest. (Pedro Moura-Costa and Louise Aukland,2001)
2. To reduce CO₂ emission, products with minimum packaging must be used, it would help in less amount of recycling.
3. To reduce GHG release, there must be a policy to reduce it rather than replace it with other GHGs because all GHGs are not good and have no advantages. (OECD and IEA,2003)
4. By using less heat and air conditioner in winter and summer respectively, would save almost 2000pounds of CO₂ annually.
5. By replacing light bulbs with compact fluorescent light (CFL), as it uses low energy and produces less heat and thus helps in the depletion of GHGs.
6. If capital stock is used more than its life, then it will increase GHGs released. So for this purpose, new investment must be done so to improve the environment of the society and policies must be there to have a check on capital stocks (Lempert et al, 2002).
7. By using fewer vehicles is linked with less emission of gases. For every gallon of gas emitted from the car, 20 pounds of CO₂ is released in the air.
8. By using normal water will save energy and thus save 500 pounds of CO₂ every year.
9. To reduce GHGs release from the industry sector, voluntary approaches (VAs) are utilized as a tool. (OECD 1999)

10. By saving electricity will help in the reduction of global warming.
11. The electrifying transportation system.
12. By applying carbon taxes on industries, thus GHG would be reduced. (Glen Andersen and David Sullivan, 2009)

CONCLUSION:

Greenhouse gases will always present in the air whereas the quantity of these gases is in concern. The proportion of GHGs must remain moderate in the environment.

It is a worldwide challenge to lessen GHGs emissions. It is difficult to balance greenhouse gases (GHG) concentrations in the air. The release of GHGs is mainly because of the burning of fossil fuels. An increase in GHG occurs mainly from industrial activities and transportation. This would result in a rise in the quantity of CO₂ in the atmosphere. An increase in temperature due to global warming can affect the life of every living thing on this planet. The adverse effect of global warming includes high temperature in weather and vanishing of animal and plants. To lessen the release of GHGs, people should change their lifestyle and the government should take steps to have counterbalance on industries involve in GHG release. The government should apply different taxes to avoid GHG released in the environment.

If GHG release in the air increase, it would affect the life of living things and if it continues it would make earth difficult to live on. The results of GHG in the air will be unavoidable.

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