Carbon Trading: A First Step towards Clean Environment

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Abstract. The living standard of human beings has improved and still going better day by day. Industrialization added comfort to human life and also significantly added green house gases (GHG) to atmosphere which is increasing at alarming speed. There are various gases which constitute GHG i.e. carbon dioxide, methane, nitrous oxide etc. It is estimated that 60-70% of GHG emission is through fuel combustion in industries like cement, steel, textiles and fertilizers. Some GHG gases like hydro fluorocarbons, methane and nitrous oxide are released as by-products of certain industrial process, which adversely affect the ozone layer, leading to global warming. Global warming is a process in which about 30% of incoming energy from the sun is reflected back to space while the rest reaches the earth, resulting in warming the air, oceans, and land, and maintaining an average surface temperature of about 15 ºC.In this paper the concept of carbon trading is discussed which is an outcome of Kyoto Protocol. Kyoto Protocol is a treaty voluntarily signed by 171 countries in 1990 to reduce the quantity of GHG emissions. It came legally into force on 15th February 2005. The outcome of Kyoto Protocol is carbon trading i.e. carbon credits which are certificates issued to countries that reduce their emission of GHG (greenhouse gases), which causes global warming.The concept of carbon credit trading seeks to encourage countries to reduce their GHG emissions, as it rewards those countries which meet their targets and provides financial incentives to others to do so as quickly as possible. Surplus credits (collected by overshooting the emission reduction target) can be sold in the global market. One credit is equivalent to one tone of CO2 emission reduced. Trading carbon credits between developing and developed nations will soon become a reality. Carbon trading will help developing countries to upgrade their existing equipment/structures with energy efficient equipments and adapt various energy saving schemes. This give and take mechanism of carbon trading is a motivation for uncapped countries to keep lowering their carbon emissions so that they can sell more to capped countries & earn more in return. This in turn will lead to their financial development.

Keywords: Carbon Trading, Kyoto Protocol, Green House Gases, Carbon Emission

The industrial revolution has provided a comfortable life to mankind and made living of human beings a comfortable one. The living standard of human beings is improved and still going better day by day. Industrialization added comfort to human life and also significantly added green house

gases (GHG) to atmosphere which is increasing at alarming speed. There are various gases which constitute GHG i.e. carbon dioxide, methane, nitrous oxide etc as shown in Table 1. It is estimated that 60-70% of GHG emission is through fuel combustion in industries like cement, steel, textiles and fertilizers. Some GHG gases like hydro fluorocarbons, methane and nitrous oxide are released as by-products of certain industrial process, which adversely affect the ozone layer, leading to global warming. Global warming is a process in which about 30% of incoming energy from the sun is reflected back to space while the rest reaches the earth, resulting in warming the air, oceans, and land, and maintaining an average surface temperature of about 15 ºC.

Due to high temperature of earth polar ice-caps and mountain glaciers will melt and survival of mankind is in danger. As these days industrialization is completely dependent on the availability of electricity. Even per capita energy consumption is index of developed country. The maximum amount of electricity worldwide is generated from thermal plants. The fuel used in thermal plants is coal. The quality of coal is responsible for it's burning. The low quality of Indian coal has caused low efficiency of thermal plants adding pollutants due to its incomplete burning.

The main emissions are carbon dioxide (CO), nitrogen oxides (NO), sulfur oxides (SO), chlorofluorocarbons (CFCs), and air- borne inorganic particles such as fly ash, soot, and other trace gas species. As these all gases are greenhouse gases and responsible for global warming. The fly ash soot from thermal plants cause lung tissue irritation resulting from inhalation of soot particles and various organic chemicals that are known carcinogens.

These days, the public transport sector is also expanding and own vehicles has also increase manifold. The different sources of green house gas emission from various sectors are as shown in Fig 1.

Table 1-Greenhouse gases, Global warming potential and their emission sources

Greenhouse Global Common emission source gases (GHG)	Warming Potential	Common emission sources
Carbon dioxide	1	Combustion of fossil fuels
Methane	21	Animal, agriculture & municipal wastes; rice cultivation
N2O	310	Combustion processes, chemical industry
HFCs	140-11700	Refrigerants
PFCs	6500-9200	Semiconductor industry
SF6	23900	Electrical insulation

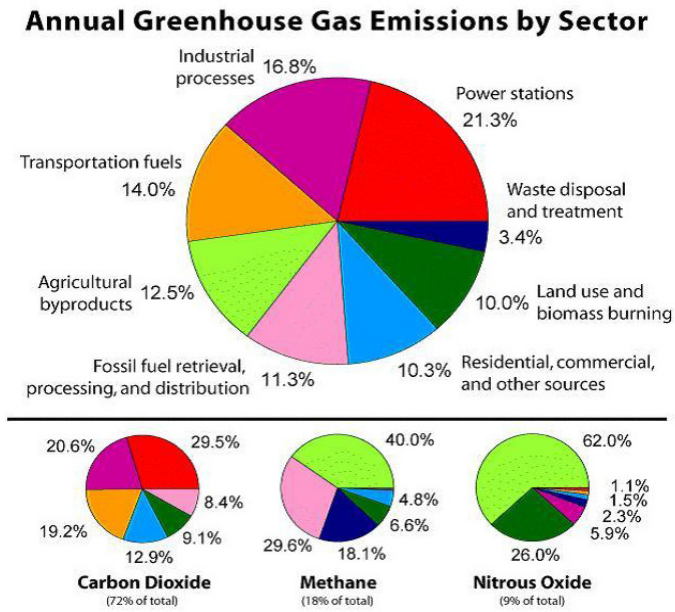

Fig 1-Annaul green house gas emission by different sectors

As it is clear from Fig 1 that maximum share of GHG is of power stations. The reason being electricity is backbone of life and all industry, transport, residential, commercial and agriculture is dependent on this. The other major chunk is of industry. If we look at Fig 1 (b) it is clear that maximum amount of CO_2 is emitted from power stations and it constitute nearly 30% of the total carbon dioxide emission.

It is clear from the above that although industry contributed a lot to mankind but it also polluted the environment to maximum. The drastically increasing global warming has made researchers; scientist and planners to think seriously about the reduction of GHG emission otherwise human beings may extinct one day. Keeping this is in view, 171 countries worldwide voluntarily signed a treaty to reduce GHG emissions by 5.2% in 2012 as it was in 1990. The treaty was named as Kyoto Protocol and it came legally into force on 15th February 2005. As per capita energy consumption is developed countries is quite more as compared to developing countries. In Kyoto Protocol it is decided that the developed countries will pay money to developing countries if they reduce their GHG emission by making to developing countries as reduction in carbon emission. Even developed countries like US which which accounts one-third of total GHG emission didn't sign the Kyoto treaty. This treaty is divided into different phases and limits of GHG emission reduction is set for different phase and if that limit is not achieved then penalty for this will be charged. There are certain terminologies are defined under Kyoto Protocol as a measure of reduction in carbon

emission. One very important term is carbon credit. It is measured in units of certified emission reductions (CERs). Each CER is equivalent to one ton of carbon dioxide reduction. It is a key component of national & international emissions trading schemes that have been implemented to mitigate global warming. They provide a way to reduce greenhouse emissions on an industrial scale by capping the total annual emissions and letting the market assign a monetary value to any shortfall through trading. Credits can be exchanged between businesses or bought and sold in international markets at the prevailing market price.

Carbon credits are a globally accepted mechanism for carbon emission reduction. The net investment of Capped countries is reduced thanks to Carbon Credits as they do not have to invest in new technologies & heavy machinery in order to reduce their emissions. They can just do so by paying a minimal amount and getting a carbon emission certificate for their emissions. This give and take mechanism is a motivation for uncapped countries to keep lowering their carbon emissions so that they can sell more to capped countries & earn more in return. This in turn will lead to their financial development.

These days, there are many companies that sell carbon credits to commercial & individual customers who are interested in lowering their carbon footprint voluntarily. These carbons off setters purchase the credits from an investment fund or a carbon development company that has aggregated the credits from individual projects.

The CER issued for a project activity may be traded, in a similar way as company shares, in the market. The international carbon market is large and there is a big demand from CERs. During 2006, the carbon market worldwide was worth $ 22.5 billion (Rs 88,000 crore)1 and transactions of about 1.6 billion tones of CO2 equivalent (CO2 e) took place. The carbon market is expected to grow significantly in 2007, possibly up to 50 per cent.

India is a key player in the carbon market. Out of over 2000 CDM projects under development all over the world, the highest number of projects (about 650) is located in India. (CERs)

Developing countries have taken initial steps to earn credits. India and china is emerging as new sources of revenue. The carbon credits can be earn by using clean development mechanism in which better equipments can be used which results less co_2 emission. The scheme has been entitled Clean Development Mechanism, or more commonly, Carbon Trading. Therefore it can be said that carbon trading is basically reduction in carbon dioxide emission while the country which is reducing is paid for it.

However, in terms of the actual volume of carbon credits or Certified Emission Reductions

But still carbon trading can help power utilities to reduce carbon emission to some extent. But with passing time this is not sufficient. There is need of the hour to take some other preventive measures also to neutralize carbon as by growing more trees and efficiently using the electricity. Carbon emission can be neutralized by planting more trees which can absorb GHG gases. Most calculate the equivalent CO2 and calculate the amount of trees required to offset this. The average US family of 4 produces 2 to 5 tons of CO2 per month. This would require planting up to 30 trees to offset.

It is clear from Fig 1 that the maximum GHG is produced in power plants and transport sector. If we use electrical energy efficiently then carbon dioxide emission can be reduced to a larger extent. There is maximum GHG is due to heating and cooling equipment. There are few general tips as switch off computers and printers from supply, don't keep electrical appliances in standby mode etc. The standby mode of these equipment will result a huge wastage of energy which is responsible for GHG emissions. It takes a lot of energy to heat water. You can use less hot water by installing a low flow showerhead (350 pounds of carbon dioxide saved per year) and washing your clothes in cold or warm water (500 pounds saved per year) instead of hot.

CONCLUSIONS

Hence it is clear from above discussion that reduction of GHG emission is challenge for all. Kyoto Protocol gave an opportunity to reward monetary the countries for producing less GHG while developed countries are not ready to cut their carbon emission while they are paying other countries to clean the environment by using clean mechanism and energy efficient equipments so that net carbon emission can be offset to a large extent in environment and global warming can be reduced to some extent. In addition to monetary benefits it is also discussed that there is need to change the behavior of individuals in daily life which can cut a large amount of carbon dioxide emission.

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