Carbon Credits

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Abstract –Most of the industries are responsible for the emissions of greenhouse gases in the environment. The industries rely on fossil fuels which are a major reason for greenhouse gas emissions. The concept of "Carbon Credits" came into beings as an awareness of the need to control the emissions. Carbon credits and carbon markets are components of international attempts to reduce the growth in concentrations of greenhouse gases (GHGs).

The main aim of this is to allow the industries, commercial processes and various markets to keep up with their production but with comparatively less emissions and low carbon than that amount which was used before when there were no charges for emitting carbon dioxide and other GHGs gases into the atmosphere.

Keywords:GHG,Kyoto Protocol,Greenhouse Gases.

I. INTRODUCTION

Considering the dramatic rise in CO_2 emissions and other pollutants in past few years, a number of new financial markets have emergedwhich offer business key incentives apart from taxes and other punitive measuresto slow down emissions growth and ideally all over the world and global warming itself.

The most important greenhouse gas i.e. Carbon Dioxide which is produced by the combustion of fuels, has become a majorcause of global warming as its concentration and levels in the Earth's atmosphere has been rising speedily (Fig. 1).

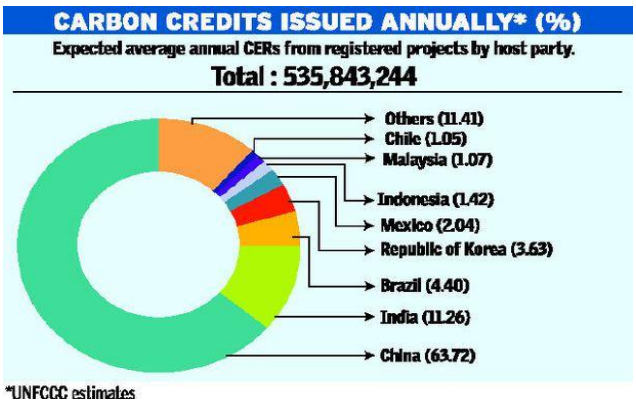


Fig. 1

This demon is however turning into a product that helps people, countries, consultants, traders, corporations and even farmers earn billions of rupees. This was unimaginable a decade ago.

II. WHAT ARE CARBON CREDITS?

To purely understand the whole concept of carbon credits, from where they are originated and how they work, we can use the analogy of our own credit cards.

Now, enquire anyone who has fallen prey to not managing their finances properly about the consequences of this. However, great number of positive benefits can be achieved when the credits are used responsibly like for finances or for accomplishing our big costly dreams or maybe the high university fees. But the danger is always there that this form of credit can be abused and when it is, the consequences can be quite adverse, reversing the quality of life immeasurably.

In this time of global warming and the changing climate day by day due to the harm done to the environment this philosophy has become ironic because, giving (carbon) credits is largely overdue and time is rapidly running out in order to address the long-overdue balance. It needs to be paid back as soon as possible. Below is the brief summary of what carbon credits are:

1. *Permission*–A country is granted permission, to produce a certain number of emissions which can be traded in, if not used. Not just a country it can be company or organization also.

2. *License to trade*– Another explanation says that a certificate is issued giving the prospective emitter the right to produce up to one ton of CO_2 or its equivalent.

3. *Carbon offsets* – Another widely used term refers to a carbon offset as a financial tool to reduce (not increase) carbon emissions by storing carbons for future or later use.

So, carbon credit (often called carbon offset) is a credit for greenhouse emissions reduced or removed from the atmosphere from an emission reduction project, which can be used, by governments, industry or private individuals to compensate for the emissions they are generating.(Fig .2)

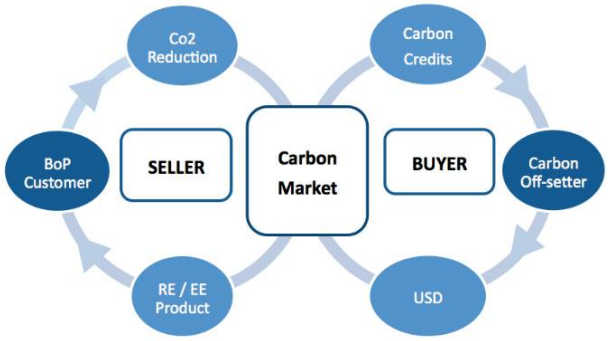


Fig. 2

As nations have progressed we have been emitting carbon, or gases which result in warming of the globe i.e. Global Warming.

Some years back (a few decades ago) a debate took place on "how the emissions that cause Greenhouse effect which leads in Global warming can be stopped?"Then,some countries came together and signed an agreement named the **Kyoto Protocol.**

Mostly European and other developed countries had said that they will bring down the level in the period from 2008 to 2012. In 2008, these developed countries decided on different conditions to bring down the level of emission fixed for their companies and factories.

III. KYOTO PROTOCOL

The Kyoto Protocol is an Worldwide contract which is associated with the United Nations Framework Convention on Climate Change, which binds its Parties by setting internationally binding targeting emission reduction.

Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity, this Protocol places cuffs on developed nations under the principle of "common but differentiated responsibilities."

The Kyoto Protocol was founded in Kyoto in Japan and hence is named as the Kyoto Protocol. It was adopted on 11th December, 1997 and was put in practice on 16th February 2005.

The brief rules for the innovation of the Protocol were formed at COP 7 in Marrakesh, Morocco, in 2001, and are referred to as the "Marrakesh Accords." The first commitment period started in 2008 and ended in 2012.

The 1992 United Nations Framework Convention on Climate change (UNFCCC)'s extended version is the Kyoto Protocol. It makes the state wise parties to reduce the emissions of greenhouse gases, based on the scientific that- a) global warming is occurring and b) it is extremely likely that human-made CO2 emissions have predominantly caused it.

There are currently 192 parties (Canada withdrew effective December 2012) to the protocol.

On 8 December 2012 (Doha, Qatar) the "Doha Amendment to the Kyoto Protocol" was adopted. The amendment includes:

1) New commitments for Annex I Parties to the Kyoto Protocol who agreed to take on commitments in a second commitment period from 1 January 2013 to 31 December 2020;
2) A revised list of greenhouse gases (GHG) to be reported on by Parties in the second commitment period; and
3) Amendments to several articles of the Kyoto Protocol which specifically referenced issues pertaining to the first commitment period and which needed to be updated for the second commitment period.

On 21 December 2012, the amendment was circulated by the Secretary-General of the United Nations, acting in his capacity as Depositary, to all Parties to the Kyoto Protocol in accordance with Articles 20 and 21 of the Protocol.

First commitment period

37 industrialized countries and the European Community committed to reduce GHG emissions to an average of five percent against 1990 levels.

- **Second commitment period**

Parties committed to reduce GHG emissions by at least 18 percent below 1990 levels in the eight-year period from 2013 to 2020; however, the composition of Parties in the second commitment period is different from the first.

Under the Protocol, countries must meet their targets primarily through national measures. However, this protocol also offers the companies and the nations to achieve their target through the help of different means as listed below.

The mechanisms of the Kyoto Protocol are:

a. International Emissions Trading
b. Clean Development Mechanism (CDM)
c. Joint implementation (JI)

These help to stimulate green- type investment and help the related parties meet their emission goals in an economical way.

IV. FEATURES OF KYOTO PROTOCOL

1. World nations are divided into Annex countries- (Industrially developed nations) like U.S, U.K, Japan etc. and Non - Annex countries

(Developing or under developing nations) like Brazil, India etc.

2. As perthis Kyoto protocol, industrialized nations had to reduce their greenhouse gas emissions by 5.2 % by

2012 against 1990 levels. They also hold the responsibility to provide technology & financial assistance to Non - Annex nations to reduce their emissions. Whereas developing nations set free to and no compulsion to bind the emission targets.

3. In order to control emissions by industrialized nations, Kyoto protocol assigns two types of responsibilities.

A. Emission Trading / Carbon trading

B. Clean Development Mechanism (CDM)

A. Emission Trading / Carbon trading

Industrialized nation have set up a quotation of units called Kyoto unit. It is equal to emission of 1 Ton of CO_2 or equal emissions of other greenhouse gases like Methane, Nitrogen oxides etc. If any nation/country exceeds these quotation, then it needs to purchase the Kyoto units from another nation who has saved the Kyoto by reducing their emissions and bind below the assigned amount units (AAU). These transactions are expressed in Carbon credits which gives them the permission to emit 1 Ton of CO_2 (Fig.3)orequal amount of other greenhouse gases. This is called "Carbon Trading / Emission.Trading".

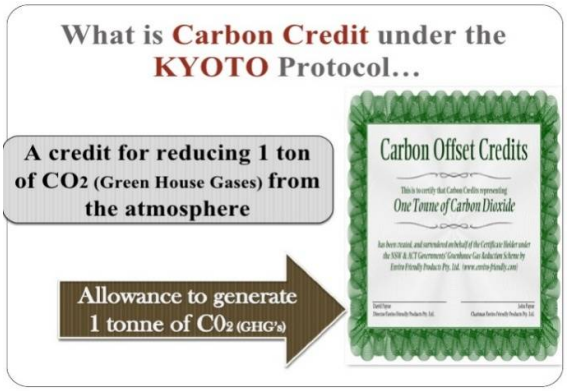


Fig.3.Carbon Credit under KYOTO Protocol.

So, to bind assigned quota of Kyoto units, each industrialized nation persuade their companies and factories to strictly adhere to assigned limit. Like these, emission trading aimed to reduce greenhouse gas emissions from highly industrialized nations.

B. Clean Development Mechanism (CDM)

Industrialized nations could opt to bind their target emissions by promoting Cleaner and carbon free technologies in Non - Annex countries like India, Brazil etc.. Clean development mechanism is considered equally applicable to companies in Developed nations as. They also can acquire Carbon credit by promoting clean & green technologies like solar energy, Wind energy etc.

V. HOW IT WORKS

Emissions limits and trading rules, norms and conditions vary country by country, so each emissions-trading market operates differently. For nations/countriesthat have signed the Kyoto Protocol, which holds each country to its own $C0_2$ limit, greenhouse gas-emissions trading is mandatory. In the United States, which did not sign the environmental agreement, corporate participation is voluntary for emissions schemes such as the Chicago Climate Exchange. Still a few general principles are opting to be applied for all markets.

Under a basic scheme, if a country's emissions fall below the allowances level it can sell its credits to other companies which have exceeded their carbon emissions limit

In this worldwide market, a group of middlemen companies, called offset firms, estimate a company's emissions and then act as brokers and offering opportunities to invest in carbon-reducing projects around the world.

VI. HOW DOES IT WORK IN REAL LIFE?

Assume that British Petroleum is running a plant in the United Kingdom. Say, that it is emitting more gases than the accepted norms of the UNFCCC. It can tie up with its own subsidiary in, say, India or China under the Clean Development Mechanism.

An inspection will be done of their efforts to reduce gases and their actual level of carbon emission. The countries like China and India are trying the advancements and technologies so that they become eligible for more carbon credits. They are selling their gained credits to their counterparts in Europe. This is how a market for carbon credit is created.

Each year European companies are required to meet certain conditions, beginning 2008. By 2012, they've achieved the required standard of carbon emission. So, in the next five years there were lot of carbon credit deals, able energy projects such as tree planting.

VII.SETTING A MARKET PRICE FOR CARBON

Unattended and neglected, energy use and hence emission levels are assumed to keep rising and rising over time. Thus the number of companies needing to buy credits will increase simultaneously, and the rules of supply and demand will rise up the market price which will encourage more groups, people, and companies to undertake environmentally friendly activities that create carbon credits to sell.

An individual allowance, such as an Assigned amount unit (AAU) or its near-equivalent European Union Allowance (EUA), may have a different market value to an

offset such as a CER. This flaw is caused due to less number of developed secondary markets for CERs. Low homogeneity between projects which makes it hard to set up prices, as well as questions due to the principle of supplementarity and its lifetime. Along with it, offsets generated by a carbon project under the Clean Development Mechanism are limited in value because operators in the EU ETS are restricted to what percentage of their allowance can be met through these flexible mechanisms.

Raising the price of carbon will achieve four goals.-

1. It will provide indications to consumers. So they can use the emissions causing products sparingly.
2. It will provide indication to the producers about which inputting material use more carbon like coal and oil and which inputs use less or no carbon like natural gas or nuclear power, thereby making the firms to substitute low-carbon inputs.
3. Market incentives can be given by the investors and innovators to produce inputs and, machineries which use less amount of carbon produce fewer amounts of greenhouse gases.
4. For the most important thing , a high carbon price will raise the price of products according to their carbon content.

Ethical consumers today, hoping to minimize their "carbon footprint," have little chance of making an accurate calculation of the relative carbon use in, say, driving 250 miles as compared with flying 250 miles.

The wheat growing causes 0.01 of a ton of carbon emissions and the milling and the transportation and the baking of a loaf of bread, then a tax of $30 per ton carbon will raise the price of bread by $0.30.

The "carbon footprint" is automatically calculated by the price system. Consumers would still not know how much of the price is due to carbon emissions, but they could make their decisions confident that they are paying for the social cost of their carbon footprint.

Nordhaus has suggested, based on the social cost of carbon emissions that an optimal price of carbon is around $30 (US) per ton and will need to increase with inflation.

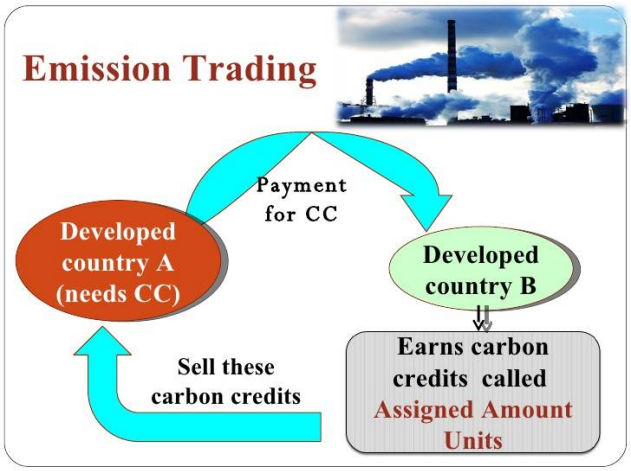
The social cost of carbon is the additional damage caused by an additional ton of carbon emissions. The optimal carbon price, or optimal carbon tax, is the market price (or carbon tax) on carbon emissions that balances the incremental costs of reducing carbon emissions with the incremental benefits of reducing climate damages.

If a country wishes to fix up a carbon tax of $30 per ton of carbon, this would make up a tax on gasoline of about 9 cents per gallon. Similarly, the tax on coal-generated electricity would be about 1 cent per kWh, or 10 percent of the current retail price. At current levels and rates of carbon emissions in the United States (US), a tax of $30 per ton of carbon would generate $50 billion of revenue per year.

VII.HOW BUYING CARBON CREDITS CAN REDUCE EMISSIONS

Carbon credits is a way of reducing the emissions of greenhouse gases by providing an markets to price the emissions caused by an industry or a company and hence when the companies obey the norms they are rewarded with credits which they can later sell it to the companies who break the pact.

Consider a business for instance that owns a factory putting out 10000 tonnes of greenhouse gas emissions in a year. Its government is an Annex I country that enacts a law to limit the emissions that the business can produce. So the factory is given a quota of say 8000 tonnes per year. The factory either reduces its emissions to 8000 tonnes or is required to purchase carbon credits to offset the excess. After costing up alternatives the business may decide that it is uneconomical or infeasible to invest in new machinery for that year. Instead it may choose to buy carbon credits on the open market from organizations that have been approved as being able to sell legitimate carbon credits.



Emissions Trading.

We should consider the impact of manufacturing alternative energy sources. For example, the energy consumed and the Carbon emitted in the manufacture and transportation of a large wind turbine would prohibit a credit being issued for a predetermined period of time.

In this developing world One seller might be a company which offers to offset emissions through different projects, such as recovering methane from a swine farm to feed a power station that previously used fossil fuel. So although the industries continue to emit gases, it would pay another group toreduce the equivalent of 2000 tonnes of car-

bon dioxide emissions from the atmosphere for that particular year.

Another seller may have already invested in new low-emission machinery and have a surplus of allowances as a result. By buying 2000 tonnes of allowances the factory can make up for the emissions.. The cost of the seller's new machinery would be subsidized by the sale of allowances. To prove that their allowances were met correctly , the buyer and the seller should submit accounts for their emissions .

VII.CARBON TAXES

A carbon tax is a tax levied on the carbon content of fuels. It is a form of carbon pricing. Carbon is that kind of element which is present in almost every hydrocarbon fuel like coal, petroleum, and natural gas and is converted to carbon dioxide (CO2) and other products when combusted. In contrast, non-combustion energy sources—wind, sunlight, geothermal, hydropower, and nuclear—do not convert hydrocarbons to CO2. CO2 is a heat-trapping "greenhouse" gaswhich represents a negative externality on the climate system (see scientific opinion on global warming). Since GHG emissions caused by the combustion of fossil fuels are closely related to the carbon content of the respective fuels, a tax on these emissions can be levied by taxing i.e. charging the content of carbon of fossil fuels at any place in the product cycle of the fuel.

Carbon tax offers social and economic benefits. It is a tax that increases revenue without significantly altering the economy while simultaneously promoting objectives of climate change policy.

To reduce the harmful and unfavorable levels of CO_2 emissions, thereby de-accelerating the climate change and its adverse effects on the environment as well as human health

Carbon taxes offer a potentially cost-effective means of reducing greenhouse gas emissions. From an economic perspective, carbon taxes are a type of Pigovian tax. They help to locate the problem of emitters of GHGs not facing the full social cost of their actions. Carbon taxes can be a regressive tax, in that they may directly or indirectly affect low-income groups disproportionately

A number of countries have implemented carbon taxes or energy taxes that are related to carbon content. Most environmentally related taxes with implications for greenhouse gas emissions in OECD countries are levied on energy products and motor vehicles, rather than on CO2 emissions directly.

A coal-fired power plant in Luchegorsk, Russia. A carbon tax would tax the CO2 emitted from the power station.

Resistance to increased environmental regulation such as carbon taxes often centers on concerns that firms might relocate and/or people might lose their jobs.It has been debated, however, that carbon taxes are more efficient than direct regulation and may even lead to higher employment (see footnotes).Large number of consumers of carbon resources in electricity generation, such as the United States, Russia, and China, are against carbon taxation.

VIII.CONCLUSION.

As the industrialization is increasing day by the rate emissions of harmful gases is also increasing, therefore, some preventive measures must be taken to reduce them and secure our environment. Carbon Credits / Carbon Trading is an effective way to help secure the environment. As the most interest nowadays is taken in doing business and increasing the profit gains, Carbon Credits is a way people can take interest and invest in thereby protecting the environment.

There are ample ways to help us reduce the carbon emissions in the environment. As along with the developing and advancing world, the industrialization cannot be stopped so alternative methods such as Carbon Credits can be used for such needs.

At least with the adoption of carbon credits people and industries will take interest in reducing the amount of GHGs produced. And surely with time this technique will be adopted in every known corner of the world and hence create a better future and save our planet.

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