review paper on Carbon credit

Article · September 2016

CITATIONS
0

READS
3,476

1 author:

Sonal Chonde
Shivaji University, Kolhapur
28 PUBLICATIONS **231** CITATIONS

SEE PROFILE

Research Paper | Environmental Science | E-ISSN No : 2454-9916 | Volume : 2 | Issue : 9 | Sep 2016

USE OF CARBON CREDITS / TRADING FOR ENVIRONMENTAL PROTECTION: A REVIEW

Dr. Sonal G. Chonde

Department of Environmental Science, Shivaji University Kolhapur.

ABSTRACT

Global Warming is the current topic in the political agenda across the globe. Every country seems to be spending lot of time, energy, and money to find solutions to one of the major international problems of climatic change. Carbon credits are issued to companies that reduce their greenhouse gas credits are then sold to companies who cannot fulfill the protocol norms, it helps the developing start with clean technologies; since these machines are expensive therefore funds are provided for countries in the form of carbon credits. 60- 70% of emission is through fuel combustion in industries such as cement, steel, textile. Some gases are released as by-products of industrial processes which affect the ozone layer. Carbon Trading is in its nascent stage in terms of development, which requires time and effort to be groomed as one of the matured markets. The estimated market value of the Carbon Trading was approximately $ 30 billion U.S. dollars in the year 2006. Carbon credit has been given the recognition of an intangible commodity and can be traded on the commodities market. Trading of car-bon credit happens in the form of Carbon Emission Reduction (CER). A CER is given by the CDM executive board projects in developing coun-tries to certify that they have reduced greenhouse gases emissions by one tons of carbon dioxide per year (20).

The Concept of Carbon Credit:

A carbon credit is generic term for any tradable certificate or permit representing the right to emit one tons of carbon dioxide or the mass of another greenhouse gas with a carbon dioxide equivalent to one tons of carbon dioxide the concept of carbon credits came into existence as a result of increasing awareness and the need for pollution control. Carbon credits were one of the outcomes of Kyoto protocol, an international agreement between 169 countries. The Kyoto protocol created legally binding emission targets for developing nations. To meet these targets, the nation must limit carbon dioxide emission; it was enforced from February 2005 (17).

The Kyoto Protocol that aims to reduce greenhouse gas emission by 5.2%. The US, one-third of the total greenhouse gas emission, has not signed the treaty. The penalty for that first phase and second phase was design as per tonneof CO'2.

There are two types of Carbon Credits:

1 Carbon Offset Credits (wind, solar, hydro and biofuels)
2 Carbon Reduction Credits

Developed countries have to spend nearly $300-500 for every tonne reduction in carbon. Greenhouse gas emission is much below the target fixed by the Kyoto Protocol therefore reduction norms of emission. But can sell surplus credits to developed countries manage to million carbon credits. India's carbon credits' trading was $100 billion at 2010.

Carbon credit units are currently trading at $15-20per unit. Most scientists agree our climate is in a state of flux. In the past century the global temperature has risen by about 1.26 degrees Fahrenheit (0.7 degree Celsius).The UN's Intergovernmental Panel on Climate Change has said there's a 90 increase is due to greenhouse gas emission produced by human activities and the combustion used to produce energy. Emission of carbon, or gases which result in warming of the globe. So with the reduce the emission of harmful gases that contributes to the greenhouse effect. So, countries came together and signed an agreement named the Protocol.

SIGNIFICANCE OF KYOTO PROTOCOL

In response to the global warming crisis, in Rio deo Janeiro of Brazil, the 1992 UN Conference on the Environmental and Development clearly raised the concept of "sustainable development". Through this conference more than 150 countries had established "United Nations Framework Convention on Climate Change", which was called UNFCCC for short. UNFCCC is the first convention to take full control of greenhouse gas emissions including Carbon dioxide discharge, and is an international convention to fight global warming which causing a lot of and adverse effect to the development of society and economy. After that, in December 1997, the third Conference of the Parties (COP) under the UNFCCC held in Kyoto of Japan, which aimed at limiting carbon emissions in developed countries. In this way, we can curb global warming .The conference ended with an agreement of "Kyoto Protocol". The Kyoto Protocol 1997 is an emissions target agreement established 11 December Kyoto, Japan and entered intoforce on 16 February' 2005. As of November 2009.If" signed the protocol. Though US is not a member which responsible for 36.1% of lay emission levels. The international agreement asked 37 countries to reduce their greenhouse gas by 2012. This will help in clean development mechanisms. Carbon credits are turning carbon emissions into a tradable commodity. Each country is given an annual emissions quota. The goal of the program is to reduce emissions by 5.2 percent of the 1990 levels by 2012.

The objective is the "stabilization and reconstruction of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Under Kyoto Protocol the countries that have been emitting more carbon and other gases (greenhouse gases include ozone, carbon dioxide, methane, nitrous oxide and even water vapors) have voluntarily decided that they will bring down the level of carbon they are mining to the levels of early 1990. Developed countries, mostly European, had said that they will bring down the level in the period from 2008 to 2012. In 2008, these developed countries have decided on different norms to bring down the level of emission fixed for their companies and factories.

A company has two ways to reduce emissions. One, it can reduce the GHG (greenhouse: ases) by adopting new technology or improving upon the existing technology to attain the new norms for emission of gases. Or it can tie up with developing nations and help them set up new technology that is eco-friendly, thereby helping developing country or its companies "earn credits.

What is Carbon Credit?

Each carbon credit equals a ton of carbon. Carbon credit, as defined by Kyoto protocol, is one Metric tonne of carbon emitted by burning of fossil fuels Companies are allocated a certain "umber of credits that they may use over a period of time. Suppose if a company is allocated 10 credits and is using only 10 credits then it can sell those credits in the market. The two pes of Carbon Credits: I Carbon Offset Credits (COC's)

Carbon Reduction Credits (CRC's).

Carbon Offset Credits consist of clean forms of energy production, wind, solar, hydro and biofuels. Carbon Reduction Credits consists of the collection and storage of Carbon from our atmosphere through biosequestration (reforestation, forestation), ocean and soil collection and storage efforts. Both approaches are recognized as effective ways to reduce the Global Carbon Emissions "crises".Those companies exceeding their limit have to purchase credits from the market. This method of and buying/selling is called carbon trading. This causes market forces to reduce overall emissions. The idea of emissions trading with carbon credits relies heavily on the ability of polluters to reduce slowly but surely their emissions each year.

Need of Carbon Trading:

Carbon credit trading is one of the ways to control greenhouse emissions. Carbon dioxide, the most important greenhouse gas produced by combustion of fuels, has become a cause of concern. Major sources of greenhouse gases are industrial emissions. Gases include carbon dioxide, nitrous oxide, methane and hydro fluorocarbons. When these gases enter the atmosphere, they hold in reflected energy from the sun and emit that radiation back down to Earth. This greenhouse effect can create climatic changes. Today Global warming, climate change, ozone depletion, sea level rise, biodiversity are all affected, one way or another, directly or directly, by harmful 'greenhouse' gases. A number of human activities are responsible for it like:

- Fuel combustion
- Energy industries
- Manufacturing industries and construction
- Transport
- Fugitive emissions from fuels
- Oil and natural gas
- Chemical industry
- Metal production
- Production of halocarbons and sulphur hexafluoride
- Consumption of halocarbons and sulphur hexafluoride

This nuisance is manmade and the harmful result is as follows

Carbon Dioxide (Co2)
CO2 emissions from fuel burning, responsible for about 87 percent of global warming

Nitrous Oxide (N2O)
- Used fertiliser in agriculture,
- Global Warming Potential: I 70 to 190 times greater than that of Co2.

Methane
- Used in landfills, livestock digestive processes and waste
- Global warming potential: About 24 times higher than that of Co2.
- Hydrofluorocarbon gases (HFC)
- Used in refrigeration; as agents used to blow foams or insulation; solvents or cleaning agents, especiallyin semi-conductor manufacturing.
- Global warming potential: 4,000 to 10,000 times that of CO2.

Perfluorocarbons (RFC), or Perfluorocompounds
- Used as a purging agent for semi-conductor manufacture and small amounts are produced during uranium enrichment processes.
- Global warming potential: 6,000 to 10,000 that of CO2.

Sulphur Hexafluoride (Sf6)
- Used as insulating material for high-voltage equipment like circuit breakers at utilities. Also used in water leak detection for cable cooling systems. SF6 is a man-made gas.
- Global warming potential: 25,000 times that of Co2.

Country	Change in Green house 2»s Emissions (1992-2008)
India	+ 124%
China	+ 167%
United States	+ 17%
Russian Federation	-23%
Japan	+9%
Worldwide Total	+42%

The Clean Development Mechanism (CDM):
The clean development mechanismis a project-based system. This means that it accomplishes its objectives at the relatively fine-grained scale of individual projects that are validated by designated entities and registered with the CDM executive board (CDM EB), the mechanism's governing body, rather than at an industry or sector-wide scale. Each project wishing to participate in the CDM must prepare a Project Design Document (PDD) that explains in detail how its future emissions reductions will be real, additional, and not induce leakage. It must also prepare a monitoring methodology that explains in detail how it will monitor emissions reductions made by the project. A project may also utilize a previously approved monitoring methodology. Real emissions reductions are ones that are monitored with sufficient care to insure that they actually occur. Additional emissions reductions are ones that are in addition to any that would have occurred absent the CDM subsidy. Leakage of emissions occurs when emissions reductions that would have occurred within a project absent the CDM subsidy, instead occur outside it because of the subsidy.

The current CDM has two main objectives
- Assisting developing countries in achieving sustainable development
- Helping industrialised countries to lower their costs incurred in meeting their emission reduction targets.

This could be achieved by lowering the global costs of mitigation; the CDM makes it easier for Parties to commit to deeper emission cuts.

Therefore, the CDM indirectly facilitates the achievement of deeper global emission reductions and thereby contributes to the ultimate objective of the Convention, [Article 12.2 of the Kyoto Protocol.]

TABLE; 1

COM Project Type	Number of projects	Total emission reduction credits per year (million)
HFC, RFC and N2O	95	132
Renewable (hydro, bio mass, wind, solar, geothermal)	2603	215
CH4{land fill, mines) and cement	657	101
Supply side energy efficiency	425	70
Fuel switching (e.g. coat to gas)	135	44
Demand side energy efficiency	194	8
Forests	34	2
Transport	8	1
Total	4151	572

Source: UnepRisoe CDM/Jl Pipeline (on-line, 1Nov 2008)

Under the (CDM) a developed country can 'sponsor' a greenhouse gas reduction project in a developing country where the cost of greenhouse gas reduction project activities is usually much lower, but the atmospheric effect is globally equivalent. The developed country would be given credits for meeting its emission reduction targets, while the developing county would receive the capital investment and clean technology or beneficial change in land use

How to Determine
The first step in determining whether or not a carbon project has legitimately led to the reduction of real, measurable, permanent emissions understands the COM methodology process. This is the process by which project sponsors submit, through a Designate-Operational Entity (DOE), their concepts for emissions reduction creation. The CDV Executive Board, with the COM Methodology Panel and their expert advisors, review eac-project and decide how and if they do indeed result in reductions that are additional.

Criticism on CDM
There have also been concerns raised over the validation of CDM credits. One concern is related to the accurate assessment of additionalry. Others relate to the effort and time taken to get a project approved. Questions may also be raised about the validation of the effectiveness of some projects; it appears that many projects do not achieve the expected benefit after they have been audited, and the CDM board can only approve a lower amount of CER credits. For example, it may take longer to roll out a project than originally planned, or an afforestation project may be reduced by disease or fire. For these reasons some countries place additional restrictions on their local implementations and will not allow credits for some types of carbon sink activity, such as forestry or land use projects.

The CDM has also been criticized for various reasons. This includes a lack of transparency, inadequate governance structures, cumbersome procedures, poor environmental integrity, little contribution to sustainable development, an inequitable geographical distribution of CDM projects, its limited ability(o reduce GHG emissions in some sectors

Sustainable Development and the CDM
The Kyoto Protocol required the CDM to meet objectives of sustainable development but this has not been clearly defined and is implemented through a rule that the host country must certify that projects meet sustainability objectives. Countries vary in how strictly they define and implement the sustainability criteria and face a contradiction between the desire for investment and broader sustainable development objectives (Olsen and Fenhann, 2008). While comprehensive attention to sustainable development might examine the environmental, economic, and social benefits and costs of projects from the national to the local scale, it appears that for some governments and project developer's only job creation or energy savings are seen as enough to justify a sustainability check off (Brown and Cabrera 2004, Olsen 2007).

The potential of the CDM to drive low carbon energy transitions and provide sustainable development benefits to the poor and ecosystems has been less than promised. Capturing industrial gases generates much more modest benefits to local people and ecosystems than energy efficiency, renewable, and forest projects. Case studies suggest that the benefits to communities from wind, solar, and improved woodstove projects can include jobs, reduced indoor air pollution, lower energy costs, and direct carbon finance payments and that reforestation projects can protect watersheds and biodiversity'.

One of the problems in linking offsets to sustainable development in very poor communities and countries is that emissions may be so low that savings are

harder to achieve, such that renewable projects are not alternatives to carbon emitting activities but the first step to greater (iflow carbon) energy use. The cost of developing a project can also be prohibitive, both in terms of transaction costs and in finding investors willing to take risks with certain technologies and weakly governed countries.

One added complication arises from factors external to the nature of offsets and carbon markets themselves. Many potential projects with very long-term emission reduction benefits and significant sustainable development benefits have not materialised under the CDM to date because of the prevailing relatively low carbon prices. This concerns projects such as renewable energy and small energy efficiency projects. Low carbon prices are primarily due to the very modest emission reduction targets agreed under Kyoto which generate relative!) low demand, and hence prices, for CDM offsets overall. This in fact has skewed investment into CDM projects towards cheap and technologically easy interventions such as industrial gas capture. One extremely important constraint is that the lack of a post-2012 international agreement together with political debate in the EU, UK and USA about the future role of the CDM, has created considerable investor uncertainty and reluctance to make long term investments.

Involvement of India:

India comes under the third category of signatories to UNFCCC. India signed and ratified the Protocol in August, 2002 and has emerged as a world leader in reduction of greenhouse gases by adopting Clean Development Mechanisms (CDMs) in the past few years. According to Report on National Action Plan for operational sing Clean Development Mechanism(CDM) by Planning Commission, Govt. of India, the total CO2-equivalent emissions in 1990 were 10, 01, 352 Gg (Gigagrams), which was approximately 3% of global emissions. If India can capture a 10% share of the global CDM market, annual CER revenues to the country could range from US$ 10 million to 300 million (assuming that CDM is used to meet 10-50% of the global demand for GHG emission reduction of roughly 1 billion tonnes CO2, and prices range from US$ 3.5-5.5 per tonne of CO2). As the deadline for meeting the Kyoto Protocol targets draws nearer, prices can be expected to rise, as countries/companies save carbon credits to meet strict targets in the future. India is well ahead in establishing a full-fledged system in operational sing CDM, through the Designated National Authority (DNA).

India has generated some 30 million carbon credits. India has surplus credit to offer to countries that have a deficit. For example a small a forestation project in Haryana has become the first in the world to qualify for carbon credits, which the project managers can sell in a developed country. The European Commission (EC), which has co-funded the Haryana Community Forest. Project of which this project to get carbon credits is a small part - said in a statement here Thursday that thiswas the first small-scale a forestation project in the world to get certified by the Clean Development Mechanism (CDM) of the UN,

The governing board of the CDM decides if a project qualifies to get carbon credits, and the number of credits it gets. Known officially as Certified Emission Reduction (CER) credits, each CER is equivalent to one tonne of carbon dioxide. CERs are bought and sold in specialized international exchanges. Developed countries use them towards meeting their mandatory greenhouse gas reduction targets under the Kyoto Protocol.

In this project, 370 hectares of sandy land belonging to 227 farmers in eight villages of Sirsa district in Haryana have been selected to get the carbon credits, the EC statement said.

The proposed CDM project was approved by the COM Executive Board of the UN Framework Convention on Climate Change March 23.

How it Work:

One seller might be a company that will offer to offset emission through a project in the developing world, such as recovering methane from a swine farm to feed a power station that previously would use fossil fuel. So although the factory continues to emit gases, it would pay another group to reduce the equivalent of 20,000 tonnes of carbon dioxide emissions from the atmosphere for that year. Another seller may have already invested in new low-emission machinery and have a surplus of allowances as a result. The factory could make up for its emissions by buying 20,000 tonnes of allowances from them. The cost of the seller's new machinery would be subsidized by the sale of allowances. Both the buyer and the seller would submit accounts for their emissions to prove that their allowances were met correctly,

How TO PURCHASE

These carbon credits are with the large manufacturing companies who are adopting UNFCCC norms. Retail investors can come in the market and buy the contract if they think the market of carbon is going to firm up. Like any other asset they can buy these too. It is kept in the form of an electronic certificate.

Registration is done and the ownership travels from the original owner to the next buyer. In the short-term, large investors are likely to come and later we expect banks to get into the market too. This business is a function of money, and someone will have to hold on to these big transactions to sell at the appropriate time.

It is not dubious to allow polluters in Europe to buy carbon credit and get away with

It because under UNFCCC the polluters cannot buy 100 per cent of the carbon credits they are required to reduce. Say, out of 100 per cent they have to induce 75 per Ascent locally by various means in their own country. They can buy only 25 per cent of carbon credits from developing countries.

Like in the case of any other asset, its price is determined by a function of demand and supply. Now, norms are known and on that basis European companies will meet the target between December 2008 and 2012. People are wondering how much credit will be available in market at that time.

REFERENCES

1. http://cdmindia.nic.in/cdm_india.htm
2. The Kyoto Protocol, http://unfccc.int/kyoto_protocol/items/2830.php
3. http://carbonfinance.org/Router.cfm?Page=FAQ&ItemID=24677#2
4. http://blogs.expressindia.com/showblogdetails.php?contentid=226814
5. http://economictimes.indiatimes.com/News/News-By-Industry/India-set-to-rake-in-100-billion-through-carbon-trading/articleshow/4465669.cms
6. http://economictimes.indiatimes.com/news/news-by-industry/et-cetera/India-a-leading-player-in-carbon-bazaar-Germany/articleshow/5914516.cms
7. http://en.wikipedia.org/wiki/Clean_Development_Mechanism
8. http://iis-db.stanford.edu/pubs/21211/Wara_CDM.pdf
9. http://indscanblog.com/
10. http://indscanblog.com/2010/05/03/carbon-bazaar-2010-an-event-for-carbon-trading/
11. http ;//www.carbontrading, com/
12. httpy/www.wisegeek.com/ w%t4s-carbon-coredit-lrading,htm
13. http://www.carbontradewatch;org/