

# AN ANALYTICAL STUDY ON CARBON CREDIT TRADING -IN CONTEXT OF INDIA

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## **Abstract**

The concept of carbon credit trading is generated from Kyoto Protocol and is basically used to control the green house gas emissions. This concept is used to earn carbon credit earnings and trading between the various companies and government. It is basically known for the reduction of carbon emissions in order to mitigate future climate changes, mainly the target is green house gasses specifically carbon-dioxide.

India signed and ratified the Kyoto Protocol in 2002. Since then India is exempted from the frame work of the treaty it is exempted to gain from the protocol in terms of foreign investments.

This market is now the fastest growing financial market in India. This research article mainly focuses on the business scenario of India.

Keyword : Carbon Credit Trading, Green House Gases, Kyoto Protocol.

## **Introduction**

The issue of climate change and global warming became the topic of international concern since 1980s because of increase in earth's temperature. The effects of this climate change are already being felt around the world. If this continues over the next century it may cause rise in the sea level, changes in weather events such as heat waves and diseases particularly in developing countries.

In India, Carbon Credit decision are taken by Kyoto protocol under United National Framework of Climate Change (UNFCCC). Any fluctuations on population, pollution, IIP (Impact of Industrial Production) etc will impact on carbon credits (Mahan Kali et.al, 2013).

## **Evolution Of The Concept Of Carbon Finance**

The concept of Carbon Finance came into existence as a result of increasing awareness on the need for pollution control. It took the formal form after the international agreement between 141 countries, popularly known as Kyoto Protocol. Carbon Credits are certificates awarded to countries that are successful in reducing the emissions that cause global warming (sedimbi, 2017).

One way created nations are endeavoring to lessen their discharge is to enhance the vitality productivity of their manufacturing plants and autos and different machines. This implies creating a similar measure of products or driving an indistinguishable separation for some time recently, yet utilizing less vitality to do it. They are likewise attempting to utilize vitality from sources other than coal and oil that don't deliver ozone depleting substance emanations, for example, day light and wind control.

Under the Kyoto Protocol, creating nations don't need to decrease ozone depleting substance discharges. Be that as it may creating nations can in any case, lessen their outflows and after that offer these decreases called carbon credits to created nations. For instance an association in a creating nation for example, a power organization may lessen its emanations by changing from utilizing coal to utilize water to deliver power. An organization or government of a rich nation at that point pays the task in the creating nation for decreasing outflows for its benefit. Since it is regularly costly to lessen outflow in a rich nation, governments and organizations from these nations are searching for such open doors. This circumstances has prompted the production of the "Carbon Advertise", where rich nations purchase Carbon Credits from merchants in creating countries. The purchases of the Carbon Credit can utilize to meets its emanation diminishment duties under the Kyoto Protocol. This implies they don't need to decrease such a great amount without anyone else Carbon-dioxide outflows (Rodrigues, 2017).

### **The Kyoto Protocol**

As per the Kyoto Protocol, developing and least developed countries are not bound by the emissions they produce. Under the Kyoto Protocol, countries with binding emission reduction targets (which at present are applicable to developed countries) in order to meet the assigned reduction targets are issued allowances (carbon credits) equal to the amount of emissions allowed. An allowance (carbon credit) represents an allowance to emit one metric tonne of carbon dioxide equivalent.

To meet the emission reduction targets, binding countries in turn set limits on the GHG (Green House Gases) emissions by their local businesses and entities. Further, in order to enable the developed countries to meet their emission reduction targets, Kyoto Protocol provides three market-based mechanisms.

1. Joint Implementation (JI),
2. Clean Development Mechanism (CDM),

### 3. International Emission Trading (IET).

Under JI, a developed country with a relatively high cost of domestic GHG reduction can set up a project in another developed country that has a relatively low cost and earn carbon credits that may be applied to their emission targets.

Under CDM, a developed country can take up a GHG reduction project activity in a developing country where the cost of GHG reduction is usually much lower and the developed country would be given carbon credits for meeting its emission reduction targets. Examples of projects include reforestation schemes and investment in clean technologies.

In case of CDM, entities in developing/least developed countries can set up a GHG reduction project, get it approved by UNFCCC and earn carbon credits. Such carbon credits generated can be bought by entities of developed countries with emission reduction targets. The unit associated with CDM is Certified Emission Reduction (CER) where one CER is equal to one metric tonne of carbon dioxide equivalent.

Under IET, developed countries with emission reduction targets can simply trade in the international carbon credit market. This implies that entities of developed countries exceeding their emission limits can buy carbon credits from those whose actual emissions are below their set limits. Carbon credits can be exchanged between businesses/entities or bought and sold in international market at the prevailing market price. These mechanisms serve the objective of both the developed countries with emission reduction targets, who are the buyers of carbon credits as well as of the developing and least developed countries with no emission targets ( at present) , who are the sellers/suppliers of carbon credits. The non-polluting companies from less developed countries can sell the quantity of carbon dioxide emissions they have reduced ( carbon credits ) and earn extra money in the process. This mechanism of buying and selling carbon credits is known as Carbon Trading ( Sedimbi, 2017).

#### **Literature Review**

**Mahankali et.al. (2013)** in the paper entitled “An Analysis on Carbon Credits(India)” published in Asia Pacific Journal of Marketing and Management Review started the effect of Carbon Credit on stock market.

**Sedimbi, A. (2017)**, in the paper entitled “Carbon Credit Accounting –A Study” published in IOSR-Journal of Business and Management emphasized on the factors identified were Carbon Trading,Credits,6 missions Trading and clean development mechanism.

**Rodrigues, A. (2017)**,\_in the paper entitled “Accounting for Carbon Credits” an efforts towards green environment published in JKIJMS @ JK Business School Stated the business openings in the world wide discharges advertise in Indian setting .

**Nair, S. and NandKumar, P. (2013)**, in the paper entitled “Environmental Carbon trading Scenario in India” A Global issue of 21<sup>st</sup> century : A Review published in International Journal of Advancement in Research and technology stated the opportunities for the industries in India to produce Carbon units and harness benefits out of its trading.

### **Research Methodology**

The study was planned to carry out with the help of secondary data for the purpose to understand the future of carbon finance in India.

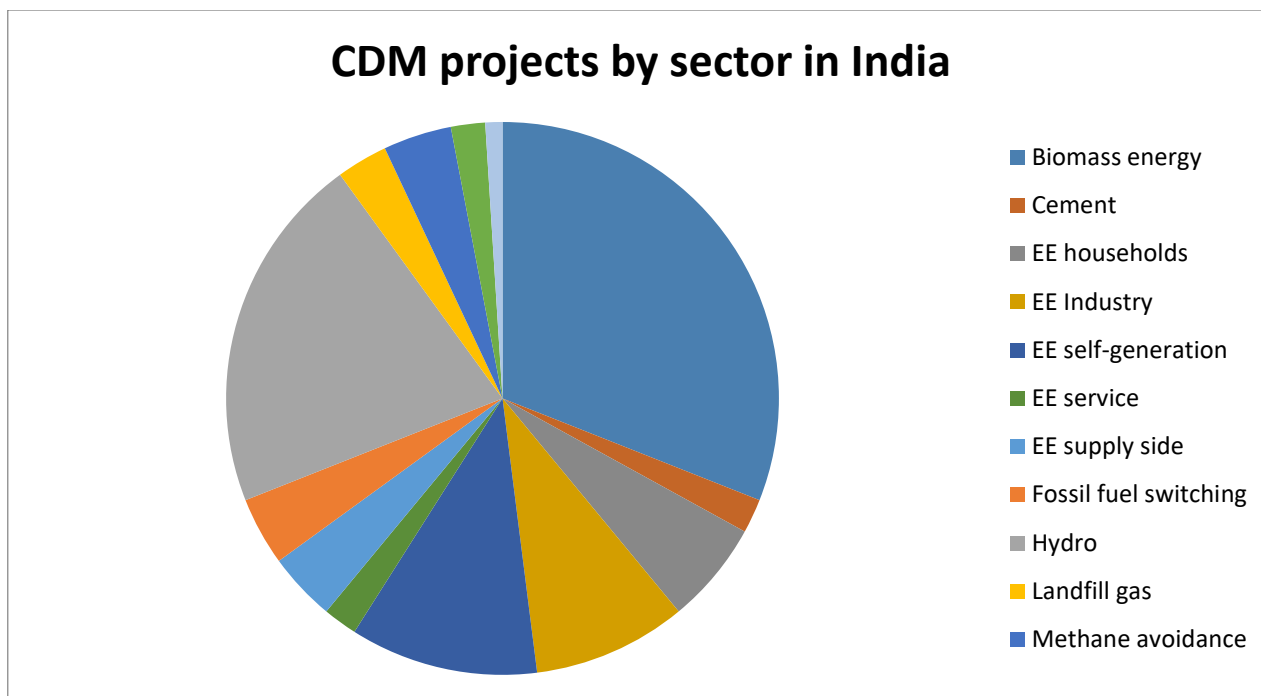
### **Data Collection**

The required data of the present study were collected from reports, articles, journals, books, documents newspapers, printed literatures, certain websites and other online data bases etc.

### **Interpretation Of Data And Discussions**

Carbon Credits have become the key element of national and international counter measures to neutralize the growth of such greenhouses gases. The reduction in emission is supported by offering monetary value in such cases. Each certificate Emission Reduction (CER) is equivalent to one tons of carbon-dioxide reduction. Such a credit can be sold in the international market at the prevailing market price. This has become an entirely new industry with great potential and opportunities for the companies (including India ones) and individual investors alike. India could emerge as one of the largest beneficiaries accounting for more than 25% of the total global Carbon trade based on the World Bank Report. Indian companies have generating Carbon Credits and Carbon Credit trading in India has gained a lot of momentum in recent years (Nair and Nand Kumar, 2013).

To date, the Clean Development Mechanism (CDM) has been the dominant form of Carbon market activity in India. India is the world’s second largest supplier of certified Emission Reductions (CERs), after China. As of March 2015, India had been cumulatively issued 13% of CERs (or 202.1 million) out of total 1540.8 million CERs issued around the globe since 2001. Moreover, India had the second largest number of CDM projects 2048 of the 8640 registered with the CDM Executive Board (CDM-EB). Energy endeavors deriving from wind, biomass, hydro and energy efficiency projects comprise the majority of CDM projects originating in India (India, 2015).



(Source

: UNFCCC, 2015 : Available in cdmpipeline.org)

**Fig. 1: CDM Projects by sector in India**

India has a huge potential of gaining from carbon trading market. The following Table-1 and the other Tables based on Table 1, i.e. Table-2,3,4,5 and 6 shows there are enough opportunities for Indian companies to produce carbon credits and capitalize its economic benefits by the trading. The growing Indian economy and its diverse sector of huge potential for CERS. Besides the CDM , the concept of voluntary Carbon Market has also picking up in India. Indian companies like L&T, WIPRO, ASIAN PAINTS, ACC and TATA STEEL are the forefront to reduce their carbon emissions (Nair & Nand Kumar, 2013).

**Table.1**

**World vs. Indian Carbon Market**

<b><u>Year</u></b>	<b><u>Global CER Transactions (mCERs)</u></b>	<b><u>Indian CER Transactions (mCERs)</u></b>	<b><u>Indian (in % terms)</u></b>
2006	466	56	12
2007	551	33	6
2008	395	16	4
2009	200	04	2

(Source : World Bank Report as appeared in International Journal of Advancements in Research and Technology, Volumn-2, issue-9, September, 2013)

**Output**

CORRELATIONS

```
/VARIABLES=globalCERtransindianCERtrans
/PRINT=TWOTAIL NOSIG
/MISSING=PAIRWISE.
```

**Table.2**

**Correlation**

		Global CER Transaction	Indian CER Transaction
Global CER Transaction	Pearson Correlation	1	.738
	Sig. (2-tailed)		.262
	N	4	4
Indian CER Transaction	Pearson Correlation	.738	1
	Sig. (2-tailed)	.262	
	N	4	4

(Source: Based on Table.1)

REGRESSION

```
/MISSING LISTWISE
/STATISTICS COEFF OUTS R ANOVA
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT globalCERtrans
/METHOD=ENTER indianCERtrans.
```

**Table.3**

**Regression**

**Variables Entered/Removed<sup>a</sup>**

Model	Variables Entered	Variables Removed	Method
1	Indian CER Transaction <sup>b</sup>	.	Enter

a. Dependent Variable: Global CER Transaction

b. All requested variables entered.

(Source: Based on Table.1)

**Table.4**

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.738 <sup>a</sup>	.545	.317	123.648

a. Predictors: (Constant), Indian CER Transaction

(Source: Based on Table.1)

**Table.5**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	36568.386	1	36568.386	2.392	.262 <sup>b</sup>
	Residual	30577.614	2	15288.807		
	Total	67146.000	3			

a. Dependent Variable: Global CER Transaction

b. Predictors: (Constant), Indian CER Transaction

(Source: Based on Table.1)

**Table.6**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	269.637	106.105		2.541	.126
	Indian CER Transaction	4.894	3.164	.738	1.547	.262

a. Dependent Variable: Global CER Transaction

(Source: Based on Table.1)

### **Analysis**

To know the effects of Indian CER Transaction on Global CER Transaction. For this we have selected the data of 4 years.

Now in order to find out association among the variables, we start with calculating linear correlation. Table 2 shows the Pearson's  $r$  between the variables. Underneath the correlation coefficient, two tailed significance of the correlation and the sample size ( $N=4$ ) is displayed. From the table it can be seen that correlations are positive. Thus, our output shows that Global CER Transaction is positively relate to Indian CER Transaction.

In regression analysis, our objective is to find out how far the variation between two variables. For this it is started with running a simple regression of Global CER transaction (Dependent variable) and Indian CER Transaction (Independent variable). Here we use enter method for entered variable while doing regression (Table 3).

From Model summary (Table 4) , we found that  $R$ , simple linear correlation between Global CER Transaction and Indian CER Transaction is 0.738 and the value of  $R$  Square is 0.545.  $R$  square is the goodness of fit of the model i.e. how independent variables are appropriately explaining the variation in the

dependent variable. That means 54.5% can be explain and 45.5% of the variation cannot be explained by Indian CER Transaction alone. So the model is good enough or moderate.

In order to make a more formal conclusion about the goodness of fit of the model we also performed F test. From the Anova table (Table 5), we find that F value is 2.392 with a p value of 0.262.

R square and Anova tells us whether model is, overall, significantly explains/ predicts the dependent variable or not. But to know whether individual independent variable is significantly contributing to this prediction or not, we have to focus to its coefficients ( Table 6). Looking at the coefficient, we can say that constant is 269.637 meaning that when Indian CER Transaction is zero ,it will give, on an average, Global CER Transaction is of 269.637%. However, looking at the p value (0.126), it can be stated that it is not significant at all.

Coefficient of Indian CER Transaction is 4.894, meaning as Indian CER Transaction increases by 1 unit i.e. 1%, Global CER Transaction will increase by 4.894 unit i.e. 4.894%. It can also be observed that Indian CER Transaction coefficient is highly insignificant (p value 0.262).

The standardized coefficients are obtained when the independent variables are transformed to z values i.e. the standard normal values.

Hence, Indian CER Transaction positively influenced Global CER Transaction and explain approx 73% (0.738 - standardise value) but insignificant at 1% or 5% level of significance.

### **Opportunities in India**

If India can capture 10% share of the world 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 Green House Gas (GHG), emission reduction of roughly 1 billion ton  $\text{CO}_2$  and prices range from US \$3.5-5.5 per ton of  $\text{CO}_2$ ). 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 operationalizing CDM, through the Designated National Authority (DNA).

There is a great opportunity waiting India in carbon trading which is estimated to go up to \$100 by 2010. In the new regime, the country could emerge as one of the largest beneficiaries accounting for 25% of the total world carbon trade, says a recent world bank report. The countries like US, Germany, Japan and China are likely to be the biggest buyers of carbon credits which are beneficial for India to a great extent. The Indian market is extremely receptive to Clean Development Mechanism (CDM). Having cornered more than half of the Global total in tradable certified emission reduction (CERs), India's dominance in Carbon trading under the clean development mechanism (CDM) of the UN convention on climate change (UNFCCC)



is beginning to influence business dynamics in the country. India Inc pocketed Rs.1500 crores in the year 2005 just by selling Carbon Credits to developed country clients. Various projects would create up to 306 million tradable CERs with India could touch 500 million of the 391 projects sanctioned the UNFCCC has registered 144 from India, the highest for any country. India's average annual CERs stand at 12.6% or 11.5 million (Nair & Nand Kumar, 2013).

### **Conclusions And Recommendations**

Indian environmental condition and the industrial practices have a huge potential of gaining from carbon trading. The carbon accounting and its disclosure has become an important issue for the Indian companies. Public and Private initiatives are urgently much required for the encouraging industries and societies to understand the different facts of environmental pollution, its reduction strategies and the carbon financing in particular. Hence the India has a large potentials to earn carbon credits and in this context the carbon consultancy service has a greater part to play and is going to add a dimension to the Environmental Consultancy and financial services arena.

Even though India is the largest beneficiary of Carbon trading Carbon credits are traded on the MCX, it still does not have proper policy for trading of carbons in the market. As a result the centre has been asked by the National Commodity and Derivatives Exchange Limited (NCDEX) to put in place a proper policy framework for allowing trading of certified emission reduction (CERs) in the market. Also, India has huge member of Carbon Credits sellers but under the present Indian law, the buyers based in European market are not permitted to enter the market. To increase the market for carbon trading forward contracts (regulation) Amendment Bill has been introduced in the parliament. This amendment would also help the traders and farmers to utilize NCDEX as a platform for trading Carbon Credits. However, to unleash the true potential of carbon trading India, it is important that a special statute be created for this purpose as the Indian contract act is not enough to govern the contractual issues relating to carbon credits.

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