

# GREEN ECONOMY IN INDIA: JOURNEY THROUGH CARBON CREDIT MECHANISM

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## **Abstract**

**Emission of Green House Gases such as Carbon Dioxide (CO<sub>2</sub>), Methane (CH<sub>4</sub>), Nitrous Oxide (N<sub>2</sub>O), Per Fluoro Carbons (PFCs), Hydro Fluoro Carbons (HFCs), and Sulfur Hexa Fluoride (SF<sub>6</sub>) were considered as the major reason for the drastic climatic changes and global warming over the years. In order to control and reduce the ill effects of these, Kyoto Protocol was signed by world nations in 1997. Carbon credit /Carbon offset being the brain child of Kyoto protocol offers vast potential to the developed countries to reduce their carbon footprints by investing in the green projects of developing countries through Clean Development Mechanism (CDM) or Joint Initiative (JI). India ratified “Kyoto protocol” on 26<sup>th</sup> August 2002 and signed on “Carbon credit” in 2005.**

**The present paper analyses the potential areas of investment for carbon credit projects in India, top companies from India in the clean carbon 200 list and short term reversals faced by India in the carbon credit market in recent years. Carbon credit system has enormous potential in India in spite of the short term setbacks it has suffered due to global economic recession. However, through proper monitoring, evaluation and follow up of the green projects, it can achieve the targets of ‘Clean and sustainable development’.**

**Key Words: GHGs, Kyoto Protocol, Carbon credit, carbon footprints, CDM, Sustainable development.**

## **1. INTRODUCTION**

Environmental degradation and climatic changes have become a matter of concern all over the world during the past few decades. It is well known fact that carbon dioxide is the most important greenhouse gas produced by combustion of fossil fuels (Bhardwaj, 2013). There has been a tremendous shoot up in the atmospheric carbon dioxide (CO<sub>2</sub>) levels in recent years. It is believed to be the result of the industrialization which began in the second half of the 18<sup>th</sup> century and is still going on in many emerging global markets. Clearing of forests, setting up of factories and various other human structures have contributed a lot to the rising level of carbon dioxide and other Green House Gases (GHGs) in the atmosphere thereby causing serious damages to the ecological system. Statistics show that more than 36 billion metric tons of carbon dioxide was produced globally in 2013 as against 11 million metric tons in 1751.

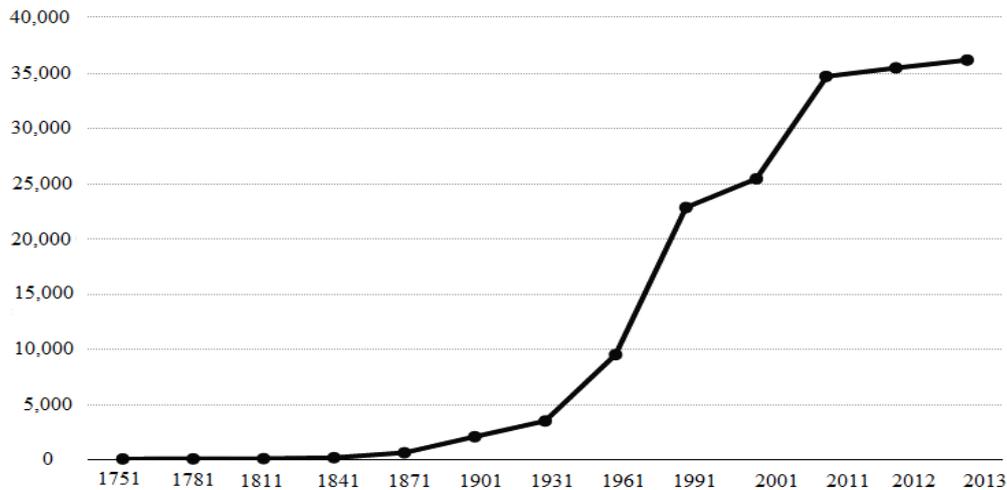


Figure -1 - CO<sub>2</sub> emissions in Million Metric tons (from 1751-2013)

Source: [www.statista.com/statistics/264699/worldwide-co2-emissions/](http://www.statista.com/statistics/264699/worldwide-co2-emissions/)

In 2014, the largest CO<sub>2</sub> producers included the United States and the four members of the BRIC countries. Brazil, Russia, India and China were all ranked among the five largest emitters, with China taking the top spot. In 2015, china continued to be the highest emitter, followed by U.S., India, Russia, Japan and Germany.

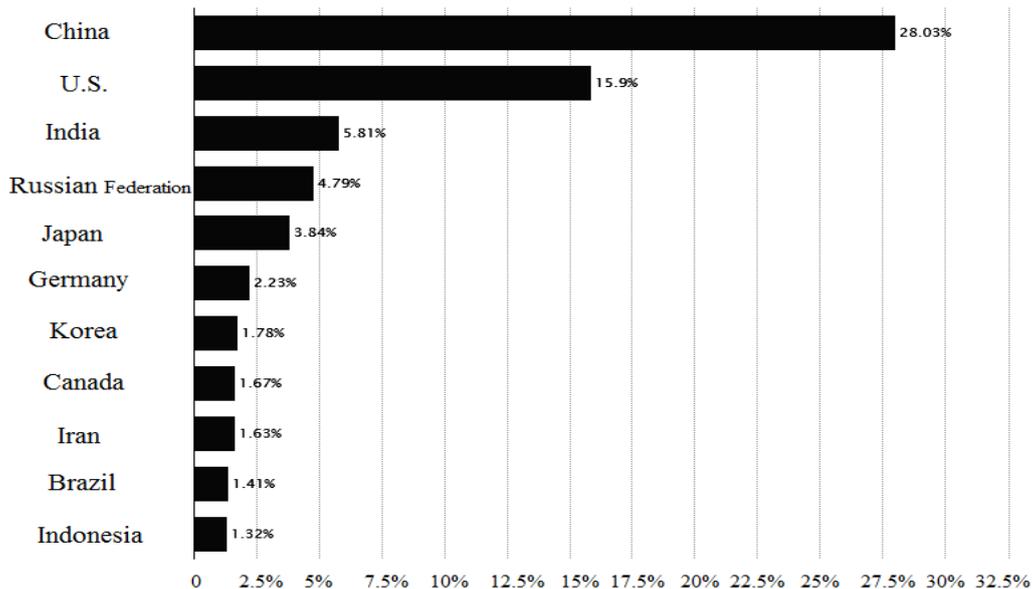


Figure -2 - Share of total emissions by world countries in 2015

Source: [www.statista.com/statistics/271748/the-largest-emitters-of-co2-in-the-world/](http://www.statista.com/statistics/271748/the-largest-emitters-of-co2-in-the-world/)

In the *International Energy Outlook 2016* (IEO2016) Reference case, world energy related CO<sub>2</sub> emissions increase from 32.3 billion metric tons in 2012 to 35.6 billion metric tons in 2020 and to 43.2 billion metric tons in 2040. Foreseeing the dangerous effect of GHGs over mankind, Kyoto protocol was introduced by world treaties in an effort to reduce the emission of these pollutant gases and preserve the natural composition of environment.

### 1.1 Kyoto Protocol

Kyoto Protocol is an international treaty made under the United Nations Framework Convention on Climate Change (UNFCCC) to lower overall emissions of GHGs. Even though it was initiated in December 1997 as a result of the third conference held at Kyoto, Japan, it came on to effect only on February 2005. International treaties have established quotas on the amount of GHG that countries can produce. Credits are awarded to countries or groups that have reduced their GHGs below their emission quota. The Kyoto Protocol provides three ways in which developed countries can meet their emission reduction targets:

- (i) reduce GHG emissions in their own countries through technological or policy interventions;
- (ii) buy emission allowances from other countries through a regional or global trading scheme (such as the European Trading Scheme – ETS); or
- (iii) invest in emission reduction projects in transition economies through the JI program or in developing countries through the CDM.

### 1.2. Carbon Credits

Carbon Credit is the brain child of Kyoto protocol. Carbon credits are certificates issued to countries that reduce their emission of GHGs which cause global warming. Carbon credits are measured in units of Certified Emission Reductions (CERs). Each CER is equivalent to one tonne of carbon dioxide reduction.

Carbon credit is defined as a “generic term to assign a value to a reduction or offset of greenhouse gas emissions. It is measured in terms of one tonne of carbon dioxide equivalent. i.e., One Carbon Credit = One tonne of CO<sub>2</sub> equivalent. (The Environment Protection Authority)

Carbon credit is a “permit that allows the holder to emit one ton of carbon dioxide which can be traded in the international market at their current market price”.(Investopedia)

### 1.3. Carbon Trading

As per the Kyoto Protocol and Carbon credit mechanism, commercial entities emitting above the permitted limit of carbon dioxide were required to cut down their emissions to prescribed levels. Industries or businesses that are over their emission quotas must buy carbon credits for excess emissions, while those below can sell their remaining credits. Otherwise they should pay a charge for the excess emission, which is referred to as carbon tax. The prices are normally quoted in Euros per ton of carbon dioxide.

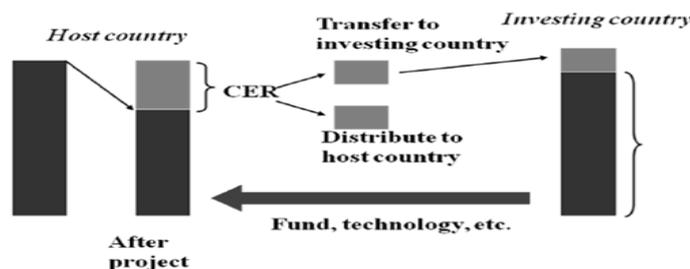


Figure 3 – Mechanism of Carbon Trading

Source: (Vivek, 2012)

Eg:- A company from a developing country(A) is investing in a new hydel project using a particular technology at the cost of X crore. A company from a developed country (B) is ready to provide ‘A’ with slightly better technology that result in lower emissions, at a much higher cost (say Y crore. Country ‘B’ will only pay the incremental cost of the project i.e., Y minus X. In return, country ‘A’ will get certified emission reductions (CERs), or credits, which it can use to meet its Kyoto commitments. This is a very good deal for the investing country. ***Not only do they sell developing countries their technology, but they also meet their Kyoto commitments even without lifting a finger to reduce their domestic emissions. Countries like the US can continue to pollute at home, so long as it makes the reductions elsewhere.***

#### 1.4. India and Carbon Credit

As per the conventions of Kyoto protocol, India being a developing country has no emission targets to be followed. However, the country can be greatly benefitted by entering into Clean Development Mechanism (CDM) or Joint Initiative (JI) projects with the developed countries. Under CDM, a developed country can take up a GHG reduction project activity in a developing country where the cost of GHG reduction project activities is usually much lower. The developed country would be given Carbon Credits for meeting its emission reduction targets, while the developing country would receive the capital and clean technology to implement the project. Through the CDM project, cooperation between developed Annex I and developing non-annex I countries is enhanced and a win-win situation can be realized in a cost-effective way. Other imminent benefits of CDM include technology transfer to the host country as well as improvement in livelihood of local communities through job creation and increased economic activity. Thus the developing countries like India would be able to contribute more revenue to the economy through the green initiatives.

**Table No. 1**

**Clean Development Mechanism Statistics (as on 31<sup>st</sup> March 2016)**

Total No. of Projects Registered with UNFCCC	7630
Total No. of CERs issued to projects	1.55 bn
Total No. of Registered projects from India(% of total)	1565(20.51%)
Total No. of CERs issued to Indian projects(% of total)	203.31mn(13.09%)

Source: www.idbi.com

China continued to lead with 3,762 registered CDM projects followed by India and Brazil with 1565 projects and 335 projects respectively.

## 2. LITERATURE REVIEW

Birla et al (2012) made a review of the prospects of carbon credit market in India by suggesting the technologies and market standards that India can follow. He pointed out that

even though India is the largest beneficiary of carbon trading, it does not have a proper policy for trading carbons in the market.

Bhardwaj (2013) discussed about the business of carbon in International market and the opportunities for emission trading in the Indian context. She concluded that India will emerge as the leader in Carbon trading.

Lobo and Raghavendra(2016) evaluated the current scenario of carbon trading in India and opined that carbon trading is the best way to mitigate climate change. But monitoring, estimating and verifying of actual emissions are very costly.

Kumari etal. (2013) made a study of carbon credit effects on stock market and the relative factors which influence stock market in India. She found out that the factors influencing carbon credits were Msci, Powerex, Carbonex and Greenex.

Rajput and Chopra (2014) analysed the basic concepts related to carbon credit as a tool to save environment. They also analysed the opportunities for emission trading in India.

Sandeep and Sruthi ( 2013) examined how various CDM projects are financed and the benefits of financing for both host countries and home countries through a case study of DMRC(Delhi Metro Rail Corporation) and Japan Carbon Finance Ltd. The study reported that the DMRC project was financed by Japan and the carbon credits earned by DMRC in regenerative rolling stock is purchased by Japan at a price of 1.2 crore per annum. Japan used this carbon credits for meeting its Kyoto requirements and the finance contributed for sustainable development to DMRC and India.

### **3. RATIONALE OF THE STUDY**

Carbon trading is considered as the “Greenest” trading platform for the small and large scale private and governmental sector players in India. (Birla etal, 2012) However behind every trading activity there should be some ethics. It makes no sense if carbon trading is considered as a license to the companies or counties to emit carbon up to the desired limit.

It is argued that an emission trading does not solve the pollution problem, as the industries that do not pollute sell their conservation to the polluting industries that continue to pollute; overall reduction in the greenhouse gas emissions would not occur. So rather than concentrating on offsetting the carbon credits through carbon trading, steps should be taken to promote earning more carbon credits though “green projects” (those reducing the emission of GHGs). In this context the present paper analyses the potential areas of investment for carbon credit projects in India. It also aims at identifying the top companies from India and the shortcomings for trading carbon credits in India.

### **4. OBJECTIVES**

- a) To identify the potential areas of investment for carbon credit projects in India.
- b) To identify the top performers from India and their operations.
- c) To analyse the setbacks, if any, faced by India in the carbon credit market.

### **5. METHODOLOGY**

The study mainly relies on secondary data to identify the top performers and their initiatives. Data were mainly collected through online sources including the World Bank and UNFCCC reports.

## 6. FINDINGS

### a) Objective 1- Potential areas of Investment for carbon Credit Projects in India

India can set up environment friendly projects in the following areas:-

#### i) Energy Efficiency Projects

- Increase building efficiency (Concept of Green Building) e.g. Technopolis Building Kolkata
- Increase commercial/industrial energy efficiency (Modernization and renovation of old power plants)
- Fuel switching from more carbon intensive fuels to less carbon intensive fuels
- Introduction of wind, solar, hydel energy projects

#### ii) Transport

- Improvements in vehicle fuel efficiency by the introduction of new technologies
- Changes in vehicles and/or fuel type, for example, switch to electric cars or fuel cell Vehicles (CNG/Bio fuels)
- Switch of transport mode, e.g. changing to less carbon intensive means of transport like trains(Metro in Delhi)
- Reducing the frequency of the transport activity and Prohibiting prolonged use of vehicles

#### iii) Methane recovery

Animal waste methane recovery & utilization

- Installing an anaerobic digester & utilizing methane to produce energy

Coal mine methane recovery

- Collection & utilization of fugitive methane from coal mining
- Capture of biogas

Landfill methane recovery and utilization

- Capture & utilization of fugitive gas from gas pipelines
- Methane collection and utilization from sewage/industrial waste treatment facilities

#### iv) Industrial process changes

- Any industrial process change resulting in the reduction of any category greenhouse gas emissions
- Recycling of plastics and using them for road tarring along with bitumen.
- Recycling of e-wastes.

#### v) Cogeneration

- Use of waste heat from electric generation, such as exhaust from gas turbines, for industrial purposes or heating (e.g. Distillery-Molasses/ bagasse)

#### vi) Agricultural sector

- Energy efficiency improvements or switching to less carbon intensive energy sources for water pumps (irrigation).
- Methane reductions in rice cultivation.
- Reducing animal waste or using produced animal waste for energy generation.

- Avoidance of artificial fertilisers and pesticides.
- Any other changes in an agricultural practices resulting in reduction of any category of greenhouse gas emissions.

**b) Objective 2 – Top performers from India and their operations**

Corporate Knights (a company that produces corporate rankings, research reports and financial product ratings based on corporate sustainability) published the Carbon Clean 200 (Clean 200™) list on 15<sup>th</sup> August 2016. It is a list of the 200 largest companies worldwide ranked by their total clean energy revenues.

The list is topped by Japan’s Toyota Motor followed by Germany’s Siemens AG. More than 70 of the companies included in the list receive majority of their revenue from clean energy, the rankings show, with most of the 200 from China (66 entries) and the US (40), although there is also strong representation from Japan (20), Germany (8), India (7) and Canada (5). Four Indian companies - Godrej Industries, NHPC Ltd, SJVN, and Bharat Electronics - have moved out of the rankings for being laggards and being utilities producing less than 50 per cent green energy.

**Table No. 2**  
**Indian companies among Carbon Clean 200 List**

<b>World Rank</b>	<b>Name of company</b>	<b>Type of projects</b>
68	Suzlon Energy	Wind farms
106	Bharat Heavy Electricals Ltd.	Wind electric generators and solar cells
114	Tata Chemicals	Chemicals for biodiesel, solar energy, and fuel cells
139	Thermax Ltd.	Vapour absorption chiller that uses water as refrigerant instead of ozone depleting chlorofluorocarbons
153	Exide Indus	Electric storage batteries
155	IDFC Ltd.	Green infrastructure financing
166	Havells India	Energy meters

Source : [www.ibef.org](http://www.ibef.org)

**c) Objective 3- Set backs to India in the Carbon credit market**

India as the third largest contributor of CDM projects worldwide; it bagged a lot in terms of Certified Emission Reductions. However, there is a short fall in the demand for carbon credits and sharp decline in CER prices in recent years. Even though it is traded in different parts of the world, there is no full-fledged system for trading in India. Another problem is

that carbon credit system is not yet compulsorily implemented in India by Law. Neither the govt. provides incentives to boost up green projects nor imposes taxes on projects having emissions over a ceiling limit. As India has no emission targets to be followed as per the Kyoto protocol, the fixation of emission limit is also a major difficulty. The main problems faced by India in the carbon credit market in recent years are:-

- Due to global recession, in the year 2008, there was a sharp decline in sales and manufacturers were forced to reduce the volume of manufacturing.
- Global decline in manufacturing meant that companies were producing lower than expected carbon. As a result, demand for carbon credits was substantially lower than the supply.
- This resulted in CER prices to fall drastically. For credits to be issued between 2013 and 2019, the estimated notional loss is of around Rs 10,500 crore. Although it is termed as notional loss in the realm of finance, it is perceived as real loss to the overall industry.
- Indian CER holders have been struggling to sell their CERs to countries with maximum emission of greenhouse gases.

## 7. CONCLUSION

Even though the Corporate's have made significant contribution in the carbon credit regime, Small Scale industries which are the backbone of the Indian economy can contribute a lot to the green economy initiative. If they were given subsidies to purchase solar power systems or adopting less energy consumption methods, it will be a remarkable achievement considering the Indian scenario. Another alarming situation is due to plastics and e- wastes. Recycling of degradable items such as rubber and usage of agri waste will reduce the carbon emission problem. Non degradable items like plastic should also be recycled. India is the largest producer and consumer of plastic. Plastic has a life span of nearly 300 years which can cause health problems as well as air pollution while burning. Incentives should also be given to such industries. Besides, Re usage of electronic items by small modifications will provide us with lesser e-waste.

Thus carbon credit system has enormous potential in India in spite of the short term setbacks it has suffered due to global economic recession. It doesn't matter how India earned in terms of Emission trading. Rather it is essential to check the contribution of India in terms of CERs, Greener projects and events. As Indians, we cannot simply sit and say "global warming is the result of industrial revolution". If we are planting a tree and nurturing it, it can be counted as one of the green initiatives at the grass root level. Through proper monitoring, evaluation and follow up of Green projects and imposition of carbon tax for non- green projects, India can achieve the targets of 'Clean and sustainable development' and become a Green economy.

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