

Carbon Trading; A system for the enhancing environmental sustainability

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Abstract

Modern civilization came up with so many fortuitous things such as rapid industrialization and advanced technology. Undoubtedly, these things are indispensable for the repaid growth and development for the human and the human life becomes very easier with the progress of technology. However, this technological advancement came up with the cost of environmental degradation. Therefore it is important to maintain a balance between human progress and the environment to keep going. To maintain this ecological balance a new system is introduced by the environmental economist, which is Carbon Trading. The objective of this study is to review the carbon trading system used for emission trading.

Key words-: Technological advancement, carbon trading, ecological balance

1. INTRODUCTION

The earth has an atmosphere; the critical function of this atmosphere is to maintain life-sustaining conditions on the earth. This atmosphere is built by numerous chemical compositions and gases. There should be a proper balance is required of these chemicals and gases. The earth's atmosphere provides life living conditions by absorbing the heat of the sun as much as required and releases the residual energy. If the earth absorbs less energy than the required level, the atmosphere of the earth would become colder and colder, on the other hand, if the earth absorbs all the energy and heat of the sun the atmosphere of the earth would become hotter and hotter. Both situations are not favorable for human life(Jitendra Kumar Singh, 2001).

The atmosphere consists of a well-balanced composition of the following gases-:

Table No. 1 composition of gases in the atmosphere

S.N.	Gas	Percentage
1.	Nitrogen	78%
2.	Oxygen	21%
3.	Argon	0.93%
4.	Carbon dioxide	0.04%
5.	Other	7.03%

Source: Space.com (2017)

Apart from the above composition few gases are heat absorbents, they are known as Greenhouse gases. Greenhouse gas includes carbon dioxide, nitrous oxide, methane, hydrofluorocarbon, perfluorocarbon, and sulfur hexafluoride. The greenhouse gases are heat absorbents and also responsible for increasing earth temperature and acid rain. The composition of these gases in the atmosphere is increasing day by day due to rapid industrialization and emission through vehicles. To reduce the effect of greenhouse gases Kyoto Protocol came into existence.

In Japan on 11 December 1997, the treaty was negotiated in Kyoto. From 1998 to 1999 this treaty was opened for signature and finally, in 2005 it came to action, from that point of time the countries that ratified this treaty committed to reducing greenhouse gases as decided by the protocol or engaged in carbon trading if they exceed the limit(ICAI, 2009). The Kyoto protocol provided three types of flexibility mechanism for meeting the emission targets in a very cost-effective manner these are -:

1.1 Joint Implementation

In the joint implementation, developed countries set up the green house gases reduction projects to the developed country. However, the country that set up the greenhouse gas projects has a comparatively high cost on domestic greenhouse gas reduction.

1.2 Clean development mechanism

In a clean development mechanism in a developing country, a developed country sponsors greenhouse gas reduction projects. In developing country the cost of greenhouse gases reduction project must have lower than the developing nation but the project generate an equal amount of environment benefits (ICAI, 2009). This study is focusing on the third type of flexibility mechanism that is emission trading.

2. REVIEW OF RELATED LITERATURE

Following past research work is analyzed for study purpose-:

Debesh Bhowmik (2017) explored the road maps for the Indian carbon market. In this study, the author highlighted the concept of carbon emission trading with its mechanism, international organizations involved in carbon trading. The author concluded that regarding prospects the international carbon market is facing considerable uncertainties. The author said that there is much scope for emission trading with the global market. However, slight changes are required in this system.

Ashim Paul (2011) explored that with the growing industrialization the carbon trading becomes one of the most growing international markets. This business became more attractive because of changes introduced by the Kyoto Protocol. The recent trends in carbon trading serve as a piece of evidence that how successfully this market is growing day by day. The author further described that India has great potential in carbon reduction and limiting the emission of greenhouse gases. For utilization of such potential and growth in the carbon market, India has to work hard

Jitendra Kumar Singh (N.A.) describes the issues related to global warming and how these issues can be removed. The author told about the composition of greenhouse gases with the solution for the reduction of greenhouse gases. The concept of a clean development mechanism is explained by the author in detail, then the author described the potential of clean development projects in India. A brief introduction of Indian policies regarding greenhouse gases is also given in this study.

The Institute of Chartered Accountants of India (2009) explained that carbon credit is growing at a faster rate not only around the developed countries but also in developing countries like India. The concept of carbon credit came into existence as a tool for mitigating global warming. The reason for the evolution of carbon credit according to the author is anthropogenic activity and emission of greenhouse gases which lead to global warming in the earth. The author said that carbon credit becomes an effective measure for controlling the effect of global warming because it can serve two purposes, first for the protection of nature, second for revenue generation.

3. OBJECTIVE OF THE STUDY

As mentioned earlier the Kyoto Protocol has three types of flexibility mechanisms for controlling the emission of greenhouse gases. The objective of this study is to understand the concept of carbon emission trading and the Clean Development Mechanism in the Indian context and also explore the role played by the carbon trading system for flourishing the efforts of the Indian government towards minimization of climate mitigation effects.

4. RESEARCH METHODOLOGY

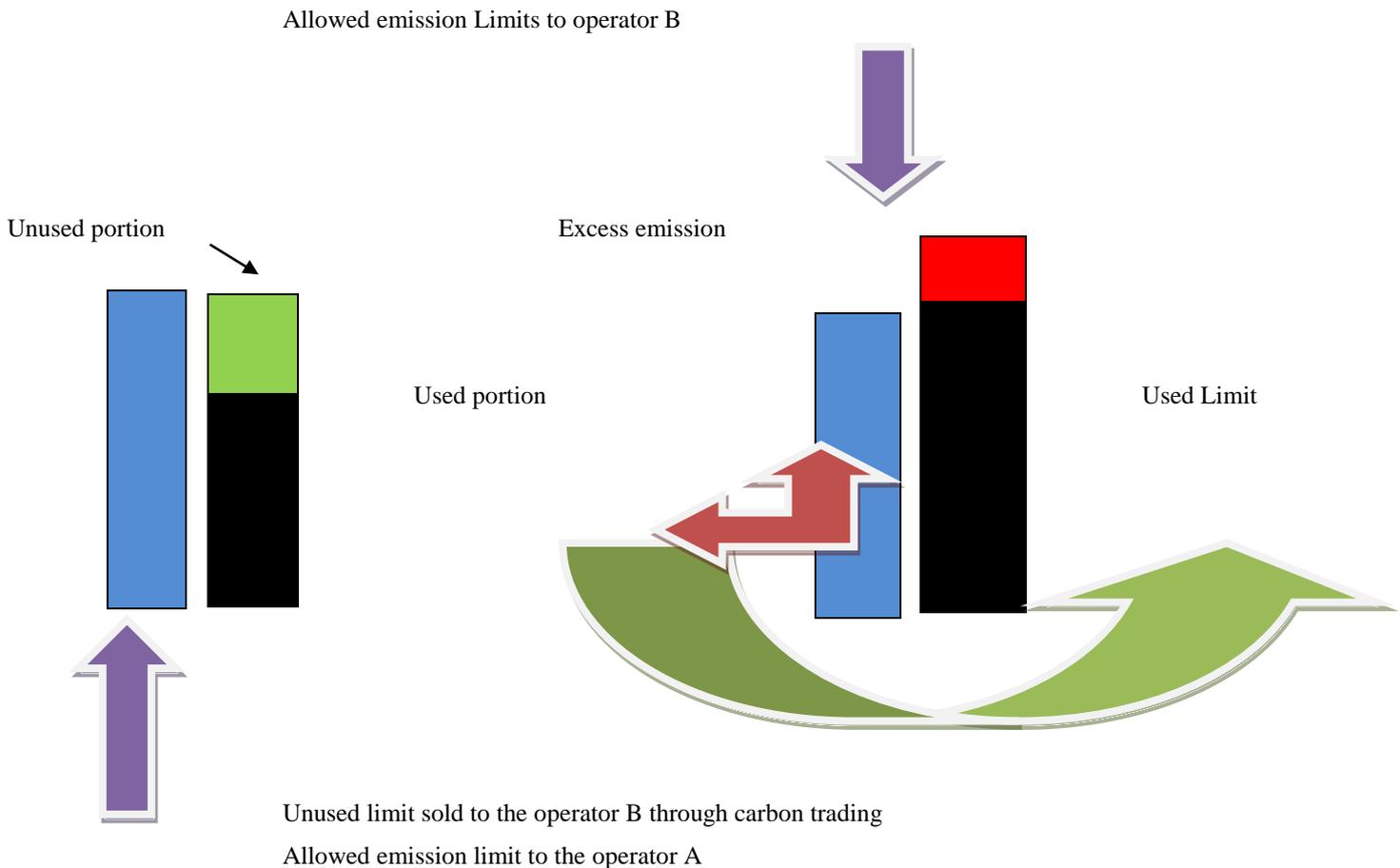
For the accomplishment of the underlying objective, secondary data is used and data is gathered from previously published articles, newspapers, reports, and research papers. Tables and figures are used for the exploration of facts from the collected data with help exploratory research design.

5. RESULT AND DISCUSSION

Kyoto protocol is the result of rapid industrialization and an excess amount of greenhouse gas emission. The protocol segregates nation into two categories-:

- **Annexure I countries:** developed countries and the countries passing through the development process and engaged in the transformation of the economy. All the countries that meet the above criteria and accepted greenhouse gas emission controlling responsibility and annual greenhouse gas must be submitted by them.
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- **Non – annexure I countries:** countries with no greenhouse gas reduction obligations come under this annexure or all the remaining countries of Annexure I also come under this head. The countries that come under this head may take participate in a clean development mechanism.

The protocol introduced a “cap” and trade system. The cap means nothing but the emission quota. It means the countries that come under the annexure I require to limit the emission of greenhouse gases within the permissible limit. On the other hand, trade means selling the unused quota of carbon emission to countries that exceed the greenhouse gas emission. Based on the above system the Annexure I countries set the emission targets and sell permits to the local business and companies, generally named as “operator”. These operators are managed by the countries themselves through registries, that should be according to the United Nation Framework Convention on Climate Change (ICAI, 2009). The above-mentioned ground is responsible for the evolution of the carbon emission trading and carbon credit system. Carbon emission trading can be better understood by the following figure-:



Unused limit sold to the operator B through carbon trading

Allowed emission limit to the operator A

Figure No.1 Carbon Trading System

Source: Carbon Trading and India’s Road Map (2017)

Just like the other trading system carbon trading system does not involve any physical transfer of commodity, rather it involves the commodity created by law; here sellers sell their unused carbon emission limit to the buyer. As it is shown in the above figure that in this there is a minimum of two parties involved that can be country of Annexure I or its operators and emission limit is allowed to them under the protocol that is indicated by the blue color on the above figure, black color is tell about the emission of greenhouse gases for both the operator, the green area is showing the unused quota of greenhouse gas emission where the red area is indicating the excess emission of greenhouse gas. Excess emission can be adjusted through carbon trading by purchasing unused limits from operator A.

The concept of carbon emission trading is quite similar to the trading of commodities and securities in the financial market. In carbon trading, a value is assigned to the carbon and permits countries, companies, and people to trade it. If a country or company wants to burn carbon, it has to purchase the right for them. On the other hand, if a country is selling carbon emission limit means giving the right to burn the carbon. The value of carbon is based on the country's ability to preserve it or to prevent its emission into the atmosphere. This is a hard nut to crack for the company in the industrialized nation so they could buy the carbon emission right from the other country, the companies do not emit so much carbon (Bhowmik, 2017).

5.3 Advantages of carbon trading

Following advantages are associated with carbon trading-:

- **To the buyer,**
It is a cost-effective way to meet the emission targets. It helps to achieve the targets of corporate social responsibility.

- **To the seller**

The seller can get the new and advanced technology in exchange for carbon credit. It helps in increasing the profits of sellers by selling unused limits (ICAI, 2009).

5.4 India and carbon Trading

In 2002, India signed and ratified the Kyoto Protocol. Since India is a developing nation and non-annexure country so there are no emission targets for India as mentioned above, but it can ensure its participation in Clean Development Projects. India has emerged as a great player in the carbon market. As per the data of the Federation of India Chamber of Commerce and Industry the number of approved projects in India had 2123, out of these projects 738 projects were registered with UNFCCC (Bhawna Bhardwaj, 2013).

5.4.1 Some highlighted point of carbon Trading and India

- The carbon credit or trading market is one of the fastest-growing markets in India and it is expected that India will gain approximately 22500 to 45000 core through carbon trading.
- It is also can be seen that India is one of the largest beneficiaries of clean development mechanism, It part 31% of the total portion.
- India's market generated around 30% of carbon credit and made it to the second-highest carbon credit generator.
- The Indian carbon trading market is growing faster than the IT, BPO sector, and Biotechnology.
- In India carbon is traded in multi-commodity exchange that is the first exchange in Asia to trade carbon credit.
- Delhi metro corporation reduces 30% electricity by using a regenerative banking system and became the first metro station in the world to earn carbon credit (Bawana Bhardwaj, 2013).

5.5 Some carbon Trading companies in India

Following are some companies that saved and sold the carbon in India:-

Table No. 2 List of companies

S.N.	Company	Detail
1.	Jindal Vijaynagar Steel	\$225 Million worth
2.	Powerguda in Andhra Pradesh	Saved 147 tones carbon dioxide credit
3.	Handi Forest In Madhya Pradesh	Re stored 10000 hectares of degrade forest
4.	Torrent Power AEC	Estimated to received 199.9 crore from energy efficient projects
5.	Indian Aluminum	Estimated to received 42.9 crore from Gas capture Projects
6.	Kalpataru Power Transmission	5.3 crore estimated to received by energy efficient projects.
8.	Grasim Industry	Estimated to received 4.1 crore from energy efficient projects
9.	Balrampur Chini	Estimated to received 15.7 crore from renewable projects.

Source: Ashim Paul 2011 and Legal service .com

5.6 Number of Clean Development projects in India

The following figure is representing the sector wise clean development projects in India:-

Table No. 2 state wise clean development project list

S.N	State	Total Projects	CER Annual	CER upto 2020
1	Andaman & Nicobar	1	100000	200000
2	Andhra Pradesh	10	503652	3047892
3	Arunachal Pradesh	1	100000	200000
4	Assam	1	100000	200000
5	Bihar	1	100000	200000
6	Chattisgarh	2	93837	235498
7	Gujarat	19	893470	3496161
8	Karnataka	9	1037035	4301632
9	Madhya Pradesh	21	1051936	5930242
10	Maharashtra	10	361233	2561629
11	Orissa	2	72231	822752
12	Punjab	2	203160	670748
13	Rajasthan	15	634189	2478484
14	Tamil Nadu	8	1828372	7081703
15	Telangana	3	617645	1858249
16	Uttar Pradesh	2	112655	460094
17	Uttarakhand	1	35971	107913
18	West Bengal	2	161226	934712

Source: Report of National CDM Authority (2021)

5.7 Allocation of clean development projects into different sectors

Following are sectors which benefited from the clean development mechanism in India. Below figure is showing the percentages area where environmental projects established.

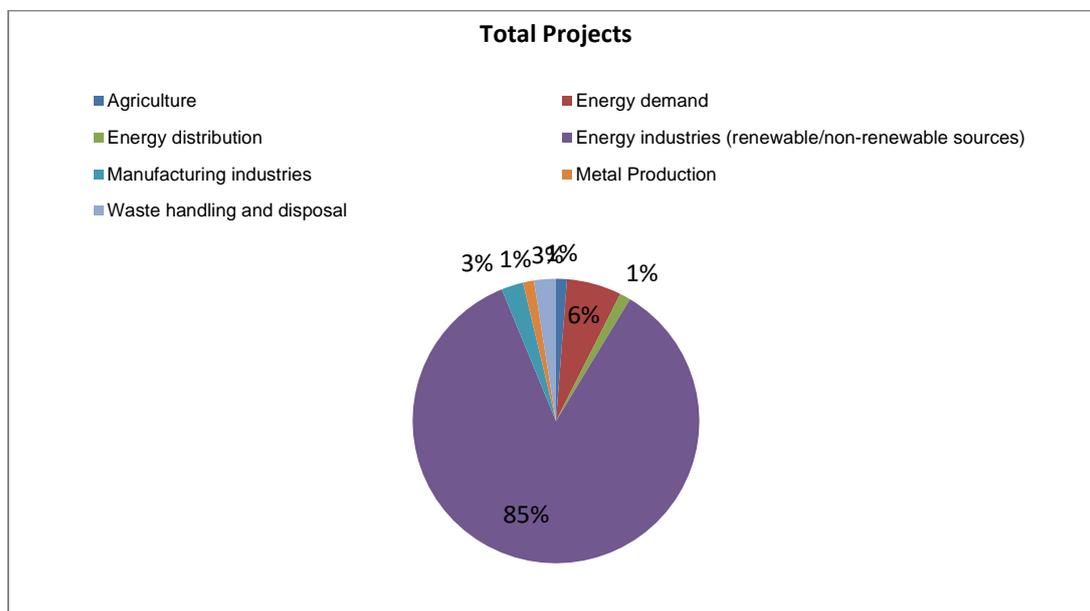


Figure No 2: percentage bifurcation of environmental projects area

Source: Report of National CDM Authority (2021)

5.8 Role of Carbon Trading for Flourishing the Efforts of Indian Government towards Minimization of Climate Mitigation Effects

As mentioned earlier carbon market is one of the fastest-growing markets in the country. Since India is on the path of development rapid industrialization is obvious. The challenging task for India is to maintain this development process without

compromising with the environment. The Indian government introduced so many measures for controlling climate mitigation carbon trading is one of them. Carbon trading can flourish the Indian government efforts towards climate mitigation in the following manners (Wri India.com, 2021):-

5.8.1 Helpful in the accomplishment of current and future environmental ambitions

Since India is a non-annexure country under the Kyoto Protocol. However, it experienced the global carbon market through a clean development mechanism. India can use these experiences for developing a similar structure with the country. Such a carbon market can be proven more effective for utilizing the potential of waste reduction, it can the efficiency of the industry by synthesizing different markets into a single common commodity.

5.8.2 Helpful in achieving the development goal

The co-benefit of carbon trading is that it can proliferate the progress of India on sustainable development goal:-

- **(SDG 3) Good Health and Wellbeing** - by restricting emission and the air quality of the country will get improved as a result of which there would be declining health-related issues can be seen.
- **(SDG 7) Affordable and Clean Energy**- with the introduction of a clean development mechanism the developed country may set up renewable energy projects the meeting the emission targets. Due to these projects India can avail the clean energy at affordable prices.
- **(SDG 9) Innovation and Infrastructure**- being part of CDM the developed country may choose India for establishing the environmental projects that will lead to improving the innovation and infrastructure in the country.
- **(SDG 12) Responsible Consumption and Production**- For availing the carbon credit the Indian industry may try to produce low carbon commodities as a result of which responsible consumption and production spirit may increase(Wri India.com, 2021).

5.8.3 Carbon Trading pushes the emission at the lowest cost

One of the features of the carbon market is to provide the incentive to the operators who reduced the emission beyond the mandate level. This is also a feature of the carbon market where an operator with a high emission reduction cost can supplement with low emission reduction cost. Hence through carbon trading flexibility, the emission reduction cost can be minimum

5.8.4 Carbon Trading can enable low Carbon Industry

Carbon trading gives many signals to companies and investors about the cost of emission. These indications give predictability and clarity for the working area to formulate progressive mitigation measures, develop sustainable products, minimize emission throughout the supply chain and invest in low carbon technology. These technologies can help the Indian industry to shift towards sustainable development (Wri India.com, 2021).

6. Conclusion

It is clear from the above section that without being part of the emission trading system Indian took many advantages from the Clean Development Mechanism, a measure for mitigating the effect of climate change, introduced by the Kyoto protocol. The most benefited sector by this flexibility mechanism is the renewable energy sector in India, where the most benefited state under this mechanism is Madhya Pradesh. In Madhya Pradesh, almost 21 certified emission reduction projects are running. Overall it can be concluded that the emission trading market is one of the fastest-growing markets in India and it plays a significant role in achieving sustainable development goals and enhancing environmental sustainability by reducing the emission of greenhouse gases.

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