

# Carbon credit for sustainable development

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## Abstract

The Greenhouse Gases which include Carbon dioxide, Methane and also other oxides on account of incomplete combustion substantially disturb the balance of the heat in the earth's atmosphere leading to warming of the atmospheric temperature which is called as Global Warming and considered a major threat to life on earth. In today's world situation, it is very much necessary to find out the solution for the global impact of pollution for the survival of life. The rules & regulations which are meant for the control of pollution are seen to be somewhat ineffective. One of the reasons behind the failure of such systems is that there are no attractive proposals in front of industries. The solution requires obviously the attraction in terms of economy. With this, the Kyoto Protocol, 1997, supported by United Nations Framework Convention on Climate Change (UNFCCC) gave a wonder full solution which may prove to be the golden midway between the reduction in pollution & the economy. Sustainable and clean renewable energy systems such as hybrid solar/wind electric generators can be used to eliminate or reduce carbon dioxide emissions by replacing old diesel, oil, gas or coal fired electric generators which emit greenhouse gases that produce global warming. Carbon sequestration credits or offsets are calculated by the amount of carbon emissions that would have been emitted if a diesel or other traditional polluting electric generator was used to produce the same amount of electricity. Companies and electric utilities in countries can buy these emission reduction carbon credits to replace the emissions from their coal burning electric power plants to meet regulatory requirements.

**Keywords:** Green house gases, global warming, Kyoto protocol, carbon credit

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## INTRODUCTION

Our earth is undoubtedly warming. This warming is largely the result of emissions of carbon dioxide and other Greenhouse Gases (GHG's) from human activities including industrial processes, fossil fuel combustion, and changes inland use, such as deforestation etc. Addressing climate change is not a simple task. To protect ourselves, our economy, and our land from the adverse effects of climate change, we must reduce emissions of carbon dioxide and other greenhouse gases. To achieve this goal the concept of Clean Development Mechanism (CDM) has come into vogue as a part of Kyoto Protocol. The objective is the "stabilization of greenhouse gas at a level that would prevent dangerous anthropogenic interference with the climate. Since India generates enormous amount of Municipal Solid Waste, implementation of CDM project for power generation is incredibly viable. Carbon is an element stored in fossil fuels such as coal and oil. When these fuels are burned, carbon dioxide is released and acts as what we term a "greenhouse gas". Similarly, oxides of Carbon and Nitrogen which are released on account of incomplete combustion also are Green-house gases. Methane or Natural gas liberated is also a green house Gas. These Green house gases form a blanket over the earth surface thus trapping and preventing the heat from escaping the earth's surface,

thus resulting in increasing the temperature of the Earth, a process termed as Global Warming. The effects of Global warming are well known to humans, including ill effects on all living species of plants and animals and giving rise to the threat of melting of ice bergs in the Sea, which can raise the sea levels in dangerous proportions resulting in flooding & led to climate change. Considering the global impacts of climate change, the carbon came about in response to the Kyoto Protocol. Signed in Kyoto, Japan, by some 180 countries in December 1997, the Kyoto Protocol calls for around 38 industrialized countries to reduce their greenhouse gas emissions between the years 2008 to 2012 to levels that are 5.2% lower than those of 1990. Carbon is given an economic value, allowing companies, agencies or governments to buy sell, bank and trade Carbon Credits called Certified Emission Reductions or CERs

## THE KYOTO PROTOCOL

Kyoto Protocol is an agreement made under the United Nations Framework Convention on Climate Change (UNFCCC). The treaty was negotiated in Kyoto, Japan in December 1997, opened for signature on March 16, 1998, and closed on March 15, 1999. The agreement came into force on February 16, 2005, under which the industrialised countries will reduce their collective emissions of greenhouse gases by 5.2% compared to the year 1990 (but note that, compared to the emissions levels that would be expected by 2010 without the Protocol, this target represents a 29% cut). The aim is to lower overall emissions of six greenhouse gases - carbon dioxide, methane, nitrous oxide, sulphur hexafluoride, HFCs (Hydrofluoro Carbon), and PFCs - calculated as an average over the five-year period of 2008-12. National targets range from 8% reductions for the

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European Union and some others to 7% for the US, 6% for Japan, 0% for Russia, and permitted increase of 8% for Australia and 10% for Iceland. The Clean Development Mechanism (CDM) is an arrangement under the Kyoto Protocol allowing industrialized countries with a greenhouse gas reduction commitment to invest in emission reducing projects in developing countries as an alternative to what is generally considered more costly emission reductions in their own countries. Under CDM, a developed country can take up a greenhouse gas 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 credits (Carbon Credits) for meeting its emission reduction targets, while the developing country would receive the capital and clean technology to implement the project. Carbon credits are certificates issued to countries that reduce their emission of GHG (greenhouse gases) which causes global warming. Carbon credits are measured in units of certified emission reductions (CERs). Each CER is equivalent to one tonne of carbon dioxide reduction. Its rate stood at 22 Euros in April, fell to below 7 Euros, before stabilizing at 12-13 Euros. Under IET (International Emissions Trading) mechanism, countries can trade in the international carbon credit market. Countries with surplus credits can sell the same to countries with quantified emission limitation and reduction commitments under the Kyoto Protocol. Developed countries that have exceeded the levels can either cut down emissions, or borrow or buy carbon credits from developing countries. The UNFCCC divides countries into two main groups: A total of 41 industrialized countries are currently listed in the Convention's Annex-I, including the relatively wealthy industrialized countries that were members of the Organization for Economic Co-operation and Development (OECD) in 1992, plus countries with economies in transition (EITs), including the Russian Federation, the Baltic States, and several Central and Eastern European States. The OECD members of Annex-I (not the EITs) are also listed in the Convention's Annex-II. There are currently 24 such Annex-II Parties. All other countries not listed in the Convention's Annexes, mostly the developing countries, are known as non-Annex-I countries. They currently number 145. Annex I countries such as United States of America, United Kingdom, Japan, New Zealand, Canada, Australia, Austria, Spain, France, Germany etc. agree to reduce their emissions (particularly carbon dioxide) to target levels below their 1990 emissions levels. If they cannot do so, they must buy emission credits from developing countries or invest in conservation. Countries like United States of America, United Kingdom, Japan, New Zealand, Canada, Australia, Austria, Spain etc are also included in Annex-II. Developing countries (non-Annex I) such as India, Srilanka, Afghanistan, China, Brazil, Iran, Kenya, Kuwait, Malaysia, Pakistan, Phillippines, Saudi Arabia, Singapore, South Africa, UAE etc have no immediate restrictions under the UNFCCC. This serves three purposes:

- a) Avoids restrictions on growth because pollution is strongly linked to industrial growth, and developing economies can potentially grow very fast.
- b) It means that they cannot sell emissions credits to industrialized nations to permit those nations to over-pollute.
- c) They get money and technologies from the developed countries in Annex II.

**Green house gas emission in developed and developing countries”**

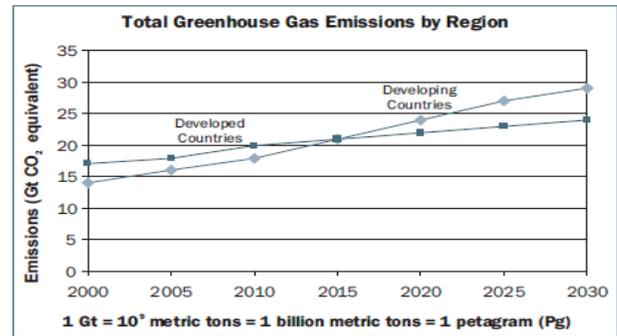


Fig 1

**Global warming potential of different gases**

| Greenhouse Gas      | Global Warming Potential |
|---------------------|--------------------------|
| Carbon-di-oxide     | 1                        |
| Methane             | 21                       |
| Nitrous Oxide       | 310                      |
| Hydroflourocarbons  | 140-11,700               |
| Perflourocarbons    | 7,000-9,200              |
| Sulfur Hexaflouride | 23,900                   |

Fig 2.

**NECESSITY OF CARBON CREDIT**

Carbon credits are reductions of emissions of greenhouse gases caused by a project or a Product utilized by anybody which directly or indirectly reduces or eliminates green house gases. Currently this reduction is measured in terms of Carbon-di-oxide reduced.

1 Carbon Credit = 1 Ton of Carbon Dioxide Reduction

The concept of carbon credits came into existence as a result of increasing awareness of the need for pollution control. Carbon credits are a basic component of national and international emissions trading schemes that have been implemented to prevent or overcome impact of global warming. They provide a way to reduce greenhouse emissions on an industrial scale by reducing total annual emissions and letting the market assign a monetary value to any shortfall through trading. Credits can be exchanged between businesses or bought and sold in international markets at the prevailing market price and can be used to finance carbon reduction schemes between trading partners and around the world. It was formalized in the Kyoto Protocol, an international agreement between 169 countries. Carbon credits are certificates awarded to countries that are successful in reducing emissions of greenhouse gases. Understanding the precarious situation due to Global warming, the carbon trade came about in response to the Kyoto Protocol. Thus the developed countries set themselves a target to reduce the Greenhouse gas emissions by employing measures to reduce the green house gases in their in house production units. However, since it is not possible to scrap the production units, the countries pledged to maintain the balance of the green house gas emissions by encouraging the third world countries to put up measures to reduce the green house gases either by decreasing their emissions or by encouraging measures of reducing the green

house gases such as setting up Projects which encourage the use of alternate energy which reduce carbon emissions including promotion of Pollution reducing Products and Projects involving plantation. So, concept of Carbon Credits is a very effective way to reduce the impact of pollution as the emission reduction is made the object of business

**MECHANISM AND PROCESSES INVOLVED**

Companies in countries buy the emission reduction achieved (carbon credits) that are realized through investment in JI or through CDMs and that otherwise would not have existed. Prices are realized by process of competitive bidding. The Kyoto Protocol provides for three mechanisms that enable developed countries with quantified emission limitation and reduction commitments to acquire greenhouse gas reduction credits. These mechanisms are:

1. Joint Implementation (JI): Under Joint Implementation (JI) a developed country with relatively high costs of domestic greenhouse reduction would set up a project in another developed country.
2. Clean Development Mechanism (CDM): Under the Clean Development Mechanism (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 country would receive the capital investment and clean technology or beneficial change in land use.
3. International Emission Trading (IET): Under International Emissions Trading (IET) countries can trade in the international carbon credit market to cover their shortfall in allowances. Countries with surplus credits can sell them to countries with capped emission commitments under the Kyoto Protocol.

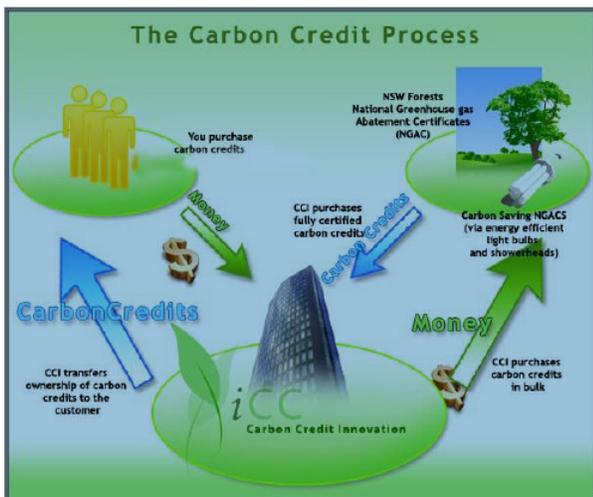


Fig 3

- A developed country with relatively high costs of domestic greenhouse reduction would set up a project in another developed country that has a relatively low cost.

- Under CDM, a developed country can take up a greenhouse gas reduction project activity in a developing country where the cost of greenhouse gas reduction project activities is usually much lower.
- The developed country would be given credits for meeting its emission reduction targets, while the developing country would receive the capital and clean technology to implement the project.
- Under IET, countries can trade in the international carbon credit market. Countries with surplus credits can sell them to countries with quantified emission limitation and reduction commitments under the Kyoto Protocol

**CARBON CAPTURE AND STORAGE (CCS)**

This Technology allows emissions of carbon dioxide to be captured and stored – preventing them from entering the atmosphere. CCS presents one of the most promising options for large-scale reductions in CO2 emissions from energy use. CO2 captured is possible from fossil fuel power plants or from other large CO2 sources, such as the chemical, steel or cement industries, Power Projects or from natural gas production. CO2 can be stored in geological formations such as saline aquifers or expired oil and gas reservoirs or specially developed storages.

**PROCEDURE FOR OBTAINING CREDITS AND CERTIFICATIONS REQUIREMENT**

Before carbon credits can be sold, the important factors to be taken into consideration are:

1. Areas where you emissions can be reduced and be eco-friendly.
2. Identify and plan a suitable CDM project and determine how much the project reduces emissions.
3. Prior to this a baseline is to be defined, which is a scenario in which supporting evidence about what the emission of greenhouse gases would be until 2012 without your investment is provided.
4. Comparing this baseline with the lower emission that will be achieved through the investment in CDM. The difference between them is the amount of saleable carbon credits.
5. In case of JI projects, the reduction achieved between 2008-2012 can only be sold & not what is achieved in previous or after years.

**CERTIFICATIONS**

- A validation or certification organization, acting as an independent third party, validates the baseline you have drawn up.
- This organization must work according to the "Accreditation Guidelines on the Application of EN 45004 (ISO/IEC Guide 17020) for the Validation and Verification of JI projects" or according to the guidelines of the UNFCCC Executive Board Accreditation Panel for CDM projects.
- The host country's government must give approval for the transaction in carbon credits through a Letter of Approval.

- The payback mechanism under the Kyoto Protocol is a system called carbon credits that are traded like stocks and bonds.
- The ones who are selling are companies that use clean technology and those doing the buying are the world's polluters like the Industries, Power Plants, Aviation and the energy sector.
- A company that wants to earn from reducing green house gas emissions can get it certified from the Indian government and the UN body monitoring climate change.
- Then it can sell the credit it earns from reducing emissions to another company that's failed to achieve the Kyoto target or to a company that trades using the generated Carbon Credits.

| Sl. No. | Country        | Total Emissions (Million metric tons of CO <sub>2</sub> ) | Per Capita Emissions (Tons/capita) |
|---------|----------------|---|------------------------------------|
| 1       | China          | 6018  | 4.58                               |
| 2       | United States  | 5903  | 19.78                              |
| 3       | Russia         | 1704  | 12                                 |
| 4       | India          | 1293  | 1.16                               |
| 5       | Japan          | 1247  | 9.78                               |
| 6       | Germany        | 857.6   | 10.4                               |
| 7       | Canada         | 614.3   | 18.81                              |
| 8       | United Kingdom | 585.7   | 9.66                               |
| 9       | South Korea    | 514.5   | 10.53                              |
| 10      | Iran           | 471.5   | 7.25                               |
| 11      | Italy          | 468.2   | 8.05                               |
| 12      | South Africa   | 443.6   | 10.04                              |
| 13      | Mexico         | 435.6   | 4.05                               |
| 14      | Saudi Arabia   | 424.1   | 15.7                               |
| 15      | France         | 417.8   | 6.6                                |
| 16      | Australia      | 417.1   | 20.58                              |
| 17      | Brazil         | 377.2   | 2.01                               |
| 18      | Spain          | 372.6   | 9.22                               |
| 19      | Ukraine        | 328.7   | 7.05                               |
| 20      | Poland         | 303.4   | 7.87                               |

Fig 4

**Sectors in which Carbon Credits can work:**

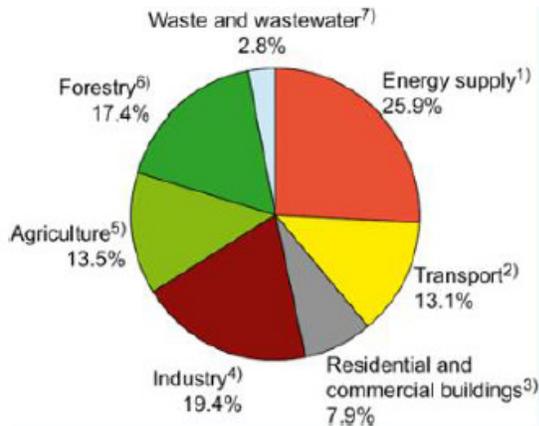


Fig 5.

**CONCLUSION**

Currently though the market value of a single carbon credit is around USD 27, the purchase can actually happen around USD 10 per CER. Now even if the cost of locking away a tonne of carbon is between US\$10 and \$15 a tonne depending on the type of product or technology used, it offers a margin of 5USD per Carbon Credit or CER. Assuming the economies of scale, this becomes an attractive model for Industries, Power plants and Consumers alike to gain additional income or reduce costs in the process of meeting their commitments towards controlling pollution and joining the drive to be Eco-friendly. Many Indian companies and also those in other developing countries must thus soon realize that there's money to be made by becoming eco-friendly. They would rapidly turn to Clean

Technologies and would begin trading their carbon credits with companies in the US and the European Union. Carbon Credit greatly contributes towards the fight against Global warming, improves the return on investments in projects, boosts the economic feasibility of projects, accelerates project implementation and thus provides an additional source of revenue. As several countries are responsible for a large proportion of global emissions (notably USA, Australia, China and India) have avoided mandatory caps and Governments of capped countries may seek to unilaterally weaken their commitments. The grandfathering of allowances is there and establishing a meaningful offset project is complex so is the validation of the effectiveness of some projects. The carbon credit business is a rapidly changing business, and people should be aware that market rates, protocols, and registration programs can change quickly.

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