

Awareness & Preference Towards Carbon Credits – An Initiative To Go For Green

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INTRODUCTION

“What’s the use of a house if you haven’t got a tolerable planet to put it on?” This astonishing statement of Henry David Thoreau has become a grass root reality of the earth. Now, man has the power to send rockets to Mars; Man created the wheel and rotated the whole world on it, Man has discovered life on moon but he only failed to understand a simple fact that, *“The frog does not drink up the pond in which he lives”*. Man’s strong greed has created a threat for the environment, which has transformed the feeling, “Pride of mother earth to crime on mother earth” and has forcefully shortened the aim of human beings from “Betterment of life to just Survival of life”.

OBJECTIVES OF THE RESEARCH

The research was mainly aimed at measuring the level of awareness and preference towards carbon credits with special focus on companies operating in Gujarat. The main objectives were:

- To assess the level of awareness about climate change, factors responsible and awareness about the concept of carbon credit and related aspects.
- To know the views of interviewees about the implementation of projects generating carbon credits.
- To study the benefits and implications of carbon credits.
- Designing strategies to harness carbon credits.

SCOPE OF THE RESEARCH

The area of the research was confined to Gujarat State only. The industries involved in increasing carbon emissions like power generation and distribution, steel, cement, textile and petrochemicals were undertaken to study the level of awareness and preference towards carbon credits.

SAMPLING PLAN

Target Population: All the industrial units emitting CFC and/or any one or more of the six green house gases identified under the Kyoto Protocol & all the consultants of carbon credit.

Sampling Unit: Power generation and distribution; steel; cement; textile and petrochemicals and advisors and consultants of Gujarat.

Sampling Technique: Non-probability judgmental sampling & snowball sampling. Some of the sample elements had been selected on the basis of conscious judgment. Other sampling elements were selected based on the referrals of the interviewee.

Sample Size: Sample size was limited to 10. The study consisted of interviewing consultants as well as company executives. 3 consultants had been sampled for the research exercise, while 7 company personnel were interviewed.

DATA COLLECTION

The data collection process consisted of structured personal interviews with consultants and executives from selected sectors. The sample elements were identified on the basis of judgment and the data has been collected by administering a structured questionnaire. For respondents who could not be reached personally, data has been collected through e-mail.

FROM AWARENESS TO AGREEMENTS

It was up to the scientists to draw international attention to the threats posed by global warming. Evidence in the 1960s and '70s, that concentrations of carbon dioxide in the atmosphere was increasing, led climatologists and others to press for action.

In 1988, an **Intergovernmental Panel on Climate Change (IPCC)** was created by the World Meteorological Organization and the United Nations Environment Program (UNEP). This group issued a first assessment report in 1990 which reflected the views of 400 scientists. The report stated that global warming was real and urged that something must be done about it.

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The Panel's findings spurred governments to create the **United Nations Framework Convention on Climate Change (UNFCCC)**.

IPCC reports are frequently used as the basis for decisions made under the Convention, and they played a major role in the negotiations leading to the Kyoto Protocol, a second, more far-reaching international treaty on climate change that entered into force on February 16, 2005.

The Kyoto Protocol is more powerful and legally binding agreement and it measures emission reduction targets for industrialized countries.

INTRODUCTION TO THE CONCEPT OF “CARBON CREDIT”

A 'carbon credit' or Exchange Soil Offset (XSO) is a market term. A carbon credit is a type of new currency. One carbon credit is equal to one tonne of CO₂ and is normally quantified in terms of carbon dioxide equivalent (CO₂e). When entities that emit carbon dioxide into the air need to reduce those emissions, they may buy a carbon credit from someone who is engaging in a practice that removes carbon from the atmosphere on a long-term basis. In other words, a carbon credit gives the owner the right to emit one tonne of carbon dioxide.

The Kyoto Protocol is designed to not only undo the climatic ill-effects of industrialization, but also to identify the economic beneficiaries of the same and make them more accountable in damage control. Carbon credits basically seek to encourage countries to reduce their greenhouse gas (GHG) emissions, as it rewards those countries that meet their targets and provides financial incentives to others to do so as quickly as possible.

India, being a developing country, is exempted from the requirement of adherence to the Kyoto Protocol. However, it can sell carbon credits to developed countries. Some of the Indian companies that have benefited from the carbon credit trading are: Torrent Power AEC, Gujarat Fluoro Chemicals, Kalpataru Power Transmission.*

BUYERS OF CARBON CREDITS

Japanese and Europeans entities are the biggest buyers of carbon credits.

SELLERS OF CARBON CREDITS

Asia is the largest supplier of carbon credits, followed by Latin America, and Eastern Europe. Five countries (India, Chile, Brazil, Indonesia and Romania) represent two-third of the supply in terms of volume of carbon credits.

*http://unfccc.int/essential_background/items/2877.php

ANALYSIS

AWARENESS TOWARDS CLIMATE CHANGE AND FACTORS RESPONSIBLE FOR THE SAME

High	9
Low	1

Awareness of climate change and its adverse effects on the earth are very well known but there is a lack of

GHGs	4
Pollution	3
Global warming	2
Depletion of ozone	2
Industrialization	2
Burning of fossil fuel	2
Others	5

consensus regarding the factors responsible for climate change. No single factor has been identified as most detrimental to climate. Greenhouse-gases (GHGs) and pollution are the two most commonly cited reasons. Thus, it can be interpreted that the interviewees believe in climate change because they are aware of the unusual climatic events occurring around the world and the same can be generalized for all. But an in-depth understanding is still required to be imparted to gain preference towards environmental concerned activities.

AWARENESS ABOUT GASES RESPONSIBLE FOR GREEN HOUSE EFFECT

CO ₂	8
CH ₄	6
N ₂ O	6
SO ₂	4

*http://unfccc.int/essential_background/items/2877.php

CFC	3
HFC	4
PFC	4
SF6	2
Others	2

There was a consensus regarding CO₂ as a gas responsible for Green House Effect. The surprising results were that the level of awareness about fluoro-carbon compounds (CFC, HFC, PFC) is significantly lower among company executives. Some unexpected reasons like water vapor and carbon monoxide were also cited by interviewees. Thus, it can be concluded that people are not adequately aware about the substances and gases that cause global warming.

AWARENESS ABOUT CARBON EMITTING SECTORS

Power	9
Renewable energy	3
Manufacturing	4
Mining	3
Steel	5
Waste Management	5
Fertilisers	2
Exploration	2
Transport	3

Power generation is widely recognized as a sector where there is potential to generate carbon credits. The level of awareness about sectors like transport is comparatively lower among company executives and at the same time, awareness level regarding renewable energy generation is lower than what one might expect. It can be clearly interpreted that as carbon emission is not restricted and made mandatory, some of the sectors (even though emit a large amount of GHGs) are able to escape smoothly.

AWARENESS ABOUT TECHNIQUES TO REDUCE EMISSIONS

Use of clean fuel	8
Energy efficiency	8
Renewable energy	6
Using waste heat	4
Fly-ash management	2
Co-generation	2
Others	7

Use of cleaner fuel and adoption of energy efficiency measures are the most commonly cited technologies. The consultants have cited some innovative technologies like advanced super critical power generation, reduction of HFC, and carbon capture & storage (CCS). People are aware about using cleaner fuel and its advantages. Also, it is well recognized and believed that adopting measures to increase energy efficiency will lead to lower requirements of fuel and ultimately lower emissions.

OPINION OF EXPERTS

Experts' opinion comprises of consultants and company personnel. Total 3 consultants and 7 companies were selected for the research purpose. Those companies who have implemented carbon emission projects or are under the process of implementation remained the base of the selection. The paper represents selected concrete opinions on selected themes instead of covering all in detail.

CONSULTANTS

OPINIONS ON THE CONCEPT OF CARBON CREDIT

ABPS Infrastructure Advisory Ltd.	Carbon credits provide a way to reduce greenhouse effect emissions on an industrial scale by capping total annual emissions and letting the market assign a monetary value to any shortfall through trading. Credits can be
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	exchanged between businesses or bought and sold in international markets at the prevailing market price.
Synergy Global Pvt. Ltd.	The system is simple. Companies that are involved in any activity which helps reduce the carbon content of air, such as industries manufacturing energy-saving devices or setting up waste-processing systems, are given 'credits'. These can be used by other companies which emit carbon beyond a certain extent to avoid being penalized for the damage they cause to the atmosphere.
DNV (GHG verification and validation)	Carbon credits are the tools used to encourage people to participate in emission reduction projects. Carbon credits are used by entities that have targets to meet regarding their allowable allowances. Instead of indulging in emission reduction projects, such entities can use the credits to meet their targets, thus it creates a market where those who produce it will earn depending upon the supply-demand dynamics of normal market scenario.

OPINIONS ON REFUSAL BY US TO BE A SIGNATORY MEMBER OF KYOTO PROTOCOL

ABPS Infrastructure Advisory Ltd.	The US govt. has concerns regarding the economic effect of these measures. Already the US economy is in recession and any measure in this direction may force the US industry to spend more on technology and reduce emissions. The US also wants countries like China and India to reduce their emissions. As of now, both China and India do not have any emission reducing targets which makes the US all the more uncomfortable.
Synergy Global Pvt. Ltd.	The United States, although a signatory to the Kyoto Protocol, has neither ratified nor withdrawn from the Protocol. The signature alone is symbolic, as the Kyoto Protocol is non-binding on the United States unless ratified. The US doesn't want to indulge in binding targets and timetables as it "would result in serious harm to the economy of the United States". This is general perception in the US senate. As far as Australia is concerned, they have ratified the treaty recently during the Bali Summit.
DNV	As per CDM, the Annex 1 nations can transfer the technology to non-Annex 1 nations for projects that reduce emissions, and in that case, the technology will be replicable and reproducible, which will, in the long term, reduce the revenue and technological know-how for these countries. This exchange may work as the main reason to oppose.

RATIONAL BEHIND MANAGEMENT'S DECISION TO IMPLEMENT EMISSION REDUCTION PROJECTS

Reliance Energy Ltd.	Our management has a future-oriented perspective in the sense that it is serious about the post-Kyoto scenario. Once the Kyoto Protocol is over, that is after 2012, there are chances that India might be subjected to the cap-and-trade system, wherein we would be expected to meet our emission targets. The company might have to buy credits to meet its targets; in which case, our own credits might come handy.
IPCL	We are in an industry which is considered as one of the major polluting industry. Our management is aware of this fact and, due to its long term view, is keenly interested in hedging against the future, particularly in the context of post-Kyoto scenario. That is why we started working towards generating carbon credit way back in 2004.

NTPC	The power industry is well known as the most polluting sector where emissions need to be reduced drastically. The European countries have stopped generating power from thermal power plants because of high levels of harmful emissions. Being a part of this industry, there was always a lot of potential to reduce emissions by certain technological improvements. It will also help us to improve our image as a responsible company which is concerned about the environment
SUZLON	Basically, we are in the wind-energy business which is an alternative source of energy. We help companies like SAIL to generate energy from clean fuel which ultimately helps them to generate CERs. The projects established by us are also entitled to carbon credits, like our project in TN. As far as we are concerned, we had not done this yet. But we are in the process to implement it.
Essar Steel	Our management views emission reduction projects as a means to carry out social responsibility. But the cost to be incurred in such projects, though it is a one time expense, is high enough. But one cannot ignore the cash flow that is generated by the sale of carbon credits.
Ambuja Cement	Our organization emphasizes on corporate social responsibility, partly due to our foreign stakeholders who consider CSR as a way of paying back the society for the resources used. For us, the emission reduction project is a means to ensure cleaner environment and thereby benefiting the society at large and ultimately keeping satisfied our foreign stakeholders.
Arvind Mills Ltd.	The management believes that by reducing emissions, the company can avail twin benefits of environment-friendly image and additional income. Moreover, with increasing awareness on this subject, the management has developed a long term view where they forecast emission reduction targets for Indian companies.

OPINIONS ON CARBON TRADING APPROVAL ON MCX

Ambuja	The MCX as an exchange is only for Indians and Indian companies. The MCX allows futures trading of carbon credits with the contract expiring in the month of December every year. The facility of trading on an Indian exchange has come as a boon for many power, energy and metal companies, which previously had to depend on their consultants for sale of generated credits.
Essar Steel Ltd.& NTPC	Carbon trading has started on the MCX. The exchange offers futures trading. This initiative is beneficial to small and medium enterprises generating credits because they can get the best price for their credits.
IPCL	On MCX, it is not carbon trading but trading of CFI that has started. In India, on the MCX, one can buy futures of CFI but it is not available in the spot market. The price on the MCX is same as the price on the European exchange and this is positive for Indian companies.
Suzlon Energy Ltd.	Carbon trading seems to be a multi billion dollar business. The move from MCX is an encouraging and welcoming step.
Hindustan Gum and Chemicals Ltd.	MCX became the first exchange where carbon credits can be sold & purchased. It is a good step because earlier, we could sell our credits only on foreign exchanges and for that, we had to rely on third party brokers. So this step will greatly benefit the industry.

CORPORATE LOOKOUT TOWARDS BENEFITS OF CARBON CREDIT GENERATION

Reliance Energy Ltd.	Carbon credits are viewed as a means to undertake corporate social responsibility along with a steady future inflow.
Hindustan Gum and Chemical Ltd.	Though the corporates view carbon credits as a means of ensuring clean environment, they consider that the tax treatment of proceeds from the sale of credits is unfair. The sale proceeds are treated as revenue earnings instead of export earnings.
Essar Steel Ltd.& NTPC	Corporates view carbon credits as “image enhancers” for the sole reason that they help carry out CSR. They consider carbon credits as meaningful only if the net present value of the cash inflows expected to be generated is significantly higher than the cost of implementation.
IPCL	Carbon credit is a good concept. It helps in transfer of technology from developing countries to developed countries; generates cash flows and most importantly, helps to meet emission reduction targets which are set by Kyoto Protocol. The significance of carbon credit is a win-win situation for one and all in the business world and reducing pollution for preserving biodiversity on planet earth in general.
Reliance Energy Ltd.	Carbon credits are viewed as a means to undertake corporate social responsibility along with a steady future inflow.
Hindustan Gum and Chemical Ltd.	Though the corporates view carbon credits as a means of ensuring clean environment, they consider that the tax treatment of proceeds from the sale of credits is unfair. The sale proceeds are treated as revenue earnings instead of export earnings.

OPINIONS ON FOLLOWING THEMES

Joint Implementation	Under JI, any country can invest in emission reduction projects in any other country as an alternative to reducing emissions domestically. In this way, countries can lower the costs of complying with their Kyoto targets by investing in greenhouse gas reductions in a country where reductions are cheaper, and then applying the credit for those reductions towards their commitment goal.
Clean development mechanism	It's a noble concept that helps developing countries to voluntarily participate in mitigation of climate change by reducing GHG emission. In addition, it helps them in achieving sustainable development for the country and the local area of the project. Indeed, this is the best idea anyone can have to encourage developing nations to participate in reducing emissions. However, whether sustainable development is occurring in reality or not, is questionable. There is no check as to whether the project is really encouraging development. Practical experience says that it only helps rich people to become richer and the poor poorer.
Roles banks can play towards environmental concern	Banks have a strategic role to play in addressing environmental issues, both in terms of the risks they pose and the new opportunities they create. Banks propose to provide a single point of delivery of services related to Carbon Credits / Clean Development Mechanism (CDM), under the Kyoto Protocol to its customers. These include, apart from finance to implement CDM projects, advisory services and value added products like securitization of carbon credit receivables, carbon credit delivery guarantees and escrow mechanism for carbon credits.

HYPOTHESIS

Null Hypothesis: Ho	Expected benefit to reduce carbon emission and target set for carbon emission by the corporates are independent.
Alternative Hypothesis: H₁	Expected benefit to reduce carbon emission and target set for carbon emission by the corporates are dependent.
Level of Significance	0.05
Degree of Freedom	2(R=3, C=2)
Chi-square calculated χ^2	46.3996
Chi-square tabulated	5.991

The sample Chi-square value calculated falls out of acceptance region. So, null hypothesis gets rejected. By this way, we can say that the objective behind generating carbon emission and target set for carbon emission by the corporates are dependent. Those corporates who are considering carbon credits as a good source of cash inflow have set up a high target and have shown strong preference towards generation of carbon credits in the near future. They have even appreciated trading of carbon credits on MCX. But some of the corporates believe that it would become mandatory in future. That is why they set moderate targets to meet the regulations. And some of the corporates believe that it is only corporate social responsibility and because of this, they are not interested in generating additional credits for trading. They are even not positive about trading permitted on MCX. Thus, it can be concluded that only few companies are taking into consideration all three major benefits of carbon emission namely cash inflow, anticipated regulatory compulsion and ultimately, corporate social responsibility. Further, based on the proved facts, it can be understood that lack of awareness of benefits is responsible for moderate level of targets set up by the corporates, even though permissible limit is higher than the set standard.

STRATEGIES TO HARNESS CARBON CREDITS

AFFORESTATION

Afforestation is the process of establishing a forest on land that is not a forest, or has not been a forest for a long time by planting trees or their seeds. The term may also be applied to the legal conversion of land into the status of royal forest. Since the industrial revolution, many countries have experienced centuries of deforestation, and governments and non-governmental organizations (NGOs) have directly engaged themselves in programs of afforestation to provide the benefits of a forest. The primary benefit of a forest cover, in context of carbon credit generation, is increased absorption of atmospheric CO₂ by a large number of trees, which ultimately lowers the threat of global warming.**

REFORESTATION

Reforestation is the restocking of existing forests and woodlands which have been depleted, with native tree stock. The term reforestation can also refer to afforestation, the process of restoring and recreating areas of woodlands or forest that once existed but were deforested or otherwise removed or destroyed at some point in the past. The resulting forest can provide both ecosystem and resource benefits and has the potential to become a major carbon sink.***

PERMANENT SEQUESTRATION

Carbon capture and storage (CCS) is an approach to mitigate global warming by capturing carbon dioxide from large point sources such as fossil fuel power plants and storing it instead of releasing it into the atmosphere. CCS applied to a modern conventional power plant could reduce CO₂ emissions to the atmosphere by approximately 80-90% compared to a plant without CCS. Capturing and compressing CO₂ requires much energy and would increase the fuel needs of a plant with CCS by about 11-40%. These and other system costs are estimated to increase the cost of energy from a new power plant with CCS by 21-91%.

INDUSTRY SPECIFIC STRATEGY

STRATEGIES FOR EMISSION REDUCTION IN POWER INDUSTRY

- Reduction in fuel requirement through more efficient combustion and adoption of state-of-the-art technologies such as super critical boilers.

- Use of best available equipments, devices and systems such as high efficiency Electrostatic Precipitators (ESPs) and tall stacks for control of stack emissions, dust extraction and dust suppression systems for control of fugitive dust, effluent treatment plants, neutralization pits and ash ponds for control of the effluent quality, ash water re-circulation system and cooling towers for control of the effluent quality as well as conservation of water.
- Environmental equipment upgradation & retrofitting of existing pollution control facilities.
- Installation of top recovery turbine.
- Waste heat recovery projects including power generation.
- Use of surplus gases of steam power generation.

STRATEGIES FOR EMISSION REDUCTION IN CEMENT INDUSTRY

- Reducing GHG emissions arising from calcinations of limestone, burning of fossil fuels and consumption of electrical energy.
- Hazardous waste co-processing in cement kiln.

STRATEGIES FOR EMISSION REDUCTION IN STEEL INDUSTRY

- Use of renewable energy at remote mines.
- Increased use of continuous casting facility.
- Installation of direct reduction process.
- Sensible heat recovery from sinter cooler.
- Replacing energy intensive motors with efficient motors.
- Waste heat recovery projects including power generation.
- Efficient re-heating furnace and soaking pits in rolling mills.
- Switch over from coal fired to gas fired boilers.

GENERAL RECOMMENDATIONS

- Measures like energy audit for every organization - from production plant to office space should be made compulsory once in a year.
- Regulatory agencies should implement programs to create awareness regarding the harmful effects of CFCs and HFCs as they are more lethal compared to carbon dioxide.
- Sectors like transport, waste management and renewable energy also generate GHG gases and this fact needs to be highlighted by the regulatory agencies.
- There is a need to increase awareness regarding innovative technologies, like CCS and co-generation among the industry persons. Such technologies can lead to significant reduction in emissions.
- Government needs to address the tax treatment of proceeds from sale of carbon credits as it is found unfair by treating it as revenue earnings instead export earnings. Such dissatisfaction might affect the decision of certain players to implement emission reduction projects.
- Govt. of India has done the right thing by allowing MCX to start trading of carbon credits. But trading is limited to the futures only which get expired in the month of December every year. Thus, if a company wants to sell carbon credits in the spot market, then it will have to rely on European exchange only. This limitation should be removed.
- Current developments are very important and corporates should keep an eye on them. If the project proposal of any company gets rejected by UNFCCC, then others must take note of it because implementation of emission reduction projects requires considerable amount of investment.

ABBREVIATIONS

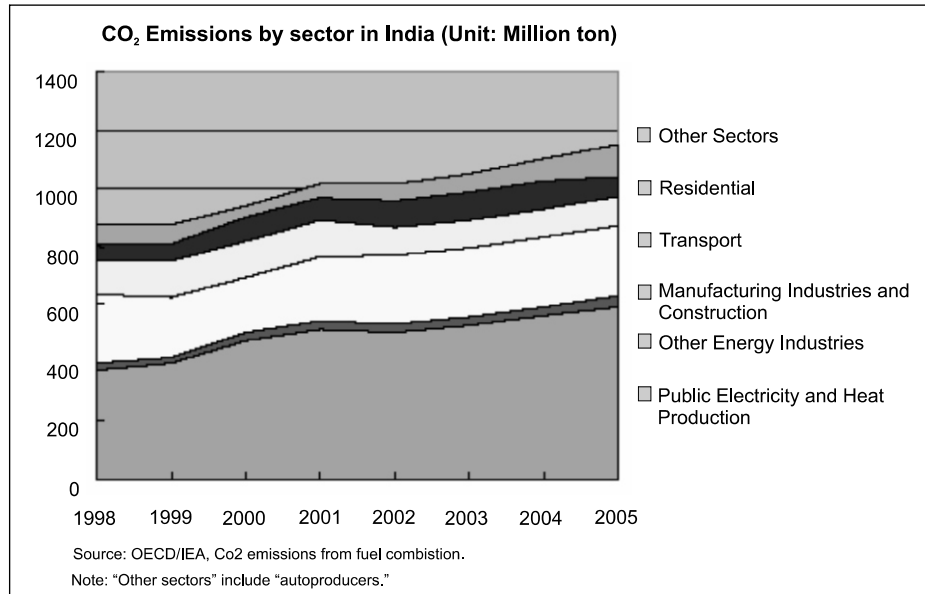
CCS-Carbon capture and storage
 CDM-Clean Development Mechanism
 CFC-Chlorofluorocarbon
 CFI-Carbon Financial Instrument
 CSR-Corporate social responsibility

** <http://en.wikipedia.org/wiki/Afforestation>

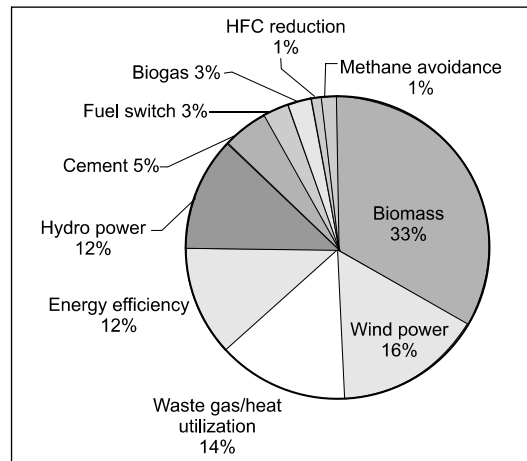
*** www.forestcaseindia.org/updates2008/Issue%2047%20Aug%202008.pdf -

GHG-Green House Gases
HFC-Hydrofluorocarbon
IPCC-Intergovernmental Panel on Climate Change
MCX-Multi Commodity Exchange
UNFCCC-United Nations Framework Convention
XSO-Exchange Soil Offset

ANNEXURE



Type of CDM Projects registered in India(As of 5th November ,2008)



Source: IGES CDM Project Database <<http://www.iges.or.jp/cdm/report.html#db>>

Source: IGES CDM Project Database <<http://www.iges.or.jp/cdmreport.html#db>>

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