



# CARBON CREDIT MARKET IN INDIA

<sup>1</sup>Er. Samir Patel, <sup>2</sup>Ar. Meera Chatwani, <sup>3</sup>Ar. Mayank Patel

<sup>1</sup>Student of Master's in Urban & Regional Planning, <sup>2</sup>Professor & Dean, <sup>3</sup>Assistant Professor

<sup>1</sup> Institute of Architecture,

<sup>1</sup> Hemchandracharya North Gujarat University, Patan, Gujarat, India

**Abstract:** Global warming is currently the largest danger to our world. Carbon Credit is one of the measures that the global economy has adopted to slow global warming. On February 16, 2005, eight years after the world's nations met in Kyoto, Japan, to discuss global warming, six greenhouse gases had been covered. Accordingly, a literature review was conducted on the carbon credit market overview and market growth prospects. The study looks at baselines, risk levels, and technology that companies have implemented in relation to the various Clean Development Mechanism (CDM) projects that Gujarati energy sector businesses have registered. In order to operate the carbon credit project, it has also looked at the challenges faced by a few chosen organisations and the effects of CDM initiatives.

Global warming is the largest issue in the 21st century's grave dilemma of global climate change. Since the Industrial Revolution, anthropogenic activities have significantly increased the atmospheric concentration of greenhouse gases (GHGs). In many nations, the agriculture industry is a substantial contributor of greenhouse gas emissions.

The study's findings demonstrate that solar and wind technologies dominate the energy sector companies' usage of technology for CDM projects in Gujarat. Among all the factors, the CDM projects' viability and need to be environmentally beneficial play a significant influence. Energy companies' CDM projects were significantly impacted by the state of the global market and the expense of project monitoring. Data research also found that due of the volatility in carbon pricing; firms that had engaged in carbon trading tend to favour forward contracts. Regarding organisation and project profile, the large-scale CDM projects are identical, with the exception of the project's budget, administration, operation, and duration.

**Index Terms – Introduction, Literature review, Conclusion.**

## I. INTRODUCTION

The result of modern civilization is rapid industrialization. Unquestionably, industrialization is vital for a nation's socioeconomic progress, but it shouldn't be done at the expense of the environment. Fortunately, the profit-seekers have finally realised the true nature of the environment in which they operate, engage in competition, and maintain their existence. Therefore, in order to prevent extinction, it is their responsibility to rescue the earth and keep industrialization at its highest possible level. It is undeniable that industrialization benefits society as a whole, but it is also true that its recent rapidity in pursuit of faster growth and unstoppable profit has frequently resulted in environmental risks and has contributed to global warming, posing a severe threat to the environment. Therefore, effective action is now required to curb industrialization's negative effects, and the Kyoto Protocol (KP) is arguably the best course of action in this regard.

It was first enacted on February 16, 2005, after being first adopted on December 11, 1997, in Kyoto, Japan. Essentially, it is an addendum to the UN Framework Convention. (UNFCCC) on Climate Change to curb global warming. It is a global agreement to limit the emissions of greenhouse gases (GHGs) by the participating nations. GHGs are the main factors that result in global warming and massive changes in climatic situations, sea-water levels, bio-diversity etc. The Indian Ministry of New and Renewable Energy (MNRE) estimates that India produces 500 million tones of crop residue annually, of which 92 million tones are burned on average. According to National Policy for Management of Crop Residues (NPMCR), state of Uttar Pradesh, followed by Punjab and Haryana are the top three states ranked in India for generating emission from crop residue burning.

According to National Policy for Management of Crop Residues (NPMCR), state of Uttar Pradesh, followed by Punjab and Haryana are the top three states ranked in India for generating emission from crop residue burning. It is estimated that, particulate matter emitted from stubble burning in Delhi and adjacent areas is 17 times greater than that from all other anthropogenic sources like industry emission, vehicle emissions, garbage burning etc. Researchers in the US and India have found that the effects of burning agricultural biomass in the north-western region of India can vigorously spread to as far as the central and southern states, including Maharashtra, Madhya Pradesh, Telangana, Chhattisgarh, and even portions of Odisha. Burning crop residue produces around 66 percent of all GHG emissions (CO<sub>2</sub>).

These carbon credits can be bought or sold at international markets at a certain market price, dependable upon several factors. In order to promote more environmentally friendly and sustainable activities in terms of global GHG emission, this led to the development of the international carbon market, where parties trade carbon emissions. As a signatory to the Kyoto Protocol, India is accountable for its proportionate share of the reduction of world GHG emissions. Crop residue burning is a significant source of GHG emissions in the Indian agriculture sector and results in a significant loss of carbon credits for India in the international carbon market. In other words, India can earn a lot of international exchange through carbon trading if stubble burning can be stopped.

### 1.1 Types of Carbon Credit

- There are two types of credits:
  1. Voluntary emissions reduction (VER):
    - A carbon offset that is traded for credits on the secondary market or in the volunteer sector.
  2. Certified emissions reduction (CER):
    - Emission units (or credits) generated by a legal framework with the intention of offsetting an undertaking's emissions. The primary distinction between the two is that, in contrast to the VER, the CER is governed by an outside certifying authority.

### 1.2 Carbon Pricing

Human-caused increases in the atmospheric concentration of GHGs lead to climate change, which has long-lasting negative effects on society, economics, and the environment. The basic premise behind carbon pricing is that well-designed carbon-pricing policies can be used effectively to “internalize” the external cost of damage caused by climate change, in part or in full, thereby providing such an incentive.

The primary factor causing climate change is the unregulated flow of industrial pollution (and households). These emissions have a negative externality on the environment and the economy because the market price of goods and services with a high carbon footprint does not reflect the entire societal cost of such products.

It appears logical to implement a price that reflects the actual cost of these emissions to remedy this market inefficiency. Indeed, this proposition has received widespread support from multilateral organizations (IMF and World Bank), industry stalwarts (Larry Fink and Anand Mahindra), and religious leaders (Pope Francis). In order to accomplish the global climate targets in the most affordable way while fostering growth, each country must set a high carbon price with the goal of attaining US\$ 40-80 per tonne of CO<sub>2</sub> by 2020 and US\$ 50-100 per tonne by 2030.

Sweden, which presently has the highest carbon price in the world at US\$139, is a notable example. A carbon credit can be valued in a variety of ways, including by considering market dynamics, the project's worth, or the cost of implementation. The kind, size, location, and other influencing elements of a project can also affect pricing.

## II. LITERATURE REVIEW FINDINGS

Carbon trading and taxes are discussed by Kumar K.S.K. in his paper from 2016. He explains that while carbon taxes and carbon trading are both market-based devices, they can be differentiated based on factors including environmental effectiveness, simplicity, political acceptability, fiscal revenue, and volatility. He also describes the defined procedure for the carbon trading which includes several steps such as Setting a Clear Goal – Capping Emissions, Assigning Responsibility – Allocating Allowances, Facilitating Cost-Effective Emission Reductions – Trading, Ensuring Accountability – Monitoring and Reporting and Ensuring Compliance – Reconciliation. Finally, the main focus of his research is cost effectiveness of carbon trading.

In his article from 2016, Fowler R. (2016) discusses the opportunities and difficulties of trading carbon credits in the agricultural sector. His research focuses mostly on farmers who are involved in the trade of carbon credits and are connected to the agricultural sector. The Clean Development Mechanism (CDM) initiatives, according to him, are the most effective at reducing carbon emissions. The biggest issue that a crop producer must deal with is the expense of measuring and verifying the change in carbon emissions. This concept is suited for the larger scale commercial farmers, especially when a group of neighboring farms is involved, can be reasonably and cost-effective, but for the small-scale farmers, it is very difficult. Finally, he wanted to emphasise that small-scale farmers have a lot of chances in the trading of carbon credits, and that they may seize these opportunities if they are motivated to do so.

In their 2015 work, Malav M. K., Kumar S., Malav L. C., and Kharia S. discuss the financial advantages of selling carbon credits. They concentrated on India's contribution to global carbon credit trading in their piece.. Now, India qualifies to be a host country for the Clean Development Mechanism (CDM) projects and India is also considered as one of the most potential countries in the world for carbon credits trading through CDM projects. This can be possible only due to because in India, there are lots of opportunities in power sector and several proactive policies of the Indian government towards CDM. In this article, they also focus on the mechanism of carbon credit trading. Although buying and selling carbon credits can be quite profitable for both countries involved, the environment ultimately bears the brunt of the costs because the GHG emitting nations are the ones who pollute the ecosystem and cause it to deteriorate. So, in that we have to be maintained a balance. This can only be done through sustainable development programs via renewable or zero carbon emission fuel.

In his paper from 2015, Moukwa M. discusses how Carbon Credits Trading is using market forces to fight climate change. According to his estimation, fossil fuels still produce about 82 percent of the world's total energy. So, even if there is still a long way to go until mankind is weaned off of carbon, carbon trading is a positive step. He holds that the Earth's climate and temperature patterns, often known as global climate change, pose the greatest environmental concerns to our world today. Although the majority of the atmospheric carbon dioxide (CO<sub>2</sub>) accumulation has resulted from the combustion of fossil fuels, effective solutions call for more than merely developing greener energy sources. Equally important is the establishment of institutions and strategies, particularly markets, business regulations and government policies, which provide economies with incentives to apply innovative technologies and practices that reduce emissions of CO<sub>2</sub> and other greenhouse gases.

### 2.1 Legal Aspects of Carbon Emissions:

H. Lawewnce L. (2009) focused on legal frame of carbon emissions in the international market. The rules in General Agreement on Tariffs and Trade and the World Trade Organization Agreement provide the underpinnings to the Global Trading System. Without those rules, the energy goods and services would be a risk. The numerous suggestions will have a significant impact on international energy trading. Each nation must comply with its legal obligations in order to answer that question.

Carbon Taxes and related national GHG- emission control schemes applying to the products which have been covered under GATT and WTO rules and disciplines. Notwithstanding international treaties such as the UNFCCC and the Koto protocol, WTO member states still have to justify carbon-reduction measures applied at the border.

Galle et al. (2011) discussed about Carbon tax. To see the central problem of the rebate scheme, the author considered: Would you rather be poor for eleven months and rich for one or middle-class the whole year round? From the way they behave, it looks like most people would prefer the latter-a "smooth" income is better than an income with the same total value but more peaks and valleys. That is because the pain of the lows is, typically, worse than the satisfaction of the pinnacles. Thus, we save up for rainy days, or insure against them, transferring money from ourselves when we are wealthy to ourselves when we are poor. Here evidence that, at a minimum, human cognition and credit markets will play large roles in the ultimate fairness of any carbon tax. There are several solutions that could mitigate these distributional impacts while allowing climate change prevention to move forward. The consumers have focused here on carbon pricing as the most politically salient example of the importance of timing in the delivery of government benefits, but it may not be the most significant in terms of overall welfare.

## 2.2 Legal and Policy Framework:

By setting up a National CDM Authority, India has a vital role in supporting and enabling the growth of CDM projects. India's Clean Development Mechanism (CDM) initiatives must be enforced. India gave the Kyoto Protocol its seal of approval. Based on the National Action Plan on Climate Change, India's climate change policy framework (NAPCC). NAPCC consists of eight public missions focused on enhancing efficiency of vitality productivity, solar technology, and feasible ecosystems. There are currently 1,527 billion CERs from 2574 CDM projects, and 7,814 CDM projects have been registered internationally. The world's emissions will be reduced by around 3,8 billion tonnes by the end of 2020, with India coming in second behind Brazil in the race to establish CDM projects with China. About 20% of CDM project activities are carried out in India, compared to 50% in China, and 13% of CERs are produced in India, as opposed to 60% in China. Compared to China, which creates large-scale CDM projects, India produces fewer CERs on a small-scale. Here are some of the regulations:

### (i) The National Environmental Policy, 2006 (NEP)

The National Environment Policy attempts to steer regulatory reform, initiatives, and projects for environmental preservation and conservation, as well as audit and enactment order. The strategy also seeks to promote partnerships between many stakeholders, including public institutions, local communities, academic and scientific institutions, the investment community, and foreign partners, in order to pool their resources for environmental protection. The primary point of NEP that while protection of environment as well as jobs and prosperity of all is also expedient.

### (ii) National Action Plan and State Action Plans on Climate Change

The National Climate Change Action Plan (NAPCC) is a policy document drafted by the Climate Change Council of the Prime Minister. It has been made bearing in mind that India's economic need to exploit its natural resources needs to be according to the need to maintain ecological balance. The NAPCC's objectives are the protection of the poor and vulnerable sectors of society, the achievement of national growth and an economic direction that improves environmental sustainability. The establishment of eight national missions was convenient, not only supporting these principles, but also forming the essence of the overall national mission.

### (iii) National Mission on Enhanced Energy Efficiency (NMEEE), 2010

The main aim of the launching of this mission was The Energy Conservation Act of 2001. The emission calculation is that upon execution of the mission, there would be fuel savings of 23 million tons per year, and the greenhouse gas emissions would reduce to 98.55 million tons per year. There are four schemes under NMEEE Perform Achieve and Trade Scheme (PAT) and it applies to large scale energy-intensive industries. It is a market-based mechanism to improve on the economic efficiency of energy efficiency and energy savings qualification which can be traded through Market Transformation for Energy Efficiency (MAT).

### (iv) Perform Achieve and Trade (PAT)

PAT is a market-based mechanism for boosting cost-effectiveness by certifying the capacity to be swapped for surplus energy savings. It is a regulatory instrument for reducing energy consumption in energy-intensive businesses. The PAT scheme's primary sectors include energy-intensive ones like thermal power plants. PAT Cycle-I designated customers (DCs) have moved their energy savings to tradable energy saving certificates (Escerts). Government of India's Service of Electricity issued 110 Designated Consumers with approximately 14.25 lakh Escerts, and 309 allocated customers with approximately 38.25 lakh Escerts.

### (v) Renewable Energy Credit Trading System (REC)

In India, the Renewable Energy Credit Trading System trading system was launched in November 2010 with the goal of promoting renewable energy in regions with a low potential for the production of renewable energy. The Government of India (GOI) intends for this system to collectively support the NAPCC and Electricity Act, 2003 (Electricity Act No. 36 of 2003) objectives for the age of sustainable power sources. To cover their costs, the producers of renewable energy now have a nationwide market thanks to the REC system. One REC (Renewable Energy Certificate) equals one megawatt-hour of energy produced from renewable resources.

### (vi) Pilot ETS

a trading mission A market-based approach to reducing pollution, the Emissions Trading Scheme (ETS) enables us to attempt adding the benefit motive as a driver of positive outcomes. The key method of emission trading is known as "cap and trade": an emission cap is set and then permits are produced up to the extent of this cap and one permit for each ton of emissions they emit must be retained by the businesses or other institutions protected by the system, enabling trade in these permits to place

a price on pollution and the cost of emitting one ton of carbon dioxide is the cost of The cost of the permit is the production of one ton of carbon dioxide and it provides versatility as to how and when waste is minimized.

(vii) Energy Conservation Act, 2001

The Energy Conservation (EC) Act of 2001 gives the Central Government the authority to establish the guidelines and rules for Designated Consumers, and industrial units from nine high-demand or energy-consuming sectors (Aluminum, Cement, Chlor-Alkali, Fertilizer, Iron and Steel, Paper and Pulp, Railways, Thermal Power, and Textile) have been designated as Designated Consumers.

(viii) Article 6 of Paris Agreement

According to Article 6 of the Paris Agreement, nations may voluntarily work together to meet the emission reduction goals outlined in their NDCs. In other words, a nation will be permitted to transfer carbon credits obtained through lowering GHG emissions under Article 6 to assist one or more nations in achieving their climate goals. The framework for trade in country-to-country GHG emission reductions is established in Article 6's Section 6.2. As with the Clean Development Mechanism of the Kyoto Protocol, Article 6.4 is anticipated to be comparable. It creates a framework for international trade in GHG emission reductions, supervised by the Conference of Parties, the organisation in charge of making decisions in accordance with the UN Framework Convention on Climate Change.

### III. CONCLUSION:

The current study focuses on organisations in the energy industry that registered and carried out significant CDM Projects in Gujarat until 2012. The study has looked at variables taken into account for registration, aspects affecting CDM projects, obstacles faced by organisations, risk associated with projects, effects on organisations, carbon trading and financing, and corporate social responsibility.

There is various renewable energy sources used for the CDM Projects. The data shows that solar and wind technologies are the major used technology by the organisations for CDM Projects because of geographical location of Gujarat. Through study it has been identified that projects need to be eco friendly, create employability and feasibility of the CDM Projects are vital aspects to be considered. The findings further revealed that there are certain external and internal factors affects the CDM Projects. In last few years, changes in the global economy has played a vital role in implementing the projects as an external factor and lack of skilled manpower has increased the monitoring cost is considered as an internal factor. The result of the study indicate that there various risks involved in the CDM Project life cycle. Out of all the risks associated with Projects, capital cost over-run risk, operational risk and supply risk were found to be influencing the CDM Projects. CDM Projects also affects organisation functions. Finance, Stakeholder and Management are most affected functions in organisation by CDM Projects. The organisations which had registered CDM Projects do not necessary to go for carbon trading because they had contract with the foreign Organisations.

Majority of the energy sector organisations had registered single Projects. By the discussion with the representative of energy organisation, there are very less organisations who wish to register other projects. The energy organisations think that they were not able to get expected return from carbon pricing and other hand the cost of the project is also increased. Till the carbon credit will not reach up to proper pricing, there are less energy organisations who wish to register projects in near future.

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