

SHRI RAM COLLEGE OF COMMERCE

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# STRIDES - A STUDENTS' JOURNAL OF SHRI RAM COLLEGE OF COMMERCE

VOLUME 4 – ISSUE1 & 2

JULY 2019 - JUNE 2020

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### **ISSN 2581-4931 (Print)**

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### **ABOUT THE JOURNAL**

It is a double blind reviewed bi-annual Journal launched exclusively to encourage students to pursue research on the contemporary topics and issues in the area of commerce, economics, management, governance, polices etc. The journal provides an opportunity to the students and faculty of Shri Ram College of Commerce to publish their academic research work.

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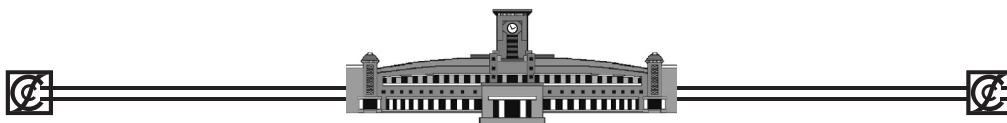
To achieve and promote excellence in research and publish quality academic as well as educational resources as guided by the Mission Statement of the College, Shri Ram College of Commerce had launched a Journal, "Strides- A Students' Journal of Shri Ram College of Commerce" on the occasion of 91st Annual Day of the College held on 13th April, 2017. The Journal was released by then the Hon'ble Union Minister of Human Resource Development, Shri Prakash Javadekar. The Journal publishes the research papers and articles written by students of the College under the mentorship of Faculty Members which go through an intense review mechanism before getting published.

Through the Journal, students get an excellent platform to enhance their research calibre, display their academic perspective, and practically apply their classroom learnings to real-world situations. The present Issue includes several multi-disciplinary and contemporary topics such as "Quantum computing: A futuristic frontier in the financial sector", "Unfolding the Global Hunger Index 2020", "Role of Monetary and Fiscal policies during Covid-19: India and Comparative Analysis", "An analysis of macroeconomic and bank-specific causes for burgeoning NPAs in India", "The political leaning paradox", and "Re-engineering climate change solutions through carbon credit trading".

I wholeheartedly congratulate the Editor, Strides, Dr. Rajeev Kumar and students whose research papers got published in Volume 4 Issue 1 & 2 of the Journal. Simultaneously, I encourage more students to contribute their research papers for the successive Issues.

My best wishes for your future endeavours!

**Prof. Simrit Kaur**  
**Principal**





## Editor's Message

Shri Ram College of Commerce is well known for its academic excellence and dedicated approach towards dissemination of knowledge in the academic world. The College acknowledges and values the role of research in education and is firmly committed to develop and encourage an inclination towards research in both faculty and students. To reaffirm this ethos, the College has taken the initiative to launch a new Journal named 'Strides - A Students' Journal of Shri Ram College of Commerce' to encourage students to pursue research under the guidance of the faculty of Shri Ram College of Commerce.

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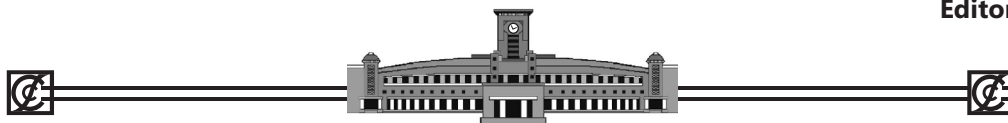


publication. The research work published in Strides is absolutely original and not published or presented in any form at any other public forum.

The foundation issue of the Journal "Strides - A Students' Journal of Shri Ram College of Commerce, Volume 1, Issue 1, 2016-17" was successfully released on 91st Annual Day of SRCC held on 13th April, 2017 by Shri Prakash Javadekar, Honb'le Union Minister of Human Resource Development, Government of India. The successive issues of 'Strides - A Students' Journal of Shri Ram College of Commerce' have been released bi-annually. However, due to the COVID19 pandemic and ensuing lockdowns the current issue has been delayed.

I congratulate all the students whose research papers are published in this issue of Strides and express my sincere thanks to their mentors and referees.

**Dr. Rajeev Kumar**  
**Editor**



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Aradhana Pandey  
B.Com. (Hons.)  
SRCC, DU

# Re-engineering Climate Change Solutions: Carbon Credit Trading

## ABSTRACT

*Today, climate change stands as the greatest threat to humanity. Melting glaciers, ever-rising temperatures, escalating sea levels, and radical weather patterns are nothing but a wake-up call for us to shun our insatiable quest for economic motives and take rigorous measures to prevent the unprecedented catastrophe that our actions might bring on future generations. To devise a strict plan-of-action in line with the same, the Kyoto Protocol (1997) established the mechanism of Carbon Credit Trading which integrated economic motives with sustainability efforts towards carbon reduction. This paper aims to establish an understanding of the framework while assessing the feasibility of the climate change solution by critically analysing the functioning of the system through the years 2005-20, and highlighting the bottlenecks that severely impaired its efficacy. This is followed by a discussion on the alternate replacement mechanisms rolled-out by the Paris Agreement to remedy the deficiencies in the existing systems.*



**Mentor:**  
Dr. Ankita Tomar  
Assistant Professor  
Department of Commerce  
SRCC, DU

**Keywords:** Climate Change Solution, Carbon Credit Trading, Price Discovery Mechanism, Kyoto Protocol, Paris Agreement, Clean Development Mechanism

## INTRODUCTION

*"Climate change is the single biggest thing that humans have ever done on this planet. The one thing that needs to be bigger is our movement to stop it."*

*-Bill McKibben*

The most direct and obvious outcome of modern civilization has been large-scale industrialization. On one hand, industrialization has undoubtedly been the propelling force behind rapid socio-economic development, but on the other, the very same phenomenon must be blamed for the irreparable devastation that our planet has suffered through over the last few decades.

Humankind's reckless abuse of the environment has single-handedly led to such inordinate alteration of the nature that, today, millions of life forms stand at the threshold of extinction. The aftermath of our very own weapons of mass destruction-climate change poses perhaps the greatest challenge threatening our existence. Engendered by the mass accumulation of carbon di-oxide, methane and other greenhouse gases in the atmosphere, today, the menace of 'global warming' is an alarming hint towards the far-reaching, and overwhelming ramifications that our profit-driven activities would have. The average global temperature has risen over 1.5 degrees Fahrenheit over the last century and, a further 2.5-10 degrees Fahrenheit surge is expected in global temperatures over the next century, as estimated by the Intergovernmental Panel on Climate Change (IPCC). The World Meteorological Department recently stated that the decade 2011-2020 has been recorded as the warmest ever, with GHG emissions reporting record-breaking levels. Extreme weather events, changed migratory patterns of wildlife, retreating glacial sheets, rising sea levels are all warning bells of how serious the human-induced climate crisis has become.

Realising the urgent need for mankind to come up with effective measures to address the problem of climate change, over the years, various conventions like the Kyoto Protocol, and the Paris Agreement rolled-out certain financial solutions in forms of carbon credits and taxes, results-based climate finance etc. that integrated economic motives with long-term environmental goals.

In this paper, a deeper study has been made of the Carbon Credit Trading System- a widely-accepted climate-change solution, with the ultimate aim of gauging its effectiveness as a tool to combat climate change.

## **LITERATURE REVIEW**

There is a rich repository of studies that have evaluated the environmental and economic viability of the Carbon-Credit Trading System. Gupta, Y. (2011) extensively discusses the role of emissions trading in creating a sustained ecosystem of firms and governments seeking to limit industrial GHG pollution together with achieving positive industrial growth. Trivedi, S. (2016) reflects upon the substantial opportunities the carbon credit markets offer and how market participants can bank on them profitably. The study also showed how the market offers an effective risk management mechanism for entities tied by emissions constraints.

Empirical evidence gathered by Rosen, A. (2016), Kim, Y et. al. (2020) shows that there exists a trade-off between GDP growth and declining GHG emissions, although, owing to advancements in technologies and substantial structural changes, economies are showing higher energy efficiency and lowered economic burden, the USA being the leading demonstrator of this decoupling phenomenon.

However, another strand of literature highlights the various lags crippling the market-based flexibility mechanisms, the main contention being how carbon credit trading ultimately results in windfall profits for the most polluters, while having minimal contribution towards adopting sustainable measures (Olsen, 2007). Against this background, this paper sketches the concept of carbon credits and their trading, their effectiveness in meeting emission reduction targets, further examining a wide range of impediments in their implementation and certain key measures that can be undertaken to address the deficiencies in the present system.

## **RESEARCH METHODOLOGY**

This review research paper has used the secondary data published by the World Bank to underpin the emergence of the carbon pricing initiatives at the global level through the 1990s till 2020. A qualitative approach has been

followed to critically analyse the various bottlenecks that impaired the efficiency of the carbon credit trading mechanisms set-up under the Kyoto Protocol (1997), supporting them by citing relevant cases from across the world. Drawing upon a range of sources, the paper also intends to establish how the new developments under the Paris Agreement (2015) have built upon the previous accord, aiming to rectify the issues that plagued the latter.

## **THE KYOTO PROTOCOL, 1997**

The Kyoto Protocol was established under the aegis of the United Nations Framework Convention on Climate Change (UNFCCC) in 1997. The international accord (effective from 2005) was ratified by the European Union and 181 signatory countries. As per Article 2, UNFCCC, the treaty aimed to stabilise the atmospheric concentrations of greenhouse gas emissions to a level safe enough to curb unwarranted anthropogenic interference with the climate. It primarily focussed on setting individual emission reduction targets binding the member countries for restricting GHG emissions of:

Hydro-fluorocarbons (HFCs)

Perfluorocarbons (PFCs)

Carbon di-oxide (CO<sub>2</sub>)

Methane (CH<sub>4</sub>)

Nitrous Oxide (N<sub>2</sub>O)

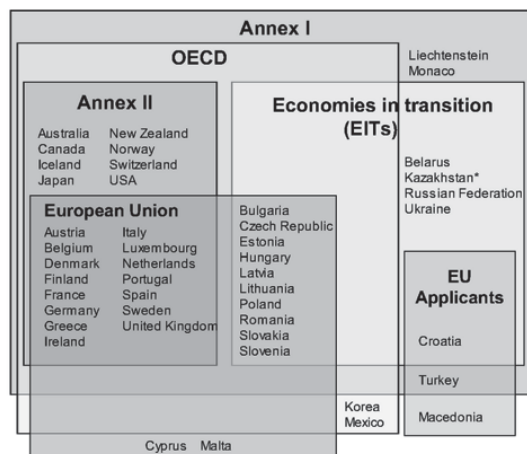
Sulphur hexa-fluoride (SF<sub>6</sub>)

The Protocol is based on the tenet of 'Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC)', acknowledging the differing responsibilities of countries across the globe in addressing climate change. It gives due regard to the fact that much of the emissions can be attributed to the developed and industrialized nations.

The member countries committed themselves to an average reduction of 5.2% in their GHG emissions from the 1990 levels by the year 2012, which was later followed by an additional commitment period having its own stringent reduction targets and obligations. Mirroring the CBDR-RC principle, the Protocol has categorized the participating countries into three main groups as per their specific commitments:

- **Annex-I Parties:** These are the industrialized nations that were a part of the Organisation for Economic Co-operation and Development (OECD) in 1992 as well as, countries classified as 'Economies in Transition' (EIT). These countries had committed to roll-out non-legally binding national policies and measures to bring down their GHG emissions to the base levels of 1990 by 2000. Under these Annex B Parties are those which had accepted reduction targets for GHG emissions for the period 2008-12.
- **Annex-II Parties:** A further specification of the Annex I parties, these include OECD members from Annex I, that were not EIT Parties. They have an additional obligation to channel financial resources to as well as environmentally friendly technologies to the developing countries and EIT parties to enable them to address and adapt to the climate change impact by undertaking low-carbon investments. These have also agreed to take responsibility of the incremental costs that the aforementioned parties shall incur to implement the emission reduction measures.
- **Non-Annex I Parties:** These are mainly developing countries. They form the most vulnerable countries that are prone to facing the most adverse effects of climate change. Unless provided with adequate monetary and technological resources by the Annex II countries, these nations are not legally bound to reduce their emissions. These include India, Malaysia, Pakistan, Philippines, Brazil, China etc.

Figure-1: Annex I and II Parties under the Kyoto Protocol



\*: Added to Annex I only for the purpose of the Kyoto Protocol at COP7

Source: Hohne et al. (2005)



## **CARBON PRICING INITIATIVES UNDER THE KYOTO PROTOCOL**

By placing a price on the GHG emissions, it is ensured that the emitters responsible for the same, internalise the negative externality within a broad range of economic alternatives, without passing on the burden to the public. At the same time, it also boosts market innovation and investments in the development of cleaner and cost-effective technologies so that economic goals are also promoted, propelled by newer, low-carbon practices. Rather than stringently imposing who shall pay how much for the emissions through a hard-and-fast rule, carbon pricing provides emitters with the option to either transform their business processes into more energy efficient ones or continue paying additional charges for their emissions. This helps achieve the environmental goals in a flexible and economical manner.

The main types of carbon pricing initiatives include:

### **1. Emissions Trading System (ETS):**

By converting GHG emissions into economic commodities, the ETS develops a market mechanism for tradeable emissions permits which businesses can engage in so as to meet their emission targets in a cost-effective manner on a short-term basis.

### **2. Carbon Tax:**

This mechanism directly sets a rate of tax on the GHG emissions. It differs from ETS on the lines that here the ultimate emissions reductions cannot be pre-defined, however, the carbon prices are established beforehand.

## **DEVELOPMENT OF FLEXIBILITY MECHANISMS UNDER THE KYOTO PROTOCOL**

Under the Kyoto Protocol, three flexibility mechanisms were established to equip the member countries in meeting their emission reduction targets (Bashmakov et al., 2001) consisting of Clean Development Mechanism, Joint Implementation Projects, International Emissions Trading. The last one revolves around an allowance-based transaction which is based on the establishment of quantitative restrictions on the emissions, whereas the

former two mechanisms are project-based transactions as they enable the generation and trade of emission reductions from different projects through the IET.

### **1. Clean Development Mechanism (CDM):**

The CDM mechanism involves an Annex I country entering into an emissions reduction project in a Non-Annex I country. The former provides financial and technological resources to the latter in lieu of Certified Emissions Reduction (CER) credits. This serves the twin purpose of offering a cost-effective way of meeting emissions targets to the Annex I country, while creating and promoting sustainable development in the Non-Annex I country, in addition to channelising capital resources into the nation.

### **2. Joint Implementation (JI):**

A project-based mechanism, the JI assists developed nations covered under Annex I to meet their emission reduction targets by entering into joint projects with other nations listed under Annex I to earn Emission Reduction Units (ERUs) rather than reducing the emissions in their own country. Under this mechanism, investors engage in emission-reduction projects in the host country that would generate transferable ERUs, which are then subtracted from the host country's allowed emissions and added to the total allowable emissions of the investor country. This aids the investor country in complying with their commitment goals under the Protocol in a very cost-effective manner, while the host country enjoys the benefits of foreign investment and technologies.

### **3. International Emissions Trading (IET):**

The 'Emissions Trading System' is an allowance based tradable permit system for the Annex B countries. Under this system, a country issues permits for emissions in the form of Assigned Amount Units (AAUs) which basically denote the right to emit a certain amount of GHGs. Here, one emission permit or 'Carbon Credit' is equivalent to one metric ton of CO<sub>2</sub> emissions. Depending upon their respective commitment levels, entities can engage in the purchase/ selling of these allowances. Thus, a country that has spare emissions permitted which are not required by it, the excess permits can be

sold for some consideration to another country that has exceeded its emissions cap. The system offers an economical solution to industrialized nations that are legally bound by emission reduction targets, as opposed to adopting cleaner production technologies.

## **CARBON CREDIT TRADING: CONCEPTUAL FRAMEWORK**

A brainchild of the Kyoto Protocol, reinforced by the Marrakesh Accords (2001), the carbon credit trading system established a market-based mechanism which converted 'carbon' into an economic commodity that could be freely traded in the markets. With over 15 years since its inception, carbon credits have made their place as widely used instruments that have created a strong international circuit for advancing efforts towards the mitigation of climate change issues. This section discusses the conceptual framework of carbon credit trading, examining the role of the market participants as well as the regulatory bodies.

- **Carbon Credits:** As mentioned earlier, carbon credits are tradeable certificates that confers upon the holder the right to emit carbon dioxide and other GHGs over a certain period. 1 carbon credit is equivalent to one metric ton of carbon dioxide or equivalent mass of any other greenhouse gas (tCO<sub>2</sub>e). As per the World Economic Forum, Carbon credits can be obtained via the following three routes:

1. **Reduced Emissions** (Via energy-efficiency measures)
2. **Removed Emissions** (Via activities like reforesting farmlands)
3. **Avoided Emissions** (Via activities like refraining from cutting rainforests)

Carbon credits can further be bifurcated into two groups:

1. **Voluntary Emissions Reductions (VERs):** These include the carbon offsets for which over the counter trade takes place in voluntary markets. Two of the most common reasons for investing in them are: Corporate Social Responsibility and Public Relations, while others might be environmental and societal benefits, certification requirements, etc.

- 2. Certified Emissions Reductions (CERs):** These include all carbon credits or emissions units that operate within a regulatory framework. These are generally sold by specific carbon funds created by large financial bodies. Their trade takes place in compliance markets where the participants are mainly businesses and governments who are required by law to maintain proper accounts of their GHG emissions.

Table 1: Key Differences Between Compliance and Voluntary Markets

Market	Compliance		Voluntary
Credit Type	Permits to Pollute	Project-Based Emission Reduction Credits	Project-Based Emission Reduction Credits
Description	A 'certificate to pollute' one tonne of CO <sub>2</sub> e. Number issued corresponds to the emissions cap of the trading scheme	A carbon credit of 1 tonne generated from an emission reduction project	A carbon credit of 1 tonne generated from an emission reduction project
Issued by	National Governments/Agencies	Certification body recognised by the Compliance Scheme e.g. UN Clean Development Mechanism (CDM), California Climate Action Reserve	Independent certification bodies e.g. Verified Carbon Standard (VCS), Gold Standard
Examples	European Union Allowance (EUA)	Certified Emission Reduction (CER)	Verified Carbon Unit (VCU), Gold Standard Verified Emission Reductions (GS VER)

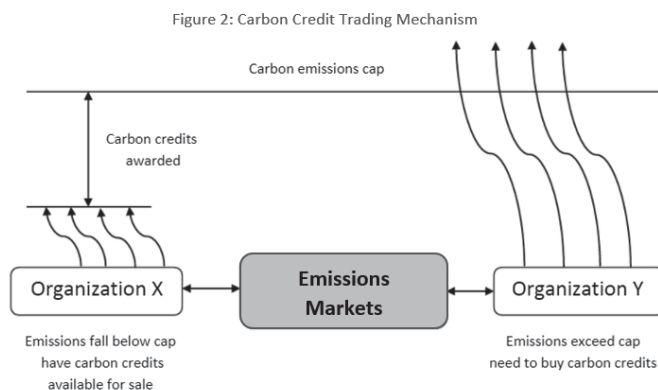
Source: ClimateCare Report, (2017)

- **Authority to Issue Carbon Credits:** The Kyoto Protocol set down the limit of GHGs that each signatory country could emit in the form of Assigned Amount Units (AAUs). It depends upon the country then to divide and assign its respective quota amongst different business units, thereby establishing an upper limit on the emissions permitted. The regulatory body administering the emissions in a particular country holds the authority to issue carbon credits there.
- **Buyers for Carbon Credits:** Carbon credits are purchased by a country as a whole or any company seeking to reduce its carbon footprints.

## CARBON CREDIT TRADING PROCEDURE

Carbon trading follows a cap-and-trade mechanism wherein GHG emissions are pegged to an upper limit for a specified time period. It intends to curb pollution by providing licenses offer licenses to both individual firms as well as industries (Stavins, 2008). An entity having emissions lower than the cap and thus, surplus credits would sell them to another entity exceeding its emissions cap (Zeng and Zhang, 2011). The caps are increasingly reduced each year. The World Economic Forum has elaborated how due to a limited number of permits being circulated in the market, an interplay between the market demand and supply forces sets in place. In the initial phase, the emissions permits might either be auctioned to businesses or allocated to them for free by the regulatory authority. With the passage of time, the maximum level of emissions keeps reducing and so does the number of available emissions licenses. This enforces pressure upon the industrial organisations for investing in long-term and cleaner production technologies for keeping their GHG emissions in check. This, thus, aids in the achievement of the ultimate goal of reducing the price of cleaner alternatives in the long run while giving a boost to the innovations being done in the field. Credits are traded in the private and public markets at the current price.

Certain special exchanges have been established for the purpose facilitating carbon credit trading: There are special exchanges that specialize in the trading of the credits: the NASDAQ OMX Commodities Europe exchange, the European Climate Exchange, the Chicago Climate Exchange, and the European Energy Exchange to name a few.



Source: Morris (2008)

## **PRICE DISCOVERY MECHANISM IN THE CARBON CREDIT MARKETS**

The prices of the carbon credits fluctuate owing to the differences in the market forces of demand and supply. Apart from the market dynamics, there are factors that influence price determination like policy considerations, input costs, industry risks, prices of conventional fuels, emissions targets and so on. A few crucial factors having a bearing on the prices of carbon credits have been listed below:

### **1. Short Term Factors:**

- **Commodity Prices and Fuel Switching:** If the prices of fuels like coal increase, power stations would transition to burning gas, thereby needing less allowances, leading to a price fall.
- **Climatic Conditions:** During colder seasons, more energy usage implies higher emissions which further pushes up the prices. Additionally, the weather conditions also determine the use of renewable source of energies (like solar energy), thus deciding the amount that would be produced using fossil fuels.
- **Market Speculation:** Like any other exchange traded securities, even carbon credits are sensitive to any market information or rumours, especially near the phase when the public anticipates a revision in the legislation.

### **2. Long Term Factors:**

- **Banking of Allowances:** If businesses tend to store the available carbon allowances, with a view to bank up on the surplus in future when prices would be higher, the market forces get distorted and thus, the pricing of carbon allowances bears the impact.
- **Allocation of Credits:** In case the number of allowances that are allocated to enterprises free of any charge goes up, the demand for purchase of carbon credits would decline, thus, reducing the prices of the carbon credits.

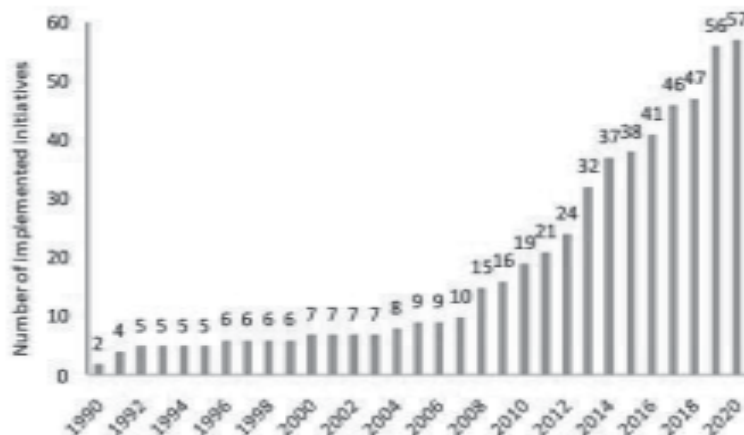
- **Economic Output:** Increased economic output would mean higher emissions thus, a greater need for allowances and subsequently, an increase in the carbon credit prices.
- **Regulatory Factors:** These refer to the policy instruments like backloading or changing emissions targets that have a direct bearing on the Emissions Trading System.
- **Renewables Target and Subsidies:** Proactive measures to incentivise the use of renewable sources of energies, decrease the requirements for carbon allowances and hence, help lower the prices.

### GLOBAL CARBON CREDIT MARKETS THROUGH THE YEARS

The carbon trading market took its root from 2005, when the market mechanism, formally laid down by the Kyoto Protocol, became effective. The United States, Japan, Germany, and the UK were amongst the first countries to establish complete legal framework and carbon markets by 2007, pioneering the path to accelerated growth of carbon finance.

**Exhibit-1** shows the total implemented carbon pricing initiatives from 1990-2020. Here it can be noted that the market has significantly bolted post-2006.

*Exhibit 1: Number of carbon pricing initiatives implemented on a global basis through the years*

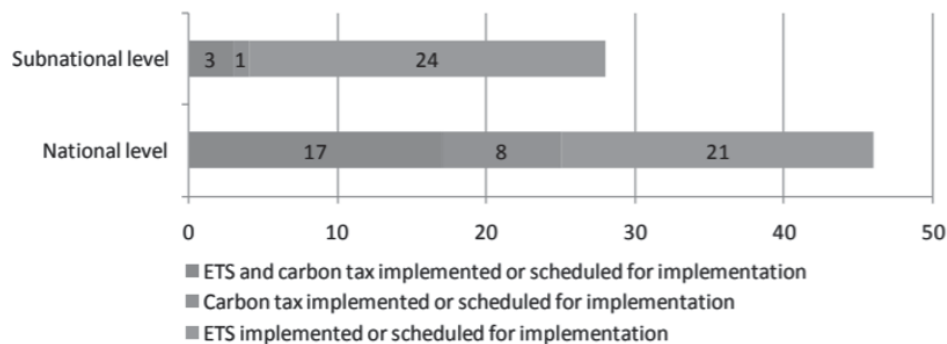


Source: The World Bank (2019)



**Exhibit-2** shows the carbon tax and ETS initiatives implemented or scheduled for the same by total 46 nations and 28 sub-nations, as of present. As of now, there are 20 active carbon trading systems globally. However, so far, a unified trading market has not yet been established

*Exhibit 2: Number of Implemented and Scheduled Initiatives On Global Level*



*Source: The World Bank (2019)*

As of 2020, the cumulative value of global carbon markets touched €229 billion, increasing by nearly 20%, marking the fourth consecutive year of record-breaking growth. Presently, the European ETS holds around 90% of global trade value while also boasting of the highest volume traded at 10.3 Gt., approximately 8 billion allowances. However, as per a report by the International Carbon Action Partnership, in future, China would emerge as the heavyweight, once its domestic market becomes active, as it is projected to double the regulated global emissions from 8% to 14%.

## **A CRITICAL ASSESSMENT OF THE PROBLEMS PLAGUING THE GLOBAL CARBON CREDIT MARKETS**

Based on a critical review of academic literature, Sovakool, B. (2011) outlined some grave bottlenecks that crippled carbon markets and restrained the development mechanisms from meeting the economic and environmental goals largely. These have been grouped under four comprehensive heads, assimilating the problems on the basis of their nature and have been extensively discussed below, citing examples from across the globe to corroborate the findings:

### **1. Homogeneity Problems:**

Right at the grassroot level, carbon markets have an inherent problem of outrightly assuming the relationship between the climate change problem and GHG emissions to be linear. It is important to recognise that neither a one-on-one trade-off between emissions and carbon credits, nor considering carbon credits to be homogeneous, regardless of their time of emission as well as place of emission, is justified. It is often hard to draw out what the 'tipping point' might be where the level of emissions would lead to an alteration in the climatic conditions. Activities like mining and large-scale deforestation could release thousands of tons of carbon and methane emissions into the atmosphere at one go, furthering this, Solomon et. al. (2009) stated that one ton of carbon emission could stay in the atmosphere for up to 35,000 years. Even the ability of forests to store carbon and that of oceans to act as carbon sinks is neither uniform nor permanent due to degradation of soil, drying out or deforestation of plants, increasing ocean acidification, temperature changes etc., thereby affecting the ability of the ecosystem to remove and cycle carbon dioxide in the atmosphere. Thus, both emissions sources and the repercussions are non-linear, unpredictable and often largely irreversible, on a human timescale. Emissions are not identical to each other and their impact also differs by both place and time. This nullifies the very assumption on which global carbon markets function: that each GHG emission has the same value whether released in day or night, on a hot day or cold day, or whether released in Denmark or India.

### **2. Justice Problems:**

These encompass the subject matter related to wealth concentrations amongst the upper strata, dependency issues and subsequently, carbon credit trading sets back the government's efforts to reduce poverty. Global carbon markets have compelled us to question their justification since it has been observed that they benefit the industrialized nations the most rather than those in need of it. Since the CDM is of a competitive nature, only a handful of industrialized (or industrializing) nations are favoured to be host countries like Brazil, India and China. The most backward countries that lack state of the art infrastructure and are in dire need of developmental projects the most are not preferred. This has further deepened the disparities between

countries. Moreover, considering that Western firms, leaders in development of high-technology low-carbon approaches and intellectual property rights, already exploited the most cost-effective and best abatement options for themselves, the developing countries when faced with the obligation to cut down their emissions will be left only with the least economical locations to choose from. This has been referred to as the 'cherry picking' or 'cream skimming' problem.

On account of these three problems of: inclination towards industrialized regions, high dependence of developing economies on Western firms, and the dearth of optimal project sites; carbon markets have failed to:

1. Address the problem of poverty,
2. Achieve millennium developmental goals

Carrying out a meta-analysis of 19 CDM projects, Olsen concluded that there existed a trade-off between the CDM goal of delivering cheap credits and the promotion of sustainable development practices, and the former always had primacy over the latter. He noted that CDM projects failed to encourage renewable energy projects, alleviate poor households, or even promote privileged projects that brought in investments rather than solely focusing on meeting developmental targets, and in several cases, CDM projects had impaired the strive towards environmental goals by massively interfering with land use practices, raising commodity input prices, and resulting forceful dislocation of communities.

### **3. Information Problems:**

These deal with the issues related to transaction costs while engaging in carbon credit trading and the highly inadequate institutional capacity of project approvers, evaluators, as well as auditors. The end-to-end process of project designing, review, approval, auditing as well as credits evaluation involves significant number of years and transaction costs. In case of CDM projects, the prices for credits are not determined until the project is approved, making the mechanism riskier and hence, more expensive due to the added volatility and unpredictability. Moreover, coupled with the lure of high profits, the issue of unpredictability and volatility could enable carbon

markets turning into potential gambling arenas. The next problem relates to the institutional capacity of project approvers. Since these individuals are paid by project developers themselves, they have a strong incentive give their approval for such projects. Moreover, in the United Nations, the global consultants roped in to certify CERs often do not require the requisite knowledge required by the role, remain overworked, and devote insufficient time for the evaluation of each case. Owing to such circumstances, very often such projects that are not worthy enough of being validated get the go-ahead while those that actually deserve do not. The same was revealed by an independent study conducted in China in 2017 which found out that 71% of the CDM projects in hydroelectric power generation should not have been certified at all.

#### **4. Gaming Problems:**

These constitute the problems related to emissions leakage in some countries, as well as the mounting pressure across geographies to invest in high-volume but least-cost projects. These can be categorized into three major heads:

##### **1. Few projects generate revenues that fund the production of fossil fuels:**

Despite the main premise of CDM being promotion of cleaner energy sources, few projects have been developed and even approved by regulators that instead promote the production of fossil fuels. Although on paper, these projects are well within the purview of CDM, but they produce revenues that are further channelized back into the production of coal and gas. For example: A couple of coal mines in China as well as one oil platform in Vietnam were given the green light for approximately 17 million carbon credits for methane capture and usage in their operations.

##### **2. Large Scale GHG emissions can be released just for the purpose of engaging in credits trading:**

Today, the production of carbon credits has become so easy and the value placed for them so high, that more and more projects are being engaged in only to emit more GHGs so as to produce credits. CDM has

made Trifluoroethane (HFC-23) and Nitrous Oxide abatement a very lucrative avenue, although both gases are roughly 300 times more threatening than carbon dioxide. The profits generated out of sale of HFC-23 offsets are worth far more than their production for their traditional purposes-use as refrigerant for ACs and Teflon manufacturing. Such kind of market manipulation has led to even more increased investments being made in carbon intensive processes, that simply go in the opposite direction than what the Protocol intended.

### **3. Severe emissions leakages between regions:**

Mounting evidence suggests that emissions are being shifted or leaked to areas having weak governance structures and relaxed policies and regulations. This leakage can occur in either of the following two ways:

#### **1. Locational Leakages:**

(For example: an American firm shifts its base to an underdeveloped country where regulations can be circumvented easily)

#### **2. Market Leakages:**

(For example: When a change in prices arising due to emission restrictions subsequently leads to a change in energy policies)

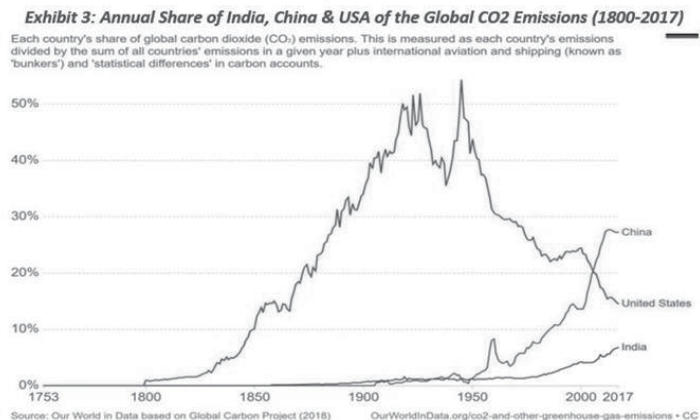
Both these illustrate the following three problems:

1. They severely dent the environmental effectiveness of GHG emission restrictions.
2. Even without the occurrence of any physical leakages, political constraints may be created due to the adverse effects of the 'fear of leakage' on economic competitiveness.
3. They further latch the asymmetries between climate-friendly and carbon-intensive regions. Over a due course of time, GHG emissions may get shifted entirely from regulated to unregulated

regions, further making the latter even more GHG intensive making the problem more complex. (Weiner, 2007)

### THE KYOTO PROTOCOL THROUGH 2005-2020: A LIMITED SUCCESS?

Going into effect in February, 2005, there is no denying that the Kyoto Protocol was indeed a milestone in international climate policy. Regarded by many as a 'game-changer' initially when it came into force, but, 15 years down the line, quite a few fingers have been pointed at its long-term effectiveness. Experts often say that the greatest weakness of the Kyoto Protocol was that developing countries did not commit themselves to attaining the targets. As aforementioned, the treaty only asked of developing nations to comply voluntarily, which is more symbolic than being stringent in nature. Hence, the disparities present in the contributions to carbon emissions made by such nations is not factored in. Owing to this, it was seen that developing countries that account for 75% of the emissions today, faced no obligations to strictly adhere. Especially in China, India- two global manufacturing hubs that also house the largest populations on the planet, as well as Indonesia, the emissions have significantly risen over the last two decades. Not only does this limit the potential of the Protocol to achieve the objectives but also, outweighs all reductions of other smaller countries.



Carbon emissions from developed nations by the end of the first commitment period of the Kyoto Protocol- 2012, had dropped by 20% vis-à-vis 1990 levels. Although the positive impact of the Protocol on carbon reductions by Annex I parties cannot be overlooked but, during the same

period, global emissions had risen overall by a staggering 38%.

Moreover, the Joint Implementation mechanism, which allowed developed countries to purchase emission credits from developing ones if they were unable to meet targets, ultimately resulted in the former buying their way around their commitments, exploiting the loopholes to skirt pledges. The main logic was to channelise funds towards the most promising and cost-effective, climate-benefitting projects. However, a 2015 report showed that roughly 80% projects under the Protocol's ETS were of poor environmental quality. The joint implementation system in-turn had raised the emissions by around 600 million MT. The main profiteers being Russian and Ukrainian companies, having issued 90% of the credits.

Over the last decade, cap-and-trade systems were increasingly adopted by countries throughout the globe. However, the CDM has been subject to major scepticism by critiques. With an insignificant amount of pay-off to the society, it let the emitters take away substantial profits without fully accounting for the social cost. With unjustified allocations, complex set-ups, regulatory issues and complicated measurements, the object of cutting down emissions somewhere got muddled in the flaws of the system. A confluence of these factors, ultimately revealed the mechanism of 'zero sum transfer' of emissions.

Though the Protocol must be commended as being the first step towards a global commitment to reduce GHG emissions and reverse climate change, however, its effectiveness always remained dubious. Had it been a resounding success, then in countries like India, China and even on an international level, emissions would certainly have been on a downward path to reduce by over 20% in the proposed period rather than being on an upward spiral. A decade into the roll-out of the Kyoto Protocol, in light of the various lags witnessed in the implementation of the proposed mechanisms, pragmatic alterations to the climate change policy were suggested wherein instead of the Kyoto's stringent targets-and-timetables system, prudent measures had to be undertaken to reduce emissions at low costs where possible with a stringent, and centralised control system in place.



## **PARIS AGREEMENT, 2015: THE WAY AHEAD FOR A STRONGER GLOBAL CLIMATE CHANGE RESPONSE**

At the 2015 United Nations Climate Change Conference- COP 21, member nations reached upon a landmark agreement to accelerate the efforts towards a sustainable low-carbon future with the inception of the Paris Agreement. Regarded as one of the most significant global climate treaties till date, the accord builds upon the Convention, charting a new course in the climate protection endeavour which requires all countries to undertake their own emissions- reduction pledges. The treaty focuses on strengthening the collective response to the vicious threat of climate change, while also increasing the ability of countries to individually deal with the impact of the same. In order to achieve the same, ensuring adequate mobilisation of financial resources consistent with low emissions, a new technology framework as well as capacity-building support measures are to be established. The Paris Agreement lays a special emphasis on the inclusion of vulnerable and developing nations and ascertaining supporting action from them, while aligning the same with their national objectives, an aspect that was overlooked by the Kyoto Protocol.

The treaty aims to advance remedy to all deficiencies in the Kyoto Protocol by replacing the CDM and JI with the Sustainable Development Mechanism (SDM), a new and more effective international carbon market instrument to be effective post 2020. Building upon the experience from the Kyoto mechanisms, the SDM will function in a radically transformed world wherein all parties would contribute towards the achievement of the following goals:

1. Contain temperature from rising 2 degrees Celsius above pre-industrial levels
2. De-carbonized global economy by the latter half of the century
3. UN 2030 Agenda's Sustainable Development Goals

Drawing from the high and low points of CDM, the SDM is an improvement over the offsetting precedence by replacing it with a result-based climate tool, backed by a centralised global carbon market. It involves a strong Monitoring, Reporting and Verification (MRV) system to oversee not just the achievement of emission reductions but also, sustainable environmental goals in a way that keeps the problem of conflict-of-interest at bay.

Table 2: Comparing the Building Blocks of SDM and CDM

SDM	CDM
Must contribute to overall emission reductions/net mitigation	Established as a pure offsetting mechanism, shifting, not reducing, emissions
Must account for mitigation targets of all countries under the Paris Agreement, including their progression over time	Based on Kyoto Protocol where developing countries did not have a reduction target and did not take future climate commitments into account
Should promote ambition and encourage implementation of climate friendly policies	Created perverse incentives to continue business as usual practices and in some cases increase emissions beyond business as usual in order to be paid to reduce them
Must reflect and reinforce changing low emission technology and policy landscape	Credited many non-additional projects
Must contribute to real, measurable and long-term mitigation and sustainable development that contributes to overall shift away from fossil fuel lock in	Made questionable contribution to sustainable development, including a lock in of fossil fuels

Source: Carbon Markets Watch Policy Brief, 2017

Under the Paris Agreement, every signatory nation is required to set its own nationally determined target. The countries were required to submit their climate action plans by the end of 2020, known as 'Nationally Determined Contributions' (NDC). NDCs would contain the proposed actions for cutting GHG emissions as well as measures that the respective country would take for building resiliency to adapt to the adverse impacts of climate change. There are not any strict, pre-determined specifications of the amount by which countries should cut their emissions, rather the levels are largely steered by political expectations, varying across countries, with regards to the nature and severity of these targets based on the latest science. Owing to this, NDCs differ a lot in their scope and ambition, mirroring each country's capabilities, and development level. For instance, China has signed up for levelling its emissions by 2030. India set committed to cutting the emissions by 33- 35% below the 2005 levels along with, assuring 40% electricity generation from non-fossil fuel sources by 2030. The United States has set sights to slash its GHG emissions by 26-28% below 2005 levels by 2025.

Over a course of every five years, nations shall assess and report their emissions as well as their implementation efforts. Termed as the 'global

stocktake', the first one has been scheduled for 2023 and for every 5 years thereafter. The primary goal of the same would be to gauge the collective progress made towards the attainment of the goals of the agreement in a facilitative and comprehensive way.

Since 2015, 197 countries have endorsed the Paris Agreement, 2015 while, 190 have formally approved it. Even the world's second largest emitter, the USA, which had withdrawn from the accord in November, 2020, re-entered the same in February, 2021. Meanwhile, nations that have still given their formal approval are: Eritrea, Iran, Iraq, Libya, South Sudan, Turkey, and Yemen.

## **CONCLUSION**

The first-ever binding treaty to steer the global response towards the devastating threat of climate change, the Kyoto Protocol, 1997 surely carved itself as a major breakthrough in the global commitment towards cutting the emissions of climate-damaging gases. Rolled into effect from February, 2005, the treaty established concrete steps, especially for the major emitters, for slowing down climate change, setting the tone for others to follow. It committed 38 industrialized nations to cut down their GHG emissions by an average of 5.2% by 2012 below 1990 levels.

Many believed the protocol to have failed post the withdrawal of the US in 2010, and Canada in 2011. However, by 2012, industrialized countries had already slashed their emissions 20% from the 1990 levels, which was equivalent to 5 times the targets set by the rest of the countries. Germany had cut the emissions by 23% whereas the EU as a whole had reduced them by 19%. On the other hand, in the same period a 38% rise was seen in the global emission levels. Shortly afterwards, varied lags were seen in the implementation of the Kyoto mechanisms that severely impaired the long-term effectiveness of the protocol. The biggest weakness of the treaty was believed to be the non-commitment of developing countries to the climate change response, which as a whole were accounting for more than half the global emissions. Even the Joint Implementation and Clean Development Mechanism established by the treaty were subject to major criticism owing to a muddle of issues ranging from insignificant pay-offs to the society unjustified allocations, complex set-ups, regulatory issues and complicated measurements. An urgent need was felt for a fresh, more stringent and

inclusive treaty which would remedy all such deficiencies recorded in the Kyoto Protocol's case. Thus, the Paris Agreement, 2015 was conceived, which charts a new course in the climate protection endeavour, requiring all countries to undertake their own nationally determined emissions- reduction pledges, built on the pillars of accountability and transparency. The Sustainable Development Mechanism, established under the Paris Agreement, promises to bring about radical change to promote further proactive efforts towards climate action. Although the CDM offers a valuable platform to be constructed upon, a fresh beginning would be made in the true sense if the SDM takes learnings from the former's successes and failures and streamlines them to itself for living up-to its role for being mankind's most influential tool for mitigating climate change.

Today, we stand at a critical juncture where immediately addressing the issue of climate variability has become the need of the hour. What we need, so as to tactfully address the climate change problem, is a system that integrates and reinforces democratic principles and popular participation, social justice as well climate justice. All steps must be taken realising that this daunting challenge doesn't only affect our today, but also our tomorrow by standing as a grave existential threat for all future generations.

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## HISTORY OF THE JOURNAL

The idea to launch this Journal was discussed in December 2016 by the former Officiating Principal, **Dr. R. P. Rustagi** with **Dr. Santosh Kumari**, the Editor of the Journal. Since the idea appealed to **Dr. Santosh Kumari**, she took the initiative to contribute to SRCC by creating this new academic research Journal and took the responsibility for its Creation, Registration, License and ISSN (International Standard Serial Number) etc. along with *Editorship*. Therefore, **Dr. Santosh Kumari, Assistant Professor in the Department of Commerce, Shri Ram College of Commerce** was appointed as the Editor of the Journal vide. Office Order – SRCC/AD-158/2017 dated March 14, 2017. She meticulously worked hard in creating the concept and developing the structure of the Journal. She introduced the concept of COPE (Committee On Publication Ethics) to maintain the high academic standards of publication.

On behalf of SRCC, **Dr. Santosh Kumari** made every effort in seeking License from Deputy Commissioner of Police (Licensing), Delhi to register the Journal at "The Registrar of Newspapers for India, Ministry of Information and Broadcasting, Government of India". The paper work for seeking license started under the former Officiating Principal, **Dr. R.P. Rustagi** on March 27, 2017. The foundation Issue of the Journal "**Strides – A Students' Journal of Shri Ram College of Commerce, Volume 1, Issue 1, 2016-17**" was successfully released on the 91st Annual Day of SRCC held on April 13, 2017 by **Shri Prakash Javadekar, Honb'le Union Minister of Human Resource Development, Government of India**. The title of the Journal got verified and approved by the Registrar of Newspapers for India, Ministry of Information and Broadcasting, Government of India on April 21, 2017. On September 1, 2017, **Prof. Simrit Kaur** joined SRCC as Principal and signed each and every legal document required for further processing and supported **Dr. Santosh Kumari**.

On December 18, 2017, the College got the license "**License No. - DCP / LIC No. F. 2 (S / 37) Press / 2017**" to publish 'Strides – A Students' Journal of Shri Ram College of Commerce'. Due to change of Printing Press, the License got updated on March 09, 2018. On April 26, 2018, the SRCC Staff Council unanimously appointed **Dr. Santosh Kumari as the 'Editor of Strides'** for the next two academic years.

On April 27, 2018 (The Foundation Day of the College), **Dr. Santosh Kumari** submitted the application for the registration of the Journal. On May 04, 2018, the SRCC received the '**Certificate of Registration**' for "**Strides – A Students' Journal of Shri Ram College of Commerce**" and got the **Registration No. DELENG/2018/75093** dated May 04, 2018. ***On behalf of Shri Ram College of Commerce, it was a moment of pride for Dr. Santosh Kumari to receive the 'Certificate of Registration' on May 04, 2018 at the Office of Registrar of Newspapers for India, Ministry of Information and Broadcasting, Government of India (website - www.rni.nic.in).***

On May 07, 2018, **Dr. Santosh Kumari** submitted the application for seeking ISSN (International Standard Serial Number) at "ISSN National Centre – India, National Science Library, NISCAIR (National Institute of Science Communication and Information Resources). Weblink - <http://nsl.niscair.res.in/ISSNPROCESS/issn.jsp>". Finally, the College received the International Standard Serial Number "**ISSN 2581-4931 (Print)**" on **June 01, 2018**.

We are proud that this journal is an add-on to the enriched catalogue of SRCC's publications and academic literature.



**STRIDES - A STUDENTS' JOURNAL OF SHRI RAM COLLEGE OF COMMERCE**  
**ISSN 2581-4931 (Print)**



**RELEASE OF FOUNDATION ISSUE OF STRIDES**



The foundation issue of the Journal "Strides - A Students' Journal of Shri Ram College of Commerce, Volume 1, Issue 1, 2016-17" was successfully released on 91st Annual Day of SRCC held on 13th April, 2017 by Shri Prakash Javadekar, Honb'le Union Minister of Human Resource Development, Government of India.



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