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Emission Trading Schemes (ETS) in India: An Overview. Esquemas de comercio de derechos de emisión (ETS) en la India: descripción general

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ABSTRACT

All we are facing the problems of global warming caused by excess emission of GHGs in the atmosphere. Out of three flexible mechanisms as suggested by the Kyoto Protocol, Emission Trading System (ETS) is the most important tool to fight global warming. In this backdrop this study tries to identify the present status of Emission Trading Scheme in India and the advantages and disadvantages of the ETS. The study is descriptive in nature and based on secondary data. From the study it is found that India has successfully introduced the Perform, Achieve and Trade (PAT) scheme to increase energy efficiency in high energy consumed industries in a phased manner from 2012. Now, India has launched world first ever particulate pollution scheme on pilot basis in Surat in 2019 to reduce air pollution in the city caused by different industries. ETS has different advantages like certainty in emission reduction, flexibility in selection of different alternatives etc. On the other hands ETS has also different disadvantages like high transaction cost, complexity of the scheme, free rider problems.

Keywords: Emission trading, GHGs, Perform, Achieve and Trade (PAT), Free rider problem, renewable energy.

RESUMEN

Todos nos enfrentamos a los problemas del calentamiento global provocados por el exceso de emisión de GEI a la atmósfera. De los tres mecanismos flexibles sugeridos por el Protocolo de Kioto, el Sistema de Comercio de Emisiones (ETS) es la herramienta más importante para combatir el calentamiento global. En este contexto, este estudio intenta identificar el estado actual del Esquema de Comercio de Emisiones en India y las ventajas y desventajas del ETS. El estudio es de naturaleza descriptiva y se basa en

datos secundarios. A partir del estudio se concluye que India ha introducido con éxito el esquema Perform, Achieve and Trade (PAT) para aumentar la eficiencia energética en industrias de alto consumo de energía de manera escalonada a partir de 2012. Ahora, India ha lanzado el primer esquema de contaminación por partículas del mundo en forma piloto. base en Surat en 2019 para reducir la contaminación del aire en la ciudad causada por diferentes industrias. ETS tiene diferentes ventajas como certeza en la reducción de emisiones, flexibilidad en la selección de diferentes alternativas, etc. Por otro lado, ETS también tiene diferentes desventajas como el alto costo de transacción, la complejidad del esquema, los problemas de los usuarios gratuitos.

Palabras clave: Comercio de emisiones, GEI, Perform, Achieve and Trade (PAT), Problema del free rider, energías renovables.

INTRODUCTION

Global warming is the increase in temperature of the oceans and lands due to over existence of the Green House Gases (GHGs) in the atmosphere. Out of all the GHGs, Carbon Dioxide (CO_2) is classified as the most significant GHG (IPCC, 2007) for its maximum global warming potential among all other GHGs. Again maximum amount of GHGs and CO_2 comes from energy sector and energy is the key factor for development of the society and industry. So, to reduce the CO_2 emission we have to use the energy in an optimum way. According to the World Energy Outlook, 2006, global per capita energy consumption, Canada occupies the first position (17179 kwh), followed by USA (13338kwh), Australia (11126kwh). India (631 kwh) is placed in the10th position. So, the per capita energy consumption of India is far low than the other developed countries. In 2014, according to JRC data catalogue- European commission, maximum CO_2 producing country was China followed by USA and India placed 4th ranks. Again in 2014 according to the JRC data catalogue- European commission Australia (17.3 tonne) places 1st followed by Saudi Arabia according to the per capita CO_2 production and per capita CO_2 of India is only 1.8 tonne. As per JRC data catalogue- European commission, 2014, India place 2nd position after China, if we consider the growth in total CO_2 production and again India place 3rd after China and Thailand if we consider the growth in per capita CO_2 production. So, from the growth in total CO_2 production and growth in per capita CO_2 production perspective, India is showing a very alarming position. Therefore, an immediate step should be taken to reduce the CO_2 emission from all the sectors. Causes of global warming are local but its effects are global. Therefore, to fight against global warming, efforts should be taken globally. To reduce the carbon dioxide emission and GHGs in the atmosphere Kyoto Protocol came into force on 16th February 2005. Kyoto

Protocol suggested the following three flexible mechanisms to reduce the GHGs from the atmosphere-

a) Clean Development Mechanism (CDM)- According to the article 12 of the Kyoto Protocol, an annexure-I country can earn Certified Emission Reduction (CER) from the project activities established in annexure –II country and in exchange this particular annexure I country provides funds and technology to the annexure II country for established this project. The CER earned by the annexure I country can be used to meet the national emission target.

b) Joint Implementation (JI) –In case of JI mechanism remains the same for earning CER by the annexure I but only the difference is that the annexure I country established the project in annexure I country in place of annexure II country.

c) International Emission Trading (IET)

In case of emission trading a specific quota or limit for GHGs emission are set for annexure I countries and they are bound to emit to that level of quota. If any countries are required to emit more than that the quota they have to purchase the excess credit ('Credit' is a unit of measurement: 1 credit=1 tonne of CO_2 equivalent emissions) from other parties, called 'credit surplus' parties, whose actual emission is below the specific limit. For this transaction buying countries (deficit spending countries) need to pay money to the selling countries (Surplus spending countries). The mechanism of buying and selling surplus credit is known as emission trading.

Out of these three mechanisms first two are project based mechanism and last one is market based mechanism. Out of these three mechanism emission trading is the most effective mechanism considering its certainty of emission reduction from the atmosphere. According to the Kyoto Protocol, developed countries are categorised as Annexure I countries and this Annexure I countries have emission reduction target. On the other side developing countries are categorised as Annexure II countries and these countries have no emission reduction target. India placed in the Annexure II countries and has no emission reduction target. But, India has taken voluntarily different strategies to reduce emission from the different sectors and most importantly from the energy sectors considering the rate of growth in per capita carbon emission and total carbon emission from the different sectors. In this study I have tried to identify the status of emission trading in India and the advantages and disadvantages of emission trading.

Sutter and Parreno (2007): The main objective of the study was to investigate whether the CDM projects fulfilled the two fold objectives laid down by the Kyoto

Protocol as reduction of greenhouse gases and sustainable development of the host country. For this, they analysed 16 existing registered CDM projects and they found that about 72% of the projects fulfilled the first objective and only 1% of the projects fulfilled the second objective.

Promode Kant (2010): The objectives of the study were to investigate the problems associated with the CDM projects situated worldwide. He found that main problem of the CDM projects was regional imbalance of establishment of CDM projects.

Kumar Rajesh et al.(2013) The objectives of the paper were to investigate the state of art in PAT mechanism design and operational features for implementation on thermal power plant sector. They conclude that same trading platforms, Power exchange India (PXIL) and Indian energy Exchange(IEX) with different controlling institutions in the interactive mode with international programmes like Clean Development Mechanism(CDM), United Nations Framework Convention on Climate Change (UNFCCC) and World Bank can be used for PAT (Perform, Achieve, Trade) Energy Savings Certificates (ES Certs) and Renewable Energy Certificate (REC). They also conclude that PAT only looks into the large industries and avoid the mini, small and medium industries which have a major impact on energy consumption and economic growth of Indian economy.

Bhimani Chirag et al. (2015) the objective of the study was to identify the challenges if India implements Emission Trading Scheme (ETS) for Particulate Matter. They conclude that India has to face a lot of challenges and these have to address right from the determination of baseline inventory level to market trading and the crimes related to these process.

The objectives of the study were 1) To identify the status of emission trading in India and 2) To identify the advantages and disadvantages of emission trading

MATERIAL AND METHODS

The study is descriptive in nature. In this study only the secondary data have been used and the secondary data have been collected from the different websites, Journal, books, newspaper etc. Very simple statistical tools like average, percentage etc. have been used.

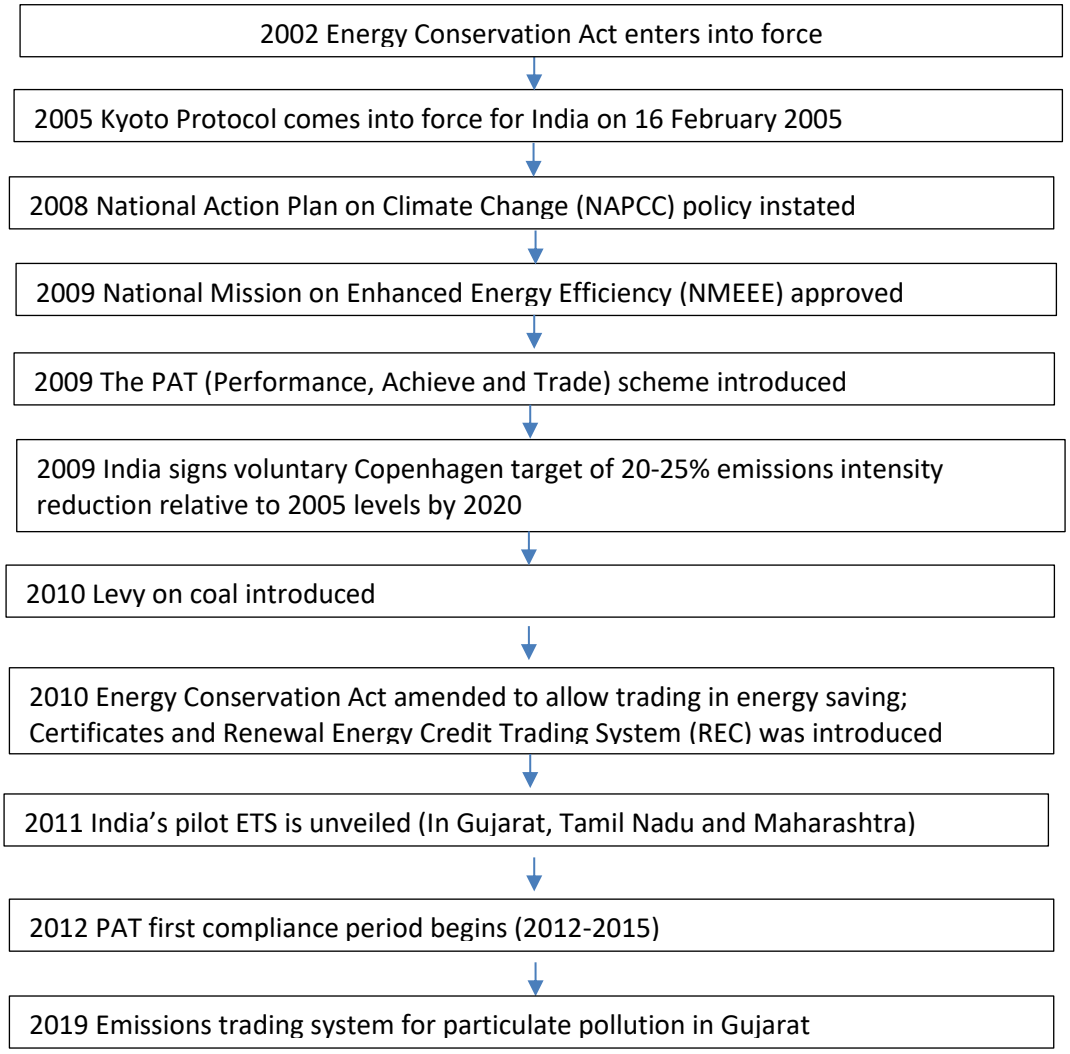
Emission trading is also known as Cap and Trade and Emission Trading Scheme (ETS). According to the Cap and Trade a specific quota of emission limit are distributed by a central authority (generally governmental body) among the different polluters considering the national emission target for a specific period of time. This quota of

emission may be distributed among the polluters free of cost by the Governmental body. All the polluters are bound to pollute with in this quota. If any polluters want to increase pollution more than the specific quota or unable to remain with in this quota, they have to purchase the excess emission permit from the others polluters who have polluted less than the specific emission quota. In this trading system the quota of emission is known as 'carbon Credit' and 1 Carbon credit=1 tonne of CO_2 equivalent emissions .The polluters who emit more than the specific emission quota is known an 'Deficit Spending unit' and the polluters who have emit less than the specific quota is known as 'Surplus Spending Unit' and the process of buying and selling of carbon credit among the deficit and surplus spending units is known as Emission Trading or Cap and Trade or Emission Trading Scheme. First successful cap and trade scheme was introduced in North America under the framework of US Acid Rain Programme. The main objective of this ETS was to reduce sulphur dioxide emission from the atmosphere. The European Union Emission Trading Scheme (EU ETS) was the first large Green House Gas emission trading scheme in the world and came into force in 2005. In 2015, India was the world's third largest polluting country and emitting 2407 million tonne CO_2e. Again India placed 2nd position in case of growth in total CO_2 production in 2014. India ratified the Kyoto protocol in 2002. But, India placed in Annexure II countries and has no mandatory emission reduction target. But, in 2009 India signs voluntary Copenhagen target for reducing emission intensity of its GDP by 20-25% relative to 2005 levels by 2020 (PMR2012). India has taken and introduced several climate policy initiatives from time to time to reduce the emission into the atmosphere. Following are the climate policy initiatives taken by India from time to time-

PERFORM ACHIEVE AND TRADE (PAT)

As per National Mission on Enhanced Energy Efficiency (NMEEE) (2009) policy Government of India has taken the four energy efficiency initiatives and Perform Achieve and Trade (PAT) is one of them. The main objective of this mission is to increase the energy efficiency in the energy intensive industries. PAT is a market based mechanism. As per this mechanism energy intensive industries are selected and assigned a specific target of reduction of energy consumption. The Energy Conservation Act, 2001 gives the right to the Central Government to specify any industry as 'Designated Consumers (DC)' considering its energy consumption and makes it mandatory to participate in this scheme assigned a specific target for energy consumption. For capping their energy consumption within this target limit these industries adopted several energy efficient technologies. If the DC is able to limit the energy consumption within the target limit i.e. if it is able to achieve the energy efficiency or able to save energy, the industry will get it in the form of Energy Savings Certificates (ES certs). But, ES certs will be issued to the industry only after the verification by the Energy Auditors appointed by the Bureau of

Energy Efficiency (BEE). These ES certs can be traded in Indian Energy Exchange (IEE) and Power Exchange India Limited (PXIL). In this exchange the DC's which are able to achieve the desired level of energy efficiency can sold their ES certs and the DC's which are unable to achieve the desired level of energy efficiency within the specific period of time can buy the ES certs. PAT cycle represents a period of three years. The first cycle of PAT was from 2012-2015 and 478 DC were selected from 8 sectors across the country to achieve the energy efficiency in these 8 energy intensive industries. BEE has notified the threshold limits of energy consumption for all the sectors covered under the PAT scheme. So, if any industry crosses the specified threshold limit of energy consumption can participate in the PAT scheme. Following table shows the different PAT cycle periods, No. of participated DC's, and total energy savings target-



Source**:** Case study of EDF "India: An Emission Trading Case study"

Table 1: Table showing the information of different PAT cycles

PAT cycle	Period	Date of issue of notification	No. and name of the Sectors	No. of designated consumers (DC)	Total Energy Savings (Million Tonne of Oil Equivalent (MTOE)
I	2012-2015	1st April 2012	8, Sectors, Aluminium, Cement, Chlor-Alkali, Fertilizer, Iron & Steel, Paper&Pulp, Thermal Power Plant and Textile.	478	6.686
II	2016-17to 2018-19	1st April 2016	8sectors of PAT cycle I+ Refineries, Railways and DISCOMs Total=11 sectors	621	8.869
III	2017-18 to 2019-20	31st March 2017	6, Thermal Power Plant, Cement, Aluminum, Pulp & Paper, Iron & Steel and Textile.	116	1.06
IV	2018-19 to 2020-21	28th March 2018	8, Thermal Power Plant, Cement, Aluminum, Pulp & Paper, Iron & Steel, Textile, Petrochemicals and Buildings	109	0.6998
V	2019-20 to 2021-22	1st April 2019	8,Aluminum, Cement, Chlor-Alkali, Commercial Buildings (Hotels), Iron & Steel, Pulp & Paper, Textile and Thermal Power Plant	110	0.5130
VI	2020-21 to 2022-23	1st April 2020	6,Cement, Commercial buildings (hotels), Iron and Steel, Petroleum Refinery, Pulp and Paper and Textiles	135	1.277

Source: Compiled from Bureau of Energy Efficiency (BEE) booklet, "Achievements under PAT" May, 2017

PILOT EMISSION TRADING SYSTEM

As per National Ambient Air Quality Standards (NAAQS)-2009 three states Gujarat, Tamil Nadu and Maharashtra have high concentrations of particulate matter than the standard norms in the air. So, to improve the air quality of these three states Central Government gives mandate to these states to implement Pilot Emission Trading System on 1st February, 2011. This Pilot ETS focuses on particulates such as SO_2, NO_x and SPM. This pilot ETS mechanism was introduced by the Ministry of Environment and Forests (MOEF), India along with the Central Pollution Control Board (CPCB), India and relevant State Pollution Control Boards (SPCBs). It was the responsibility of the SPCBs to determine which pollutants to include and set caps for industry facilities based on desired overall pollutant concentrations. After that SPCBs will distribute emissions permits among the facilities. If any facilities pollute less than the permitted emission then that facilities have the option to sale the surplus emission unit to those facilities which pollute more than the permitted unit. This pilot ETS covered 1000 facilities from the above three states to run the ETS.

RENEWAL ENERGY CREDIT TRADING SYSTEM (REC)

Renewable Energy Certificates (RECs), is also known as Green tags, Renewable Energy Credits, Renewable Electricity Certificates, or Tradable Renewable Certificates (TRCs). REC trading system was implemented in India in November, 2010. The main objective of the REC was to promote the generation of energy from the renewable sources like solar, wind, biomass, hydro, municipal solid waste etc. 1 unit of RECs will be issued only when a project generates 1 megawatt-hour (MWh) of electricity from renewable sources and fed into the shared system of power lines which transport energy. Under Energy Act, 2003 State Electricity Regulatory Commission (SERCs) specifies a target for the power companies that each power company has to purchase certain percentage of their total power from the renewable source. These targets are popularly known as Renewable Purchase Obligations (RPOs).So, when the power company purchase energy from the renewable sources, it may be considered that these power companies are helping in generating energy from renewable sources somewhere in India. Purchasing renewable energy implies purchasing of RECs. Purchasing of RECs by companies, organisations and individuals allows the purchaser to offset their carbon footprint without investing capital into generation capacities. There are two types of RECs namely solar and non-solar REC. RECs received for generation of energy from solar power is known as Solar Renewable Energy Certificates (SERCs).

EMISSIONS TRADING SYSTEM FOR PARTICULATE POLLUTION IN GUJARAT

On 6th June, 2019 world first ETS on particulate pollution was launched in Surat, India. The main objective of this ETS was to reduce the air pollution caused by particulate emission from textile and dye mill industries in Surat. According to this ETS Government will fix a cap for particulate emission for the participating industries. If any industry emit more than the cap, this industry has to purchase the deficit unit from the industry which emit less than the cap. With this ETS total particulate emission will remain within the cap in the project area. On the success of this ETS in Surat, it is expected that this ETS model will be applied in other states of India in future to reduce air pollution caused by particulate emission.

Advantages of Emission Trading

a) Certainty in Emission Reduction: The main advantage of ETS is certainty in emission reduction. In ETS maximum amount of emission that can be emit by all the industries in an economy are being fixed by the central authority and these amount of emission are then distributed among the different industries. If any industry produces more than the limit it has to purchase the deficit unit from the industries having surplus unit of emission. So, under this mechanism total emission in the economy remains within the cap.

b) Flexibility of the Scheme

Another advantage of ETS is flexibility of the scheme. According to the ETS firms have the alternatives to choose either investment in efficient technology to reduce emission from its activities or to purchase the deficit unit of emission to remain within the permitted emission limit. If the firms find that it is cost effective to purchase deficit unit from the surplus spending units rather to invest in energy efficient technology then they can do it.

c) Sources of revenue to the Government

When the Government will introduce unit auctioning system for distributing the limit of emission among the emitters, this will be a source of revenue to the Government and this revenue can be utilised for citizen wellbeing.

d) Gradual Reduction in emission permit

The Government will gradually reduce the emission permit year to year in emission trading and by this industries will need to find new ways of reduction of carbon emission from their activities.

Disadvantages of Emission Trading

a) Complexity of the scheme

Implementation mechanism of the ETS is very complex. It is very difficult to decide the maximum amount of emission permit to be allowed among the industries.

b) Transaction Cost

Implementation cost such as measuring emission, introduction of trading scheme involves huge amount of cost.

c) Problems in measurement of actual emission

A serious problem that may face in introducing ETS is measuring of actual emission by the industries.

d) Frauds in certification process

Amount of emission reduction by the firm needs certification by the appropriate authority. There is a chance of fraud in certification process and corruption may occur.

e) Free rider problems

Free ride is a problem of using services or goods without paying for it. Global warming due to excess carbon equivalent emission is a global problem. So, to solve this problem, there needs a global solution and emission trading has to be introduce in a global scale. If ETS is introduced in one country not in other countries, it may happen that production may shift to the country without ETS. In this case a country may not introduce with the fear that others countries will be free riding with their efforts.

f) Adverse impact on low income people

The low income people who have a very little scope of changing their life styles has to suffer more than the high income people with the introduction of emission trading scheme. For example low income people use more fossil fuel like coal, kerosene and also use more traditional cooking fuel for cooking and all these sources generates more emission than the modern cooking fuels. When the emission trading scheme will be introduce the lower income people will have to suffer more as they have a little scope of changing fuel shifting from high carbon intensity fuel to low carbon intensity fuels and the carbon footprint of the low income people will be maximum.

g) Gradual reduction in carbon price in global market is a serious problem for successful implementation of emission trading and put a serious question about the successful implementation of the ETS.

CONCLUSION

All we are facing the problems of global warming caused by excess emission of GHGs in the atmosphere. To fight against global problem due to global warming we all are need a global solution and Kyoto Protocol obviously is an important step towards global solution. Out of the three flexible mechanisms as suggested by the Kyoto Protocol, Emission Trading System (ETS) is the most important tool to fight global warming. ETS has different advantages and disadvantages but most important advantage of the ETS is certainty in emission reduction capability of the scheme and the most important disadvantages of the scheme are complexity in introduction of the scheme and transaction cost associated with implementation of the scheme. India falls in the annexure –II countries and having no compulsory emission reduction target till date. But, considering its growth in total and per capita carbon emission, our country should undertake immediate steps to reduce the carbon emission. PAT scheme which was introduced to increase energy efficiency in high energy consumed industries, was very successful in terms of achieving the energy consumption reduction target. It is expected that the pilot scheme to reduce particulate pollution in the air launched in Surat will also be a viable emission reduction scheme and will be administered in other states of the country in near future.

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