Carbon Credits Mechanism

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CLIMATE CHANGE AND THE GREENHOUSE EFFECT

Public awareness of the threat of climate change has risen sharply in the last couple of years and an increasing number of businesses, organizations and individuals are looking to minimize their impact on the climate.

Scientists believes that global warming will cause the average World temperature rise by one Degree Celsius by the year 2020 and four Degree Celsius by the end of 21st century. The Earth has warmed about 1^{o}F in the last 100 years. The eight warmest years on record (since 1850) have all occurred since 1998. Periods of increased heat from the sun may have helped make the Earth warmer. But many of the world's leading climatologists think that the greenhouse gases people produce are making the Earth warmer, too.

The Greenhouse Gases and the Greenhouse Effect

Greenhouse gases are the gases present in the earth's atmosphere which reduce the loss of heat into space and therefore contribute to global temperatures through the greenhouse effect.

The Kyoto Protocol covers six greenhouse gases - carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6).

The Earth has a natural temperature control system. The Earth's atmosphere carries out the critical function of maintaining life-sustaining conditions on Earth. The Greenhouse Effect is the process by which the greenhouse gases make the Earth warmer by trapping energy in the atmosphere. Greenhouse gases re-emit some of this heat to the earth's surface. Without the natural greenhouse effect, the average temperature at Earth's surface would be below the freezing point of water. An increase in the levels of GHGs could lead to greater warming, which, in turn, could have an impact on the world's climate, leading to the phenomenon known as climate change.

Global Warming Potential

The CO2 equivalence of a particular gas, when integrated over a time horizon of 100 years, is referred to as its Global Warming Potential (GWP).

Global warming potential (GWP) is a measure of how much a given mass of greenhouse gas is estimated to contribute to global warming. It is a relative scale which compares the gas in question to that of the same mass of carbon dioxide (whose GWP is by definition 1). Carbon dioxide has a GWP of exactly 1 (since it is the baseline unit to which all other greenhouse gases are compared).
A GWP is calculated over a specific time interval. GWPs are one type of simplified index based upon radiative properties that can be used to estimate the potential future impacts of emissions of different gases upon the climate system in a relative sense.
GWP is based on a number of factors, including the radiative efficiency (infrared-absorbing ability) of each gas relative to that of carbon dioxide, as well as the decay rate of each gas (the amount removed from the atmosphere over a given number of years) relative to that of carbon dioxide.

GWP (taken over time horizon of 100yrs) of the 6 GHGs under Kyoto Protocol is:
[GWP values from 2007 IPCC AR4]

- CO2 - Carbon dioxide = 1
- CH4 - Methane = 25
- C2O - Nitrous oxide = 298
- PFCs - Perfluorocarbons (PFC 14) = 7390
- HFCs – Hydrofluorocarbons (HFC 23) = 14800
- SF6 - Sulphur hexafluoride = 22800

ENERGY AND ENVIRONMENT INTERPHASE

Energy and environment are essential for sustainable development. The poor are disproportionately affected by environmental degradation and lack of access to clean, affordable energy services.

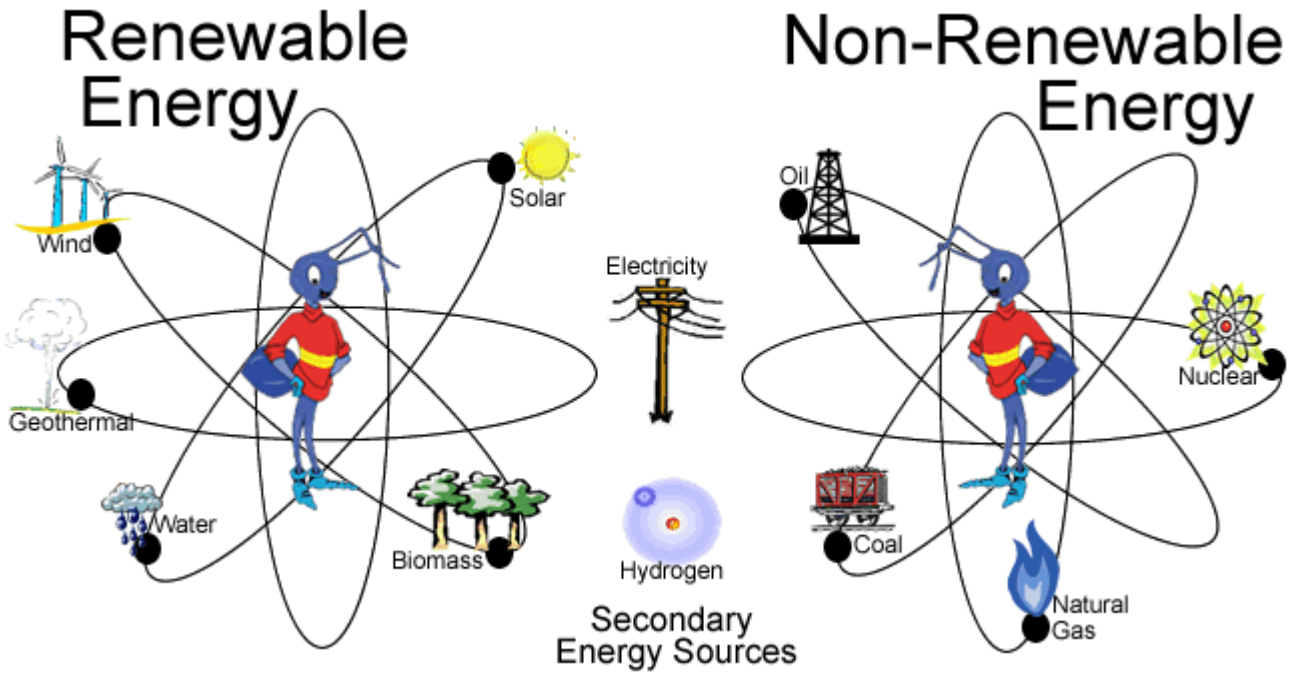
Section 2(h) of the Energy Conservation Act 2001, defines 'Energy' as –
"Energy means any form of energy derived from fossil fuels, nuclear substances or materials, Hydro-electricity and includes electrical energy or electricity generated from renewable sources of energy or biomass connected to the grid."

About 20% of world's energy is generated from coal and about 60% of worlds energy is generated from oil and natural gas. Because of extensive use of fossil fuel, such as coal, oil and natural gas, as primary source of energy today, the harmful emissions of GHG (Green House Gasses) such as Carbon Dioxide increases the GHG level and causes the Greenhouse Effect and eventually global warming.

Energy

Energy is the Ability To Do Work

All of these sources provide us the energy we need to live our busy lives.



Source: http://www.eia.doe.gov/kids/energyfacts/sources/whatsenergy.html

Energy sources are divided into two groups:

1. Renewable energy

Renewable Energy is derived from natural processes that are replenished constantly. In its various forms, it derives directly from the sun, or from heat generated deep within the earth. It also includes electricity and heat generated from solar, wind, ocean, hydropower, biomass, geothermal resources, and biofuels and hydrogen derived from renewable resources. Each of these sources has unique characteristics which influence how and where they are used.

Types of renewable energy include:

a. Wind Power – It is the conversion of wind energy into a useful form, such as electricity using wind turbines. Most wind power is generated in the form of electricity. Large scale wind farms are connected to electrical grids. Individual turbines can provide electricity to isolated locations. In windmills, wind energy is used directly as mechanical energy for pumping water or grinding grain. Wind energy is plentiful, renewable, widely distributed, clean and reduces greenhouse gas emissions when it displaces fossil-fuel-derived electricity. Today, wind energy is mainly used to generate electricity. Wind is called a renewable energy source because the wind will blow as long as the sun shines.
b. Water Power – Water Power or Hydropower or hydraulic power is the force or energy of moving water. It may be captured for some useful prupose. Prior to the widespread availability of commercial electric power, hydropower was used for irrigation, and operation of various machines, such as watermills, textile machines, and sawmill. Of the renewable energy sources that generate electricity, hydropower is the most often used.
c. Solar energy is the utilization of the radiant energy from the Sun. Solar power is used interchangeably with solar energy but refers more specifically to the conversion of sunlight into electricity by photovoltaics and concentrating solar thermal devices, or by one of several experimental technologies such as thermoelectric converters, solar chimneys and solar ponds.The sun has produced energy for billions of years. Solar energy is the sun's rays (solar radiation) that reach the earth.
d. Geothermal energy is energy obtained by tapping the heat of the earth itself, usually from kilometers deep into the Earth's crust. Ultimately, this energy derives from heat in the Earth's core. Geothermal energy is generated in the earth's core, about 4,000 miles below the surface. Temperatures hotter than the

sun's surface are continuously produced inside the earth by the slow decay of radioactive particles, a process that happens in all rocks.

e. Biomass refers to living and recently dead biological material that can be used as fuel or for industrial production. Most commonly, biomass refers to plant matter grown for use as biofuel, but it also includes plant or animal matter used for production of fibres, chemicals or heat. Biomass may also include biodegradable wastes that can be burnt as fuel. It excludes organic material which has been transformed by geological processes into substances such as coal or petroleum. Biomass is organic material made from plants and animals

2. Non-renewable energy

Non renewable Energy is energy taken from resources that will eventually dwindle becoming too expensive or too environmentally damaging to retrieve. Examples of non-renewable energy are coal, petroleum, diesel, natural gas (methane) etc.

Energy Conservation

Energy conservation is the practice of decreasing the quantity of energy used. It can be achieved through efficient energy use, where energy use is decreased while achieving a similar outcome, or by reduced consumption of energy services.

Thus energy conservation has emerged as one of the major issues in recent years. Energy requirement in our country is increasing at a very rapid rate. India's demand for commercial energy in 2020 is expected to increase by 250% from today's level. Coal accounts for about 50% of primary commercial energy today and is further increase its share. Despite its low per capita CO 2 emission of less than 1 ton, India contributed over 4% of world total CO 2 emission in 2000.

Energy conservation is the quickest, cheapest and most practical method of overcoming energy shortage. It is found that there is major scope of energy conservation in electrical distribution system and in consumer's installation. By reducing consumption of energy we can save save precious fossil fuel like coal, gas, oil which are used by the generating companies to generate electricity.

Energy conservation may result in increase of financial capital, environmental value, national security, personal security, and human comfort. Individuals and organizations that are direct consumers of energy can conserve energy in order to reduce energy costs

and promote economic security. Industrial and commercial users can increase efficiency and thus maximize profit.

Energy conservation is also an important element of energy policy. Energy conservation reduces the energy consumption and energy demand per capita, and thus offsets the growth in energy supply needed to keep up with population growth. This reduces the rise in energy costs, and can reduce the need for new power plants, and energy imports. The reduced energy demand can provide more flexibility in choosing the most preferred methods of energy production.

Energy Conservation in India

Economic growth is desirable for developing countries, and energy is essential for economic growth.
If India is to achieve the targeted growth in GDP, it would need commensurate input of energy, mainly commercial energy in the form of coal, oil, gas and electricity.
India's fossil fuel reserves are limited. The known reserves of oil and natural gas may last hardly for 18and 26 years respectively at the current reserves to production and 26 years respectively at the current reserves to production ratio (2004).

India has huge proven coal reserves (84 billion tonnes) may last for about 200 years but the increasing ash content in Indian Coal as well as associated greenhouse gas emission are the major concern. In the business as usual scenario, the exploitable coal concern may last for about less than 100 years.

Energy efficiency/conservation measures can reduce peak and average demand. One unit saved avoids 2.5 to 3 times of fresh capacity addition. Investment in energy efficiency/energy conservation is highly cost effective. It Also avoids investment in fuel, mining, transportation etc.

The Energy Conservation Act 2001

Considering the vast potential of energy savings and benefits of energy efficiency, the Government of India enacted the Energy Conservation Act, 2001 (52 of 2001).

It was enacted in October 2001 but became effective from 1st March, 2002.

Energy Conservation Act 2001 provides legal mandate to implement energy efficiency measures through Institutional mechanism of Bureau of Energy Efficiency in the Central Government and designated agencies in the states.

Measures Proposed by the Act

The Act empowers the Central Government and, in some instances, State Governments to:

- specify energy consumption standards for notified equipment and appliances;
- direct mandatory display of label on notified equipment and appliances;
- prohibit manufacture, sale, purchase and import of notified equipment and appliances not conforming to energy consumption standards;
- notify energy intensive industries, other establishments, and commercial buildings as designated consumers;
- establish and prescribe energy consumption norms and standards for designated consumers;
- prescribe energy conservation building codes for efficient use of energy and its conservation in new commercial buildings having a connected load of 500 kW or a contract demand of 600 kVA and above;
- direct designated consumers to -
  - designate or appoint certified energy manager in charge of activities for efficient use of energy and its conservation;
  - get an energy audit conducted by an accredited energy auditor in the specified manner and interval of time;
  - furnish information with regard to energy consumed and action taken on the recommendation of the accredited energy auditor to the designed agency;
  - comply with energy consumption norms and standards;
  - prepare and implement schemes for efficient use of energy and its conservation if the prescribed energy consumption norms and standards are not fulfilled;
  - get energy audit of the building conducted by an accredited energy auditor in this specified manner and intervals of time;
- State Governments may –
  - amend the energy conservation building codes prepared by the Central Government to suit regional and local climatic conditions;
  - direct every owners or occupier of a new commercial building or building complex being a designated consumer to comply with the provisions of energy conservation building codes;
  - direct, if considered necessary for efficient use of energy and its conservation, any designated consumer to get energy audit conducted by an accredited energy auditor in such manner and at such intervals of time as may be specified;

Framework of the Act

The Energy Conservation Act, 2001 is An Act to provide for efficient use of energy and its conservation and for matters connected therewith or incidental thereto.

The Act is divided into 10 chapters, comprising of 62 sections and one Schedule.

Chapter I: Preliminary
Chapter II: Bureau of Energy Efficiency
Chapter III: Transfer of assets, liabilities etc. of Energy Management Centre to Bureau
Chapter IV: Powers and functions of Bureau
Chapter V: Power of Central Government to facilitate and enforce efficient use of energy and its conservation
Chapter VI: Power of State Government to facilitate and enforce efficient use of energy and its conservation
Chapter VII: Finance, Accounts and Audit of Bureau
Chapter VIII: Penalties and Adjudication
Chapter IX: Appellate Tribunal for Energy Conservation
Chapter X : Miscellaneous

The Schedule : List of Energy Intensive Industries and other establishments specified as designated consumers.

However, the Central government has, vide its notification dated 12th March,2007 in exercise of the powers conferred by the clauses (e) and (f) of section 14 of the Energy Conservation Act,2001, in consultation with the Bureau of Energy Efficiency, altered the List of Energy Intensive Industries and other establishments specified in the Schedule to the said Act.

Establishment of Bureau of Energy Efficiency

The Bureau of Energy Efficiency (BEE) is a statutory Body under the Ministry of Power, Government of India established under the provisions of the Energy Conservation Act, 2001, with effect from 1st March, 2002.

The Bureau would be responsible for spearheading the improvement of energy efficiency of the economy through various regulatory and promotional instruments. The BEE has published specifications of several electrical equipments and appliances on energy efficiency.

The Bureau shall be a body corporate having perpetual succession and a common seal, with power subject to the provisions of this Act, to acquire, hold and dispose of property, both movable and immovable, and to contract, and shall, by the said name, sue or be sued.

The head office of the Bureau shall be at Delhi. The Bureau may establish offices at other places in India.

The mission of the Bureau of Energy Efficiency is to develop policy and strategies with a thrust on self-regulation and market principles, within the overall framework of the Energy Conservation Act, 2001 with the primary objective of reducing energy intensity of the Indian economy.

The Director-General is the chief executive officer of the Bureau of Energy Efficiency. The general superintendence, direction and management of the affairs of BEE is vested in the Governing Council having up to 26 members. The Governing Council is headed by Union Minister of Power and consists of Secretaries of various line Ministries, heads of various technical agencies under the Ministries, members representing industry, equipment and appliance manufacturers, architects, and consumers, and members from each of the five power regions representing the states of the region. The Director – General of the Bureau is the ex-officio member-secretary of the Governing Council.

Initiatives of BEE:

a. Standards & Labeling Programme - The scheme was launched by the Hon'ble Minister of Power in May,2006 and is currently invoked for equipments/appliances (Frost Free(No-Frost) refrigerator,Tubular Fluorescent Lamps, Room Air Conditioners, Direct Cool Refrigerator, Distribution Transformer, Induction Motors, Pump Sets, Ceiling Fans, LPG, Electric Geysers and Colour TV).
b. E-filing for Standards & Labeling Programme
c. E-filing of Energy Returns
d. Bachat Lamp Yojana - Bachat Lamp Yojana a CDM based Compact Fluorescent Lamp (CFL) scheme is an innovative initiative put in place by the Central Government to enhance lighting efficiency in the Indian household sector by making available CFL at prices comparable to that of Incandescent Lamps. The scheme seeks to leverage the high cost of the CFLs through the CERs generated out of the project.

The Energy Conservation Building Codes (ECBC)

The BEE launched the Energy Conservation Building Code (ECBC) on 27th May 2007 in New Delhi.

This code addresses the design of new, large commercial buildings to optimize the building's energy demand. Commercial buildings are one of the fastest growing sectors of the Indian economy, reflecting the increasing share of the services sector in the economy.

Nearly one hundred buildings are already following the Code, and compliance with it has also been incorporated into the Environmental Impact Assessment requirements

The Energy Conservation Building Codes under the Act are aimed at achieving total energy efficiency in buildings and establishments.

The new buildings are required to be designed and built with energy efficiency consideration right from the initial stages itself. The development of energy conservation building codes is necessary for this purpose. The codes would be applicable to commercial buildings constructed after the relevant rules are notified under the Energy Conservation Act. The Bureau would constitute Committee of Experts for preparation of Energy Conservation Building Codes for different climatic zones.

ECBC norms will be implemented on a voluntary basis initially and then made mandatory.

Designated Consumers (DCs)

Under Section 2(g) of the Energy Conservation Act,2001 "designated consumer" means any consumer specified under clause (e) of section 14 of the Act.

Section 14(e) says - The Central Government may, by notification, in consultation with the Bureau, specify, having regarding to the intensity or quantity of energy consumed and the amount of investment required for switching over to energy efficient equipments and capacity or industry to invest in it and availability of the energy efficient machinery and equipment required by the industry, any user or class of users of energy as a designated consumer for the purposes of this Act.

The Schedule to the Act provides a list of the Designated Consumers. These DCs have to:
1. Appoint/Designate Energy Managers
2. Get Energy Audit conducted by Accredited Energy Auditors
3. Implement Techno-Economic Viable Recommendations

4. Comply with norms of specific energy consumption fixed
5. Submit Report on Steps Taken

Gazette of India Part II Sec 3 Sub-sec(ii) 19-03-2007
Gazette of India - Ministry of Power - The Central Government notifies the 9 energy intensive industries as designated consumers under The EC Act 2001
1) **Thermal Power Stations** - 30,000 metric tonne of oil equivalent (MTOE) per year and above
2) **Fertilizer** - 30,000 metric tonne of oil equivalent (MTOE) per year and above
3) **Cement** - 30,000 metric tonne of oil equivalent (MTOE) per year and above
4) **Iron & Steel** - 30,000 metric tonne of oil equivalent (MTOE) per year and above
5) **Chlor-Alkali** - 12,000metric tonne of oil equivalent (MTOE) per year and above
6) **Aluminium** - 7,500 metric tonne of oil equivalent (MTOE) per year and above
7) **Railways** - electric traction Sub-Section(TSS),diesel loco shed, Production units and Workshops of Indian Railways having total annual energy consumption of 30,000 MTOE or more under Ministry of Railways *(as per table)*
8) **Textile** - 3,000 metric tonne of oil equivalent (MTOE) per year and above
9) **Pulp & Paper** - 30,000 metric tonne of oil equivalent (MTOE) per year and above
Energy Conversion values used for working out annual energy consumption in terms of metric tonne of oil equivalant
For the purpose of this table
i) **1 Kg of Oil Equivalant** :10,000 kcal
ii) **1 Metric Tonne of Oil Equivalant (MTOE)** : 10 x 10^6 kcal
iii) In case of coal, petroleum products and other fuels in absence of supplier certificate, GCV of the above fuel *(fuel sample)* will be considered as per the test Certificate from a NABL Accredited Lab or State Government Lab or Gov. recoganised Lab .

Source: http://www.bee-india.nic.in

Labeling Programme for Appliances

An energy labeling programme for appliances was launched in 2006, and comparative starbased labeling has been introduced for fluorescent tubelights, air conditioners, and distribution transformers.

The labels provide information about the energy consumption of an appliance, and thus enable consumers to make informed decisions. Almost all fluorescent tubelights sold in

India, and about two-thirds of the refrigerators and air conditioners, are now covered by the labeling programme.

Energy Managers and Energy Auditors

Under the EC Act, 2001 it is mandatory for the designated consumers to get energy audit conducted by an "accredited energy auditor" (under clause 14(h) and 14(i)) and to designate or appoint an energy manager (under clause 14(1)).

The BEE is empowered to specify the regulations and mechanism to meet the above objective. It has been decided that prescribed qualification for energy manager will be the passing of certification examination to be arranged by the Bureau. Also, regular accreditation is proposed to be given to energy audit firms having a pool of certified energy auditors.

BEE has retained the National Productivity Council (NPC) as the National Certifying Agency on the advise of the Governing Council of the BEE, for conducting the National Certification Examination for Energy Managers and Energy Auditors under the aegis of BEE.

A Board of Examination was constituted by BEE for this purpose comprising of 6 members under the Chairmanship of Ex-Chairman, CEA and Members from CII, PCRA, AICTE,BEE and NPC.

To qualify as Energy Manager, a candidate has to pass 3 papers of Written Examinations.

To qualify as Energy Auditor, a candidate has to pass 4 papers of Written examinations and a VIVA examination.

Energy Audits of Large Industrial Consumers:

Energy audit studies conducted in several office buildings, hotels and hospitals in India indicate energy saving potential of 20-30%. The potential is largely untapped, partly due to lack of an effective delivery mechanism for energy efficiency.

Government buildings by themselves, constitute a very large target market. The Government of India is committed to set an example by implementing the provisions of the EC Act in all its establishments as a first initiative.

To begin with, the Bureau has begun conduct of energy audit in the Rashtrapathi Bhawan, Parliament House, South Block, North Block, Shram Shakti Bhawan, AIIMS, Safdarjung Hospital, Delhi Airport, Sanchar Bhawan, and RailBhawan. Energy audit in the Rashtrapati Bhawan PMO, S S Bhawan, Sanchar Bhawan & Rail Bhawan has been completed

In March 2007, the conduct of energy audits was made mandatory in large energy-consuming units in nine industrial sectors. These units, notified as "designated consumers" are also required to employ "certified energy managers", and report energy consumption and energy conservation data annually.

Indian Energy Exchange

Indian Energy Exchange Limited (IEX) is India's first-ever, nationwide, automated, and online electricity trading platform. It has been conceived to catalyse the modernisation of electricity trade in the country by ushering in a transparent and neutral market through a technology-enabled electronic trading platform.

CENTRAL ELECTRICITY REGULATORY COMMISSION (CERC) accorded approval on 9th June 2008, to IEX to commence its operations. IEX is a demutualised exchange that will enable efficient price discovery and price risk management in the electricity market.

On 6th February 2007, the CERC issued guidelines for grant of permission to set up power exchanges in India. Financial Technologies (India) Ltd responded by proposing then tentatively named 'Indian Power Exchange Ltd' and applied for permission to set it up and operate it within the parameters defined by CERC and other relevant authorities. Based on the oral hearing on July 10, the CERC accorded its approval vide its order dated 31st August, 2007. IEX thus moved from the conceptual level to firmer grounds. On 9th June 2008 CERC accorded approval to IEX to commence its operations and 27th June 2008 marked its presence in the history of Indian Power Sector as Indian Energy Exchange Ltd (IEX), India's first-ever power exchange.

Regulator of IEX:
CENTRAL ELECTRICITY REGULATORY COMMISSION (CERC)

Promoters of IEX:

IEX is promoted by Financial Technologies (India) Ltd, and PTC India Ltd.

Financial Technologies (India):
Financial Technologies has a 90% share of the electronic exchange and online brokerage solutions market in India. The company's solutions power six exchanges and 750 out of the 800-odd brokerage houses operating over 1,40,000 trading terminals on a daily basis. IEX will be the seventh exchange to be powered by Financial Technologies.

PTC India:
A public-private partnership initiated by the government of India, whose primary focus is to develop a commercially vibrant power market in the country. It has pioneered power trading in India and is presently the leading power trading company with a market share of 44% (2006-2007)

Stakeholders in IEX:

There are a number of key stakeholders in IEX:

1. Infrastructure Development Finance Company (IDFC):
A private sector enterprise formed by a consortium of public and private investors, IDFC is a specialised financial intermediary for infrastructure. It provides financial assistance to projects in power, roads, ports, and telecommunications.

2. Adani Enterprises:
Part of the Adani group of companies, Adani Enterprises is active in the power trading business across the country. It is implementing mega thermal power projects at various locations in India. It aims to enter into power transmission in a big way.

3. Reliance Energy:
India's largest integrated private sector power utility company, Reliance Energy is into generation, transmission, distribution, and trading of power. It is also an investor in infrastructure projects including the prestigious Mumbai metro rail project and various road projects of the National Highways Authority of India.

4. Lanco Infratech:
With more than two decades of experience in power generation, power trading, construction and EPC, infrastructure and property development, Lanco Infratech's expertise in power encompasses conventional as well as non-conventional sources of

energy such as gas, coal, biomass, hydro, and wind. It is also one of the top three power trading companies in the country.

5. Rural Electrification Corporation (REC):
A wholly public sector enterprise, REC's main objective is to finance and promote electrification projects in villages all over India. It provides financial assistance to state electricity boards, state government departments, and rural electricity cooperatives for rural electrification projects.

6. Tata Power Company:
Pioneers of electricity generation in India, Tata Power is the country's largest private sector power utility. It has successfully served customers in Mumbai for over 90 years and has now spread its operations across the nation. Tata Power has generation units in Mumbai, Delhi, Jojobera, Jharkhand, and Karnataka.

Technology Support to IEX:
OMX Technology, Sweden, the technology provider to the world's leading power exchange, NORDPOOL, has joined hands with Financial Technologies (India) Ltd to provide technology support to Indian Energy Exchange (IEX).
OMX is a leading expert in the exchange industry. It owns exchanges in the Nordic and Baltic regions, and develops and provides technology and services to companies in the securities industry around the globe. In power trading, OMX is a pioneer, with four power exchanges in Europe currently using its technology.

NATIONAL ACTION PLAN ON CLIMATE CHANGE

The vulnerability assessment and adaptation studies of climate change have been made in various areas such as water resources, agriculture, forests, natural eco-systems, coastal zones, health energy and infrastructure .This has been carried out as a part of the Initial National Communication of India to the United Nations Framework Convention on Climate Change (UNFCCC);

Further, the Expert Committee on Impact of Climate Change set up by the Ministry of Environment & Forests in June 2007 assessed the impact of climate change on six areas, namely water resources, agriculture, Natural Eco-system, Health, Coastal Zone

Management and Climate modeling. Reports of the Expert Committee in these areas have been prepared.

Besides, a range of policies and programmes have been initiated to address the problem of climate change in the context of sustainable development, such as:

- ensuring energy conservation and improved energy efficiency in various sectors as well as setting up of Bureau of Energy Efficiency
- promoting use of renewable energy
- power sector reforms and active renewable energy programme
- use of cleaner and lesser carbon intensive fuel for transport
- fuel switching to cleaner energy
- afforestation and conservation of forests
- promotion of clean coal technologies
- reduction of gas flaring
- encouraging Mass Rapid Transport systems
- environmental quality management for all sectors

India released the National Action Plan on Climate Change (NAPCC) on 30th June 2008 to outline its strategy to meet the challenge of Climate Change.
It outlines a national strategy that aims to enable the country adapt to climate change and enhances the ecological sustainability of India's development path. It stresses that maintaining a high growth rate is essential for increasing living standards of the vast majority of people of India and reducing their vulnerability of the impacts of climate change.

The guiding principles of the plan are:
1. Inclusive and sustainable development strategy to protect the poor
2. Qualitative change in the method through which the national growth objectives will be achieved i.e. by enhancing ecological sustainability leading to further mitigation
3. Cost effective strategies for end use demand side management
4. Deployment of appropriate technologies for extensive and accelerated adaptation, and mitigation of green house gases
5. Innovative market, regulatory and voluntary mechanisms to promote Sustainable Development
6. Implementation through linkages with civil society, local governments and public-private partnerships
7. International cooperation, transfer of technology and funding

Eight National Missions, form the core of the National Action Plan, representing multi-pronged, long term and integrate strategies for achieving key goals in the context of climate change.

These Missions are

1. National Solar Mission,
2. National Mission on Enhanced Energy Efficiency,
3. National Mission on Sustainable Habitat,
4. National Water Mission,
5. National Mission for Sustaining the Himalayan Eco-system,
6. National Mission for a Green India,
7. National Mission for Sustainable Agriculture and
8. National Mission on Strategic Knowledge for Climate Change.

The Prime Minister's Council on Climate Change is in charge of the overall implementation of the plan. The Council is Chaired by the Prime Minister. The National Missions are to be institutionalized by the respective Ministries and will be organized through inter-sectoral groups which include in addition to related Ministries, Ministry of Finance and the Planning Commission, Experts from Industry, academia and civil society.

Each Mission will be tasked to evolve specific objectives spanning the remaining years of the 11th and the 12th Plan Period. Each Mission will report publicly on its annual performance.

Ministries with lead responsibility for each of the missions are directed to develop objectives, implementation strategies, timelines, and monitoring and evaluation criteria, to be submitted to the Prime Minister's Council on Climate Change.

The Council will also be responsible for periodically reviewing and reporting on each mission's progress. To be able to quantify progress, appropriate indicators and methodologies will be developed to assess both avoided emissions and adaptation benefits.

Government of India is designing National Mission on Enhanced Energy Efficiency (NMEEE), which is one out of eight missions planned under the National Action Plan on Climate Change.

CARBON CREDITS

The concept of carbon credits came into existence as a result of increasing awareness of the need for controlling emissions.

The need for a reduction in carbon emissions was debated at the United Nations Conference on Environment & Development (The Earth Summit) in Rio de Janeiro in 1992, resulting in the adoption of the United Nations Framework Convention on Climate Change (UNFCCC).

Over a decade ago, most countries joined an international treaty -- the United Nations Framework Convention on Climate Change (UNFCCC) -- to begin to consider what can be done to reduce global warming and to cope with whatever temperature increases are inevitable. The Convention entered into force on 21 March 1994.

More recently, a number of nations approved an addition to the treaty: the Kyoto Protocol, which has more powerful (and legally binding) measures. The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing greenhouse gas (GHG) emissions . These amount to an average of five per cent against 1990 levels over the five-year period 2008-2012.

The Kyoto Protocol, was adopted by the parties to the UNFCCC with the objective of achieving quantified emission limitations through specific policies and measures to minimizing the adverse effects of climate change. The protocol provides for various mechanisms like joint implementation, a clean development mechanism (CDM) and international emission trading to boost the cost effectiveness of climate change mitigation. The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005. 182 parties of the Convention have ratified the treaty to date. The detailed rules for the implementation of the Protocol were adopted at COP 7 in Marrakesh in 2001, and are called the "Marrakesh Accords."

The major distinction between the Protocol and the Convention is that while the Convention encouraged industrialised countries to stabilize GHG emissions, the Protocol commits them to do so.

What is Carbon Credit

Carbon credits are a key component of national and international emissions trading schemes that have been implemented to mitigate global warming. They provide a way to reduce greenhouse effect emissions on an industrial scale by capping total annual emissions and letting the market assign a monetary value to any shortfall through trading. Credits can be exchanged between businesses or bought and sold in

international markets at the prevailing market price. Credits can be used to finance carbon reduction schemes between trading partners and around the world.

In accordance with the Kyoto protocol, consumers of fossil fuels are assigned CO2 emission levels. In many cases, achieving these emission levels require massive up gradation or revamping of facilities; incurring costs too huge to justify the investment. Such parties are allowed to pay others to store carbon for them in exchange for the right to release carbon in excess of their limits into the atmosphere. This forms the basis of carbon credits.

Carbon Credit is like a Permit that allows an entity to emit a specified amount of greenhouse gases.They are certificates issued to Countries that reduce their emission of Greenhouse Gases (GHG) which causes Global Warming.

Carbon Credit Trading

The central feature of the Kyoto Protocol is its requirement that countries limit or reduce their greenhouse gas emissions. A country has two ways to reduce emissions. One, it can reduce the GHG (greenhouse gases) by adopting new technology or improving upon the existing technology to attain the new norms for emission of gases. Or it can tie up with developing nations and help them set up new technology that is eco-friendly, thereby helping developing country or its companies 'earn' credits.

Under the Kyoto Mechanism, Countries are separated into 2 categories:

1.Developed - referred to as Ann 1 Countries, and

2. Developing – referred to as Non-Ann 1 Countries

Under the Treaty, countries must meet their targets primarily through national measures. However, the Kyoto Protocol offers them an additional means of meeting their targets through market based mechanisms.

The carbon credits can be either generated by project participants who acquire carbon credits through implementation of Clean Development Mechanism (CDM) in Non Annexure I countries or through Joint Implementation (JI) in Annexure I countries or supplied into the market by those who got surplus allowances with them. The potential buyers of carbon credits are mostly in various Annexure I countries that need to meet the compliance prevailing in their countries as per the Kyoto Protocol or those investors who would like buy the credits and with the expectation of selling them at a higher price during the first commitment period of the Kyoto Protocol (2008-2012). These credits bought over by the companies of developed nations are mostly bought by Europeans, because the United States has not signed the Kyoto Protocol. Currently

European Union Emission Trading Scheme (EU ETS) is the most active market; Other markets include Japan, Canada, New Zealand, etc. The major sources of supply are Non-Annexure I countries such as India, China, and Brazil. Every year European companies are required to meet certain norms, beginning 2008. By 2012, they will achieve the required standard of carbon emission.

Potential participants in carbon credits trading include Hedgers, Producers, Intermediaries in spot markets and Ultimate buyers.

The Kyoto Protocol provides for three market-based mechanisms that enable countries or operators in developed countries to acquire greenhouse gas reduction credits:

- Emissions Trading, (known as “the carbon market") - countries can trade in the international carbon credit market to cover their shortfall in allowances. Countries with surplus credits can sell them to countries with capped emission commitments under the Kyoto Protocol.
- The Clean Development Mechanism (CDM) - a developed country can 'sponsor' a greenhouse gas reduction project in a developing country where the cost of greenhouse gas reduction project activities is usually much lower, but the atmospheric effect is globally equivalent. The developed country would be given credits for meeting its emission reduction targets, while the developing country would receive the capital investment and clean technology or beneficial change in land use.
- Joint Implementation(JI) - a developed country with relatively high costs of domestic greenhouse reduction would set up a project in another developed country.

The above carbon projects can be created by a national government or by an operator within the country. In reality, most of the transactions are not performed by national governments directly, but by operators who have been set quotas by their country.

The Protocol agreed 'caps' or quotas on the maximum amount of Greenhouse gases for developed and developing countries, is listed in its Annex I. In turn these countries set quotas on the emissions of installations run by local business and other organizations, generically termed 'operators'. Countries manage this through their own national 'registries', which are required to be validated and monitored for compliance by the UNFCCC.

Each operator has an allowance of credits, where each unit gives the owner the right to emit one metric tonne of carbon dioxide or other equivalent greenhouse gas. Operators that have not used up their quotas can sell their unused allowances as carbon credits, while businesses that are about to exceed their quotas can buy the extra allowances as credits, privately or on the open market. As demand for energy grows over time, the

total emissions must still stay within the cap, but it allows industry some flexibility and predictability in its planning to accommodate this. In this way an operator can seek out the most cost-effective way of reducing its emissions, either by investing in 'cleaner' machinery and practices or by purchasing emissions from another operator who already has excess 'capacity'.

For example, a chemical company running a plant in the United Kingdom emits more gases than the accepted norms of the UNFCC. It can tie up with its own subsidiary in India or China under the Clean Development Mechanism. It can buy the carbon credit by making the Indian or Chinese plant more eco savvy with the help of technology transfer. It can also tie up with any other company in the open market. At the end of the year, an audit will be done to check the company's efforts to reduce gases and their actual level of emission.

Any company, factories or farm owner can get linked to United Nations Framework Convention on Climate Change and know the 'standard' level of carbon emission allowed for its outfit or activity. The extent to which the company/ factory/ farm owner is emitting less carbon (as per standard fixed by UNFCCC) it gets credited in a developing country. This is how we can describe the carbon credit mechanism.

The following example of pig manure on a farm in the Philippines further explains how the mechanics of carbon credit actually works:

Daniel Co and his family raise about 10,000 pigs on a farm called Uni-Rich Agro Industrial in the province of Tarlac in the Philippines. Until recently pig manure was shoveled into concrete ponds, where it decomposed, emitting methane, a potent greenhouse gas, and a putrid smell. Daniel Co knew that he could install biogas technology to seal the ponds, trap the gas, and produce electricity, but he didn't want to spend the $200,000 or so it would cost until he heard that pig farms could collect money from Europe for capturing methane: He would be paid not to pollute.

...Daniel Co got involved when he was approached by EcoSecurities, an Irish company that has developed more carbon-mitigation projects than any other firm. Its experts calculated that trapping his farm's methane would generate 2,929 CERs a year. A CER is created when the equivalent of one ton of carbon dioxide is prevented from entering the atmosphere. (Because methane creates more global warming than carbon dioxide, trapping one ton of methane generates 21 CERs.) CERs are sometimes called carbon credits.
EcoSecurities offered to pay Uni-Rich $4 per credit, or $12,000 a year, every year, until Kyoto expires in 2012, and to handle all the paperwork at the UN, which registered the project late in 2006. Uni-Rich then installed the methane digesters.

Now, thanks to the magic of carbon finance, Daniel Co and his family treasure their pig waste. They use it to produce electricity, which has reduced their utility bills by about $48,000 a year. They collect their $12,000 a year in carbon revenues. EcoSecurities, in turn, will sell the credits

for about $18 each, or $54,000 a year, to a big French bank called Caisse des Depots. Caisse des Depots can hold onto the CERs as an investment, betting that their value will rise, or sell them to a client, most probably a European power generator or industrial firm that needs credits to meet its regulatory obligations.

Carbon Markets

Growing pressure to address climate change has created multi-million dollar markets for carbon (CO2) that are expected to reach billions of dollars in annual transactions within the next 10 years.

Carbon credits are a part of international emission trading norms. They incentivise companies or countries that emit less carbon. The total annual emissions are capped and the market allocates a monetary value to any shortfall through trading. Businesses can exchange, buy or sell carbon credits in international markets at the prevailing market price.

Countries are permitted to use a trading system to help meet their emission targets. Trading in carbon credits gives flexibility to companies to select cost effective solutions to achieve established environmental goals. The price determination would be fair as the cost of carbon is set by the market participants and not controlled by a group of people.

Currently, futures contracts in carbon credits are actively traded in the European exchanges. In fact, many companies actively participate in the futures market to manage the price risks associated with trading in carbon credits and other related risks such as project risk, policy risk, etc. Keeping in view the various risks associated with carbon credits, trading in futures contracts in carbon allowances has now become a reality in Europe with burgeoning volumes. Currently, project participants, public utilities, manufacturing entities, brokers, banks, and others actively participate in futures trading in environment-related instruments. The European Climate Exchange (ECX), a subsidiary of Chicago Climate Exchange (CCX), remains the leading exchange trading in European environmental instruments that are listed on the Intercontinental Exchange (ICE), previously known as International Petroleum Exchange (IPE).

Carbon Leakage

Carbon leakage has been cited as an impediment to the effective reduction of carbon dioxide emissions through the Kyoto Protocol
Carbon leakage occurs when there is an increase in carbon dioxide emissions in one

country as a result of an emissions reduction by a second country with a strict climate policy.

Carbon leakage may occur for a number of reasons:
a. if the emissions policy of a country raises local costs, then another country with a more relaxed policy may have a trading advantage. If demand for these goods remains the same, production may move offshore to the cheaper country with lower standards, and global emissions will not be reduced.
b. if environmental policies in one country add a premium to certain fuels or commodities, then the demand may decline and their price may fall. Countries that do not place a premium on those items may then take up the demand and use the same supply, negating any benefit.

Carbon leakage does not necessarily imply that the increased emissions are from competing companies; climate policies may have the effect of causing companies to relocate its production to countries without a climate policy in order to take advantage of the economic benefits.

Carbon Finance

Carbon finance is a new branch of Environmental finance. Carbon finance explores the financial implications of living in a carbon-constrained world, a world in which emissions of carbon dioxide and other GHG carry a price. The general term is applied to investments in GHG emission reduction projects and the creation (origination) of financial instruments that are tradeable on the carbon market. Carbon finance is the general term applied to resources provided to a project to purchase greenhouse gas (GHG) emission reductions ("carbon" for short). Commitments of carbon finance for the purchase of carbon have grown rapidly since the first carbon purchases began less than eight years ago.

The World Bank undertakes carbon finance activities through its Carbon Finance Unit. The World Bank manages nine carbon funds and facilities comprised of public and private participants: Prototype Carbon Fund (PCF); Netherlands JI and Netherlands CDM Facilities; Community Development Carbon Fund (CDCF); BioCarbon Fund; Italian Carbon Fund; Spanish Carbon Fund; Danish Carbon Fund; and the Umbrella Carbon Facility (UCF). These funds are public or public-private partnerships managed by the World Bank as a Trustee. They operate much like a closed-end mutual fund; they purchase greenhouse gas emission reductions from projects in the developing world or in countries with economies in transition, and pay on delivery of those emission reductions. The World Bank acts as a broker to ensure that the benefits of carbon finance make their way also to the developing world and to countries with economies in transition.

Carbon Project

An entity whose greenhouse gas emissions are capped by a regulatory program has three choices for complying if they exceed their cap. First, they could pay an alternative compliance measure or "carbon tax", a default payment set by the regulatory body. The second option is to purchase carbon credits within an emissions trading scheme. The trade provides an economic disincentive to the polluter, while providing an incentive to the less polluting organisation. The final option is to invest in a carbon project. The carbon project will result in a greenhouse gas emission reduction which can be used to offset the excess emissions generated by the polluter. The financial disincentive to pollute is in the form of the capital expenditure to develop the project or the cost of purchasing the offset from the developer of the project. In this case the financial incentive would go to the owner of the carbon project.

A carbon project refers to a business initiative that receives funding because of the cut the emission of greenhouse gases (GHGs) that will result. To prove that the project will result in real, permanent, verifiable reductions in Greenhouse Gases, proof must be provided in the form of a project design document and activity reports validated by an approved third party in the case of Clean Development Mechanism (CDM) or Joint Implementation (JI) projects.

Carbon projects are developed for reasons of voluntary environmental stewardship, as well as legal compliance under an Emission Trading (also called Greenhouse Gas Cap & Trade) program.

THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

The United Nations Framework Convention on Climate Change (UNFCCC) is an international environmental treaty that sets general goals and rules for confronting climate change. It was entered into force on 21st March 1994.
The UNFCCC provides the basis for concerted international action to mitigate climate change and to adapt to its impacts. Its provisions are far-sighted, innovative and firmly embedded in the concept of sustainable development. States and regional economic integration organizations may become Parties to the Convention. The Convention has been ratified by 192 parties.

UNFCCC is based on three principles –
1. Common but differentiated responsibility;
2. Precautionary approach;
3. Sustainable Economic Growth and Development.

The Convention divides countries into three main groups according to differing commitments:
1. Annex I Parties - This include the industrialized countries that were members of the OECD (Organisation for Economic Co-operation and Development) in 1992, plus countries with economies in transition (the EIT Parties), including the Russian Federation, the Baltic States, and several Central and Eastern European States.
2. Annex II Parties - Consist of the OECD members of Annex I, but not the EIT Parties. They are required to provide financial resources to enable developing countries to undertake emissions reduction activities under the Convention Funding provided by Annex II Parties is channelled mostly through the Convention's financial mechanism.
3. Non-Annex I - These parties are mostly developing countries.

Apart from the above, Least developed countries (LDCs) - 49 Parties classified as such by the United Nations are given special consideration

The Structure of the Convention

The text of Framework Convention is contained in 26 Articles. There are two annexure to the Convention. Annexure I contains the list of 41 developed nations. 6 of these nations have been added by an amendment that entered into force on 13 August 1998, pursuant to decision 4/CP.3 adopted at COP.3. Annexure I Parties include both the relatively wealthy countries that were members of the Organization for Economic Co-operation and Development (OECD) in 1992, as well as the Economies in Transitions (EITs), including the Russian Federation, the Baltic States, and several Central and Eastern European States. Annex I Parties have higher per capita emissions than most developing countries. They also have greater financial and institutional capacity to address climate change, and hence they are expected to take a lead in modifying longer-term trends in emissions. Therefore, by the means of this Convention, Annex I Parties pledged to adopt national policies and measures that aim to return national GHG emissions to 1990 levels by the year 2000.
Annexure II of the Convention is a list of 24 countries, (who are also Annexure I Parties) who were OECD members in 1992. They have a special obligation to provide "new and additional financial resources" (Article 4.3) to developing countries to help them tackle climate change. They must also facilitate the transfer of climate-friendly technologies to both developing countries and Economies in Transition.

Objective of the Convention

Article 2 of the Convention sets out the objective of the Convention. According to this article, the Convention's ultimate objective is "to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic [originating in human activity] interference with the climate system". This objective is qualified in that it "should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner".
"Greenhouse gases" has been defined in the Article 1 of the Convention as, 'those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation.' The Convention does not provide a list of the GHGs that are to be regulated nor does it state a limit for total anthropogenic GHG emissions which would have to be respected to reach the objective. It only refers to carbon dioxide that is the greatest quantity of all GHGs and "other greenhouse gases not controlled by the Montreal Protocol". Here it should be noted that the Montreal Protocol regulates those GHGs that also contribute to the depletion of the ozone layer, for example, chlorofluorocarbons (CFCs). Another important factor is that stabilizing atmospheric concentrations of GHGs near current levels would actually require a steep reduction of current emissions. This is because, once emitted, GHGs remain in the atmosphere for a considerable length of time: carbon dioxide, for instance, stays in the climate system, on average, for a century or more.

Principles behind the Convention

The 3rd Article to the Convention, states the principles of the Convention, which though not the exhaustive list are the guide lines for the Parties. Article 3.1 stresses the principles of equity and of common but differentiated responsibilities. The concept of differentiated principle was also formulated in 1992 as Principle 7 of the Rio Declaration. The justification for this lies in the fact that the past and present GHG emissions are distributed unevenly among Parties as the industrialized countries have caused more emission of greenhouse gases than lesser developed nations for instance the U.S alone accounts for 21.13% of carbon emission of world. The per capita emission of GHGs in U.S is almost 19 times higher than that in India. Moreover, the Parties have different capacities and resources to address the causes and effects of climate change. Article 3.1 thus calls on industrialized countries to "take the lead in combating climate change and the adverse effects thereof". This is also reflected in the Convention by differentiating between Annex I Parties and those Parties not listed in Annex I to the Convention (non-Annex I Parties). Within these two basic groups, further differentiations are made to take account of the different capacities, specific situations

and vulnerabilities of Parties. While all Parties have commitments under the Convention, most of which are laid down in Article 4.1 of the Convention, Annex I Parties are subject to specific requirements to demonstrate that they are taking the lead in combating climate change. Article 4.2 requires them to adopt policies and measures to mitigate climate change by limiting their GHG emissions and enhancing their GHG sinks and reservoirs. Further differentiation occurs within Annex I. On one hand, Parties listed in Annex II to the Convention (Annex II Parties) are required to provide financial assistance and facilitate the transfer of technologies to developing countries to help them implement their commitments under the Convention. On the other hand, the group of countries with economies in transition (EITs) are granted a certain degree of flexibility in implementing their commitments, on account of recent economic and political upheavals in those countries.

Article 3.2 states that the consideration should be given to the different degrees to which Parties will be affected by climate change and by measures to implement the Convention. It calls for "full consideration of specific needs and special circumstances of developing Country and Parties, especially those that are particularly vulnerable to the adverse effects of climate change." For instance, sea level that is expected to rise by 1 meter by the end of this century can result in 17% of the land area of Bangladesh getting lost and tens of millions of people displaced.

Article 3.3 refers to the precautionary principle, which is widely reflected in environmental law and environmental agreements: "Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures" – a statement which closely mirrors the wording of Principle 15 of the Rio Declaration. Thereby, calling up industrialized nations to share the advanced technologies with lesser developed nations for reducing emission of GHGs. In line with this, Article 3.3 further stresses the need for cost-effectiveness. Accordingly, the measures undertaken to implement the Convention should avoid unnecessary burdens for the economy. One way of minimizing costs might be to implement measures jointly.

Article 3.4 lays down the right, and obligation, to promote sustainable development. This is in line with Principle 3 of the Rio Declaration. Article 3.4 specifies that policies and measures to protect the climate system "should be appropriate for the specific conditions of each Party and should be integrated with national development programmes, taking into account that economic development is essential for adopting measures to address climate change".

Article 3.5 upholds the principle of free trade, calling on the Parties to promote a "supportive and open international economic system that would lead to sustainable economic growth and sustainable development in all Parties, particularly developing country Parties, thus enabling them better to address the problems of climate change". Article 3.5 also calls on Parties to avoid measures that "constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade". This Article is closely related to Principle 12 of the Rio Declaration.

Commitments under the Convention

Article 4 of the Convention deals with commitments of the Parties to the Convention. General commitments of Parties to mitigate climate change are included in Article 4.1 (for all Parties) and more specific commitments are in Article 4.2 (for Annex I Parties). The Convention draws attention to the different needs and capacities of Parties in the implementation of the commitments contained in Article 4.1. The article is premised on the need to take into account Parties' "common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances". The Parties to the Convention will have commitments to

(a) Develop, periodically update, publish and make available to the Conference of the Parties national inventories of anthropogenic emissions of all greenhouse gases calculated using agreed methodologies.

(b) Formulate, implement, publish and regularly update national and regional programmes containing measures to mitigate climate change by addressing anthropogenic and measures to facilitate adequate adaptation to climate change.

(c) Promote and cooperate in the development, application and diffusion, including transfer, of technologies, practices and processes that control, reduce or prevent anthropogenic emissions of greenhouse gases in all relevant sectors, including the energy, transport, industry, agriculture, forestry and waste management sectors

(d) Promote sustainable management, and promote and cooperate in the conservation and enhancement of sinks and reservoirs of all greenhouse gases including biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems

(e) Cooperate in preparing for adaptation to the impacts of climate change; develop and elaborate appropriate and integrated plans for coastal zone management, water resources and agriculture, and for the protection and rehabilitation of areas, particularly in Africa, affected by drought and desertification, as well as floods;

(f) Take climate change considerations into account, to the extent feasible, in their relevant social, economic and environmental policies and actions, and employ appropriate methods, for example impact assessments, formulated and determined nationally, with a view to minimizing adverse effects on the economy, on public health and on the quality of the environment, of projects or measures undertaken by them to mitigate or adapt to climate change;

(g) Promote and cooperate in scientific, technological, technical, socio-economic and other research, systematic observation and development of data archives related to the climate system and intended to further the understanding and to reduce or eliminate the remaining uncertainties regarding the causes, effects, magnitude and timing of climate change and the economic and social consequences of various response strategies

(h) Promote and cooperate in the full, open and prompt exchange of relevant scientific, technological, technical, socio-economic and legal information related to the climate

system and climate change, and to the economic and social consequences of various response strategies.

(i) Promote and cooperate in education, training and public awareness related to climate change and encourage the widest participation in this process, including that of non-governmental organizations; and

(j) Communicate to the Conference of the Parties information related to implementation

The paragraph 2 of the article 4 of the Convention contains further commitments for industrialized nations contained in Annexure I of the Convention. Article 4.2(a) also calls for differentiation among the Annex I Parties, stating that account should be taken of "the differences in these Parties' starting points and approaches, economic structures and resource bases, the need to maintain strong and sustainable economic growth, available technologies and other individual circumstances

Paragraph 3 to 5 of the Article 4 states further requirements to be adhered to by the Parties specified in the Annexure II of the Connention.

Article 4.7 requires that to the extent to which developing country Parties will effectively implement their commitments under the Convention will depend on the effective implementation by developed country Parties of their commitments under the Convention related to financial resources and transfer of technology and will take fully into account that economic and social development and poverty eradication are the first and overriding priorities of the developing country Parties.

Institutional Bodies under the Convention

Various institutions and bodies work within the framework of the Convention. These include institutions and bodies established by the Convention like the Conference of the Parties to the Convention (COP), the subsidiary bodies (SBs), the Bureau and the secretariat and also other bodies established by the COP, in accordance with Article 7.2(i) of the Convention like committees, working groups and expert bodies. Here we will have a overview of these institutional bodies.

The Conference of the Parties (COP)

Article 7.2 defines the COP as the "supreme body" of the Convention, as it is its highest decision-making authority. The climate change process revolves around the annual sessions of the COP, which bring together all countries that are Parties to the Convention. The COP is responsible for reviewing the implementation of the Convention and any related legal instruments, and has to make the decisions necessary to promote the effective implementation of the Convention. COP is headed by its President. The office of the COP President normally rotates among the five United Nations regional groups. The President is usually the environment minister of his or her home country. She/he is elected by acclamation immediately after the opening of a

COP session. Their role is to facilitate the work of the COP and promote agreements among Parties. The work of the COP and each subsidiary body is guided by an elected Bureau. To ensure continuity, it serves not only during sessions, but between sessions as well. The COP Bureau consists of 11 officers: the COP President, seven Vice-Presidents, the Chairs of the two subsidiary bodies and a Rapporteur. It deals mainly with procedural and organizational issues arising from the COP, and advises the President. In addition, the Bureau has other technical functions, such as examining the credentials of Party representatives and reviewing – in cooperation with the secretariat – requests for accreditation by nongovernmental organizations (NGOs) and intergovernmental organizations (IGOs).

Subsidiary Bodies (SBs)

The Convention establishes two permanent subsidiary bodies (SBs), namely the Subsidiary Body for Scientific and Technological Advice (SBSTA), by Article 9, and the Subsidiary Body for Implementation (SBI), by Article 10. These bodies
advise the COP. In accordance with Articles 9.1 and 10.1, they are both multidisciplinary bodies open to participation by any Party, and governments send representatives with relevant expertise.

Subsidiary Body for Scientific and Technological Advice (SBSTA)

The SBSTA's task is to provide the COP and, as appropriate, its other subsidiary bodies "with timely advice on scientific and technological matters relating to the Convention". The following tasks are assigned to the SBSTA:

- to provide assessments of the state of scientific knowledge of climate change and its effects to the COP by reviewing the latest relevant information provided by competent bodies such as the IPCC, and evaluating its implications to the extent possible
- to prepare scientific assessments of the effects of measures taken in implementing the Convention by compiling in-depth reports on national communications, and making recommendations on technical aspects of the review process
- to identify innovative, efficient and state-of-the-art technologies and know-how and advise on how to promote their development and/or transfer by ensuring that information on them is collected and disseminated and by providing advice on them and evaluating ongoing efforts in their development and/or transfer according to need under the Convention
- to advise on scientific programmes, international cooperation in research and development and on supporting capacity-building in developing countries, and to assist the Parties in implementing Article 5 and Article 6 of the Convention, by ensuring that information on related international initiatives is collected and disseminated. In addition, to advise on education programmes, human resources

and training and on the promotion of such initiatives, and to evaluate ongoing efforts in this field according to need under the Convention

- to respond to scientific, technological and methodological questions that the COP and the SBI may put to it.

Subsidiary Body for Implementation (SBI)

The SBI's task is to assist the COP "in the assessment and review of the effective implementation of the Convention". More specifically, the following tasks are assigned to the SBI:

- to consider the information communicated by all Parties in accordance with Article 12.1, in order to assess the overall aggregated effect of the steps taken in the light of the latest scientific assessments of climate change
- to consider the information communicated by Annex I Parties in accordance with Article 12.2, in order to assist the COP in carrying out the review of the adequacy of commitments.
- to assist the COP, as appropriate, in preparing and implementing its decisions

The Secretariat

The secretariat, also known as the Climate Change Secretariat, was established as per the Article 8 of the Convention. This secretariat services the COP, the SBs, the Bureau and other bodies established by the COP. Its main function includes:

- to make practical arrangements for sessions of the Convention bodies, namely the COP and its SBs
- to assist Parties, in particular developing countries, in implementing their commitments
- to provide support to negotiations and
- to coordinate with the secretariats of other relevant international bodies, notably the Global Environment Facility (GEF) and its implementing agencies (United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP) and the World Bank), the IPCC and other relevant conventions
- to prepare official documents for the COP and the SBs, coordinating in-depth reviews of Annex I Party national communications and compiling GHG inventory data
- It also carries out tasks that are specified in the programme of work that is adopted by the COP and other tasks decided by the COP.
- The secretariat also services the bodies established by the Kyoto Protocol

Other bodies

Other bodies have been set up by the COP to undertake specific tasks. These bodies report back to the COP when they complete their work. Some of the bodies established

by COP are various Ad hoc groups and certain limited membership bodies. Some of the important Ad hoc group are , the Ad hoc Group on the Berlin Mandate (AGBM) , the Ad hoc Group on Article 13 (AG13), and Ad hoc working group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG). Beside these, several specialized bodies with a limited membership have been established to address specific areas, namely:

- the Expert Group on Technology Transfer (EGTT);
- the Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention (Consultative Group of Experts, or CGE); and
- the Least Developed Countries Expert Group (LEG).

These groups have been set up on an ad hoc and temporary basis. Their mandate and possible continuation is subject to review by the COP. The nature of their work is technical; their conclusions and recommendations must be reported either to the SBSTA or to the SBI.

A variety of groups of a more informal character has been set up on an ad hoc basis to move the negotiation process forward during sessions. Their existence is therefore usually limited to the session in which they were established.

Parties & Observers under the Convention

1. Parties

The Convention divides countries into three main groups according to differing commitments:

Annex I Parties

This include the industrialized countries that were members of the OECD (Organisation for Economic Co-operation and Development) in 1992, plus countries with economies in transition (the EIT Parties), including the Russian Federation, the Baltic States, and several Central and Eastern European States.

Annex II Parties

This consist of the OECD members of Annex I, but not the EIT Parties. They are required to provide financial resources to enable developing countries to undertake emissions reduction activities under the Convention and to help them adapt to adverse effects of climate change. In addition, they have to "take all practicable steps" to promote the development and transfer of environmentally friendly technologies to EIT

Parties and developing countries. Funding provided by Annex II Parties is channelled mostly through the Convention's financial mechanism.

Non-Annex I Parties

These are mostly developing countries. Certain groups of developing countries are recognized by the Convention as being especially vulnerable to the adverse impacts of climate change, including countries with low-lying coastal areas and those prone to desertification and drought. Others (such as countries that rely heavily on income from fossil fuel production and commerce) feel more vulnerable to the potential economic impacts of climate change response measures. The Convention emphasizes activities that promise to answer the special needs and concerns of these vulnerable countries, such as investment, insurance and technology transfer.

The 49 Parties classified as least developed countries (LDCs) by the United Nations are given special consideration under the Convention on account of their limited capacity to respond to climate change and adapt to its adverse effects. Parties are urged to take full account of the special situation of LDCs when considering funding and technology-transfer activities.

2. Observer organizations

Several categories of observer organizations also attend sessions of the COP and its subsidiary bodies. These include representatives of United Nations secretariat units and bodies, such as UNDP, UNEP and UNCTAD, as well as its specialized agencies and related organizations, such as the GEF and WMO/UNEP Intergovernmental Panel on Climate Change (IPCC). Observer organizations also include intergovernmental organizations (IGOs), such as the OECD and its International Energy Agency (IEA), along with non-governmental organizations (NGOs).
The NGOs represent a broad spectrum of interests, and embrace representatives from business and industry, environmental groups, indigenous populations, local governments and municipal authorities, research and academic institutes, parliaments, labour unions, faith groups, women and youth. Constituency groupings have emerged to facilitate interaction.

THE KYOTO PROTOCOL

The Kyoto Protocol is an international and legally binding agreement to reduce greenhouse gas emissions worldwide and is an addition to the UNFCCC treaty. The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into

force on 16 February 2005. 185 parties of the UNFCCC have ratified the Protocol. The major feature of the Kyoto Protocol is that it assigns mandatory targets for 37 industrialized nations and the European Community to reduce their emission of the specified 6 greenhouse gases (GHGs). These amounts to an average of five per cent against 1990 levels over the five-year period 2008-2012. The Protocol distinguishes between two types of countries: **Annex I** countries – with binding emission targets for Industrialized countries (West and Eastern Europe, Canada, Japan, New Zealand , Russia etc.); and **Non-Annex – I** Countries – with voluntary participation of developing countries (China, India, Phillipines, Brazil etc.)

The first commitment period under this Protocol starts from calendar year 2008 to calendar year end 2012. Annex I parties of the UNFCCC have agreed to reduce their GHGs emission by 5.2 % below 1990 levels in the Protocol's 1st commitment period

The major distinction between the Protocol and the Convention is that while the Convention encouraged industrialized countries to stabilize GHG emissions, the Protocol commits them to do so. However, to understand the Kyoto Protocol (KP), it is important to read it together with the Framework Convention on Climate Change (FCCC).

Structure of the Protocol

The text of the Kyoto Protocol comprises of a short preamble, twenty-eight Articles and two Annexure viz. Annexure A and Annexure B. Annexure A give the list of Greenhouse Gasses the emission of which is to be regulated under the Protocol. It also gives the list of sources and categories of sectors, which are significant in respect to controlling emission of GHG. Annexure B gives the name of the parties and "quantified emission limitation or reduction commitment" (QUELROS) binding upon the parties as a percentage of the base year.

Objective of the Kyoto Protocol

The preamble to the Kyoto Protocol states that the Protocol has been developed to meet the 'ultimate objective' of the FCCC as stated in its Article 2. The objective of the FCCC is "*to achieve....stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner*."

Under the Treaty, countries must meet their targets primarily through national measures. However, the Kyoto Protocol offers them an additional means of meeting their targets by way of three market-based mechanisms:
-Joint Implementation
-Clean Development Mechanism
- Emission Trading

Principles behind the Protocol

The preamble of the Protocol states that the development of Protocol has been guided by the Article 3 of FCCC. Equity and common but differentiated responsibilities are, important guiding principles of the Kyoto Protocol.

Paragraph 1 of Article 3 specifies that the Parties included in Annex I of the UNFCCC shall, individually or jointly, ensure that their aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases listed in Annex A of Kyoto Protocol do not exceed their assigned amounts, calculated pursuant to their quantified emission limitation and reduction commitments inscribed in Annex B of the Protocol and in accordance with the provisions of this Article, with a view to reducing their overall emissions of such gases by at least 5 per cent below 1990 levels in the commitment period 2008 to 2012.

The Article 3 of the FCCC lists the following guiding principles, among others:

- Nations which have become a party to the FCCC will take action to protect the climate system keeping in mind the following:
    - the benefits of present and future generations;
    - equity; and,
    - the common but differentiated responsibilities and respective capabilities of nations.
    - Developed countries are expected to take the lead in combating climate change and its adverse effects.

- The special needs and circumstances of developing countries will be given full consideration, especially the needs of those that are particularly vulnerable to the adverse effects of climate change, and those that would have to bear a disproportionate or abnormal burden under the FCCC.
- Signatories to the FCCC will take precautionary measures keeping the following in mind:
    - anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects;

- where there are serious threats of serious or irreversible damage, lack of full scientific certainty will not be used as a reason for postponing such measures;
- policies and measures to deal with climate change will be cost-effective so as to ensure global benefits at the lowest possible cost; and,
- these policies and measures should take into account different socio-economic contexts, be comprehensive, cover all relevant sources, sinks and reservoirs of greenhouse gases and adaptation, and cover all economic sectors.

Interested nations can cooperate amongst themselves to address climate change.

- Nations have a right to, and should, promote sustainable development. Policies and measures should be appropriate for the specific conditions of each nation and should be integrated with national development programmes, taking into account that economic development is essential for adopting measures to address climate change.
- Nations should cooperate to promote a supportive and open international economic system so that there is sustainable economic growth in all nations, especially developing countries, which will enable them to address climate change in a better way. Measures taken to combat climate change, including unilateral ones, should not lead to arbitrary or unjustifiable discrimination or a disguised restriction on international trade.

Highlights of Kyoto Protocol

1. Important Definitions

Article 1 of the Kyoto Protocol defines the terms like conference of parties, convention, Intergovernmental Panel on Climate Change, Montreal Protocol, parties present and voting, party and party included in Annex 1. It is important to note that party refers to the party to the Kyoto Protocol whereas as Conference of Parties has been defined as Parties to the Convention.

The term ' party included in Annex 1' means a nation included in Annex 1 to the FCCC or a Party which has made a notification under Article 4, paragraph 2 (g), of the Convention. By making this notification any party though not in Annex I of the Convention may commit itself to actions specifically provided under subparagraph (a) and (b) of Article 4(2) of the FCCC. These actions described under Article 4, sub-paragraphs 2(a) and 2(b) are:

a. adoption of national policies and measures and implementation of corresponding measures to mitigate climate change by limiting their anthropogenic emissions of greenhouse gases and protecting their sinks and reservoirs; and,

b. keeping other nations informed about their policies and measures so that this information can be reviewed by the Conference of Parties (CoP).

2. Commitments under Kyoto Protocol

Article 2 of the Kyoto Protocol states the activities that Annex 1 countries should take to meet their commitments under the Kyoto Protocol. Sub-paragraph 1 (a) lists a number of activities that Annex 1 nations can undertake to achieve their "quantified emission limitation and reduction commitments" (QUELROS). These activities are:

- enhancement of energy efficiency;
- protection and enhancement of sinks and reservoirs of greenhouse gases not controlled by the Montreal Protocol and promotion of sustainable forest management, afforestation and reforestation;
- promotion of sustainable agriculture;
- research and promotion of new and renewable sources of energy, carbon dioxide sequestration technologies, and innovative environmentally-sound technologies;
- changes in fiscal policies, including subsidies in all greenhouse gas emitting sectors;
- reforms in relevant sectors;
- limit and/or reduce greenhouse gases from the transport sector; and,
- limit and/or reduce methane emissions through better management of wastes and of the energy sector.

The article also says that countries should cooperate with each other to enhance their individual and combined effectiveness. The COP serving as the first meeting of Parties (MOP) to the Kyoto Protocol will consider ways to facilitate such cooperation.

Paragraph 2 of Article 2 states that nations will reduce greenhouse gas emissions from the aviation and marine sectors working through the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO).

Paragraph 3 states that measures taken by Annex 1 nations must minimize adverse effects, including adverse effects:

- of climate change;
- of measures taken to address climate change on international trade; and,
- social, environmental and economic impacts on other nations, especially developing countries and in particular small island nations; countries with low-

lying coastal areas; countries with arid and semi-arid areas, forested areas and areas liable to forest decay; countries with areas prone to natural disasters; countries with areas liable to drought and desertification; countries with areas of high urban atmospheric pollution; countries with areas with fragile ecosystems, including mountainous ecosystems; countries whose economies are highly dependent on income generated from production, processing and export, and/or on consumption of fossil fuels and associated energy-intensive products; land-locked and transit countries; and, least developed countries.

Measures must take into account the guiding principles of Article 3 of FCCC described in the previous chapter. The MOP will take action to promote the implementation of this sub-paragraph.

Finally paragraph 4 states that the MOP can set up mechanisms to coordinate the policies identified in sub-paragraph 2.1(a) if it considers such coordination to be beneficial.

3. Emission Reduction Targets

Paragraph 1 of Article 3 details the first commitment period and the overall reduction targets. It says, that a reduction in "*...overall emission of such gases by at least 5 per cent below 1990 levels in the commitment period 2008-2012*" has to be achieved by Annex 1 countries as a whole. The greenhouse gases are listed in Annex A of the Kyoto Protocol and the quantified emission limitation and reduction commitments (QUELROS) are listed in Annex B.

This sub-paragraph also states that Annex 1 nations can meet their reduction targets individually or jointly. It also clarifies that their "aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases" should not exceed their 'assigned amounts'.

In other words, even if the emissions of one greenhouse gas goes up, emissions in other greenhouse gases should be enough to meet the reduction target in aggregate. Separate targets have not been set for the different greenhouse gases, which was a demand of many countries and environmental groups.

The paragraph 2 of article 3 says that by 2005 nations should "have made demonstratable progress in achieving commitments ...". However, what is "demonstratable progress" has not been defined. However, this is a provision to ensure that effective greenhouse gas accounting systems have been created domestically by then. Particularly in relation to tradable emissions and joint implementation, a "certifiable national system" would be necessary to ensure and judge compliance.

Paragraphs 5 and 6 provide certain flexibilities for economies in transition listed under Annex 1. While the base year or period for the implementation of commitments will remain the same for those economies in transition which have already had their's set pursuant to the Decision 9 of CoP-2, others which have not yet submitted their first national communication under Article 12 of the FCCC can notify the MOP the historical base year or period other than 1990 for the implementation of its commitments. But the MOP will decide on the acceptance of this notification. The MOP will provide economies of transition with a certain degree of flexibility in order to enhance their ability to address climate change. This was also agreed to in sub-clause 4(6) of the FCCC. According to the Decision 9 of CoP-2, Bulgaria was granted the base year of 1989, Poland 1988, Romania 1989 and Hungary the base period of 1985-87.

Paragraph 7 and 8 explains how Annex I countries will calculate their emissions reductions in the first commitment period, which is from 2008 to 2012, a period of five years. These countries will individually take their 1990 "aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases listed in Annex A (of the Kyoto Protocol)" and multiply this figure by five. Then each country will ensure that its total reductions during the entire period of 2008 to 2012 when compared to the 1990 figure multiplied by 5 is equal to or less than the percentage ascribed to that country in Annex B. However, the Kyoto Protocol leaves one big loophole here in terms of its ability to actually control build up of greenhouse gases. The Kyoto Protocol does not specify any quantification of the 'emissions pathway' between the base year 1990 and the commitment period.

Paragraph 8 states that Annex 1 countries can take 1995 as the base year for estimating their QUELROS with respect to the three gases — hydrofluorocarbons (HFCs), perfluorocarbons and sulphur hexafluoride — which are helping to reduce damage to the ozone layer, a threat which is being addressed by the Montreal Protocol on Substances that Deplete the Ozone Layer. These gases have a potential to cause global warming.

As per the paragraph 9 of the Kyoto Protocol, commitments for subsequent periods will be established in accordance with Article 21.7 of the Kyoto Protocol. The MOP will start consideration of these commitments at least 7 years before the end of the first commitment period, which means that this exercise will begin before the start of 2006.

Paragraphs 10, 11 and 12 set rules for the benefits that an Annex I party can get from other Annex 1 or non-Annex 1 parties. These nations will have to follow the rules set by Article 6 which deals with Joint Implementation activities, Article 12 which deals with the Clean Development Mechanism, and Article 17 which deals with emissions trading.

According to these three paragraphs, countries can transfer and/or accept:

- emissions reduction units;
- parts of assigned amounts; and,
- certified emissions reductions.

Paragraph 13 states that if the emissions of an Annex 1 country are less than its assigned amount for the first commitment period, then this difference can be added to the assigned amount of that country in subsequent commitment periods.

Paragraph 14 states that Annex 1 countries must ensure that their actions do not result in adverse social, environmental or economic impacts on all developing countries and especially those identified in paragraphs 4.8 and 4.9 of the FCCC and listed above. In case there are possibilities of adverse effects, efforts will be made to minimize these adverse effects.

The first MOP will consider what actions are necessary to minimize adverse effects of climate change and/or impacts of response measures by Annex I countries on developing countries. Among other issues, MOP-I will discuss funding, insurance and technology transfer.

4. Mechanisms for attaining targets

a. Bubble Formation

Article 4 o the Kyoto Protocol contains a provision which allow developed nations to form a bubble wherein they can set out their own individual targets as long as the countries which set out to form a 'bubble' meet their targets in aggregate. However, this provision will be applicable only for first commitment period. In case countries that form a bubble fail to achieve their "total combined level of emission reduction", each party to that agreement will be responsible only for that level of emissions that have been set out in the agreement

b. Formation of national accounting system

The article 4 of the Protocol states that all Annex I nations must have in place, no later than one year prior to the start of the first commitment period, namely, by 2007, a national accounting system for estimation of emissions of greenhouse gases and their absorption by sinks. The methodology for these estimations will be developed by the Intergovernmental Panel on Climate Change and agreed by COP-3 which was held in Kyoto in December 1997. MOP-I will build upon these methodologies to develop guidelines for the national accounting systems. Where such methodologies are not used, appropriate adjustments to these methodologies can be agreed upon by MOP-I. The MOPs will take advice of IPCC, SUBSTA and other bodies to regularly review and, where necessary, revise these methodologies.

c. Joint Implementation

Joint Implementation means transfer of emissions reduction at the project level only between Annex I Parties. This is one of the three flexible mechanism provided to Annex I Parties in Kyoto Protocol for accomplishing their reduction targets. This mechanism has been discussed at length in subsequent chapter.

d. Clean development Mechanism

Article 12 of the Protocol defines Clean Development Mechanism (CDM). Unlike Article 6, this is a mechanism between industrialized countries and developing countries. This mechanism has been discussed at length in subsequent chapter.

e. Emission Trading

Article 17 of the Protocol states that the Parties included in Annex B may participate in emissions trading for the purposes of fulfilling their commitments under Article 3. This provides the Parties with another flexible mechanism under the Protocol for fulfillment of the commitment. The mechanism has been discussed at length in subsequent chapter.

Bodies under the Protocol

1. Meeting of Parties (MOP)

As per the article 13 of the Protocol, the COP, which is the supreme body of the FCCC, will also serve as the Meeting of Parties (MOP) of the Kyoto Protocol. Nations that have become parties to the FCCC but not parties to the Protocol can participate as observers in the MOP. The MOP will regularly review the implementation of the Protocol and take decisions to promote its effective implementation. It will also assess the overall effects, in particular environmental, economic and social effects, of the measures taken in pursuance of the Protocol and the extent to which progress is being made to achieve the objective of the FCCC. It will periodically examine the obligations of parties *i.e.* the adequacy of their commitments in the light of new scientific and technical knowledge and consider and adopt regular reports on the implementation of the Protocol.

The MOP will also:

- promote exchange of information on measures adopted by parties to address climate change and its effects;
- coordinate measures adopted by two or more parties, at their request, to address climate and its effects;

- develop and periodically refine comparable methodologies for the effective implementation of the KP;
- recommend any other matter necessary for the implementation of the KP;
- mobilise additional financial resources as indicated in Article 11.2 of the KP;
- establish subsidiary bodies as required;
- seek the services of competent international organisations, and intergovernmental bodies and NGOs, as necessary; and,
- undertake all other steps as may be required to implement the KP.

The first MOP will take place in conjunction with the first CoP that meets after the KP has entered into force. Subsequent ordinary sessions of the MOPs will take place every year and in conjunction with the ordinary sessions of the CoPs.

Extraordinary sessions of the MOPs will be held either if they have been decided by earlier MOPs or at the request of any party, provided one-third or more parties agree within six months of the request being communicated by the secretariat.

National or international, governmental or non-governmental agencies can attend the MOP as observers provided they are qualified in matters covered by the Protocol, they have informed the secretariat in advance, and their presence has not been objected to by at least one-third of the parties present.

2. Secretariat

As per the Article 14 of the Protocol, the Secretariat for the KP will be the same as the Secretariat for the FCCC. It will have same functions and arrangements for functioning as specified in the convention. The Secretariat shall, in addition to its functions under the FCCC, exercise the functions assigned to it under this Protocol.

3. Subsidiary Bodies

The Subsidiary Body for Scientific and Technological Advice (SBSTA) and the Subsidiary Body
for Implementation (SBI) established by Articles 9 and 10 of the Convention shall serve as, the Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body for Implementation of this Protocol. They will have same functions as specified in the convention.

EMISSION TRADING

Countries with commitments under the Kyoto Protocol to limit or reduce greenhouse gas emissions must meet their targets primarily through national measures. The three market-based mechanisms i.e Emission Trading, Joint Implementation and Clean Development Mechanism are additional means of meeting these targets. Parties with commitments under the Kyoto Protocol i.e. Annex B Parties have accepted targets for limiting or reducing emissions. These targets are expressed as levels of allowed emissions, or "assigned amounts," over the first commitment period i.e. 2008-2012. The Article 17 of the Kyoto Protocol allows countries that have emission units to spare i.e. emissions permitted to them but not used by them, to sell this excess capacity to countries that are exceeded their targets. This transaction of the excess of the assigned amount, expressed in units called Assigned Amount Units (AAU's) is called Emission Trading.

Thus, a new commodity was created in the form of emission reductions or removals. Since carbon dioxide is the principal greenhouse gas, people speak simply of trading in carbon. Carbon is now tracked and traded like any other commodity. This is known as the "carbon market." The carbon market is a key tool for reducing emissions worldwide. It was worth 30 billion USD in 2006 and is growing.

As per the Article 17 of the Protocol, the Conference of the Parties(COP) shall define the relevant principles, modalities, rules and guidelines, in particular for verification, reporting and accountability for emissions trading. Accordingly, modalities, rules and guidelines for emissions trading under Article 17 of the Kyoto Protocol is contained in decision 18 of COP 7 and Modalities for the accounting of assigned amounts under Article 7, paragraph 4, of the Kyoto Protocol is contained in decision 19 of COP 7.

Units for Trading

- **Emission Reduction Unit (ERU)** : It is a unit generated by a joint implementation project and is equal to one metric tonne of carbon dioxide equivalent, calculated using global warming potentials defined by decision 2/CP.3 or as subsequently revised in accordance with Article 5.
- **Certified Emission Reduction (CER)**: It is a unit issued pursuant to Article 12 of the Protocol i.e in Clean Development Mechanism and is equal to one metric tonne of carbon dioxide equivalent, calculated using global warming potentials defined by decision 2/CP.3 or as subsequently revised in accordance with Article 5.
- **Assigned Amount Unit (AAU)**: It is a unit issued under the Protocol to Annex B Parties and is equal to one metric tonne of carbon dioxide equivalent, calculated using global warming potentials defined by decision 2/CP.3 or as subsequently revised in accordance with Article 5. This unit is relevant in Emission Trading Mechanism.

- **Removal Unit (RMU):** It is a unit issued pursuant land use, land-use change and forestry (LULUCF) activities such as reforestation and is equal to one metric tonne of carbon calculated using global warming potentials.

Eligibility Requirement for transfer of Units

A Party included in Annex I of the Convention (FCCC) with a commitment inscribed in Annex B of the Protocol is eligible to transfer and/or acquire ERUs, CERs, AAUs, or RMUs issued in accordance with the relevant provisions, if it complies with the following eligibility requirements:

- They must have ratified the Kyoto Protocol.
- They must have calculated their assigned amount in terms of tonnes of CO2-equivalent emissions.
- They must have in place a national system for estimating emissions and removals of greenhouse gases within their territory.
- They must have in place a national registry to record and track the creation and movement of ERUs, CERs, AAUs and RMUs and must annually report such information to the secretariat.
- They must annually report information on emissions and removals to the secretariat.
- They must submit the supplementary information on assigned amount in accordance with Article 7, paragraph 1, and make any additions to, and subtractions from, assigned amount as per the provisions of the Protocol.

A Party is considered to meet the eligibility requirements referred above only after 16 months have elapsed since the submission of its report to facilitate the calculation of its assigned amount and to demonstrate its capacity to account for its emissions and assigned amount, in accordance with the modalities adopted for the accounting of assigned amount.

Moreover, a Party is considered to continue to meet the eligibility requirements referred above unless and until the enforcement branch of the compliance committee decides that the Party does not meet one or more of the eligibility requirements, has suspended the Party's eligibility and has transmitted this information to the secretariat.

Calculation of Assigned Amount Unit

The assigned amount, for the first commitment period, for each Party having a commitment inscribed in Annex B shall be equal to the percentage inscribed for it in Annex B of its aggregate anthropogenic carbon dioxide equivalent emissions of the

greenhouse gases, and from the sources, listed in Annex A in the base year, multiplied by five.

For instance, let us assume that country A had in 1990 aggregate anthropogenic carbon dioxide equivalent emissions of greenhouse gases listed in Annex A equal to 50 million tonnes of carbon equivalent (or 50mtC). Then, in the period 2008 to 2012, in case of Annex B states whose QUELROS is 95 per cent, its total aggregate anthropogenic carbon dioxide equivalent emissions of greenhouse gases must not be more than 50mtC x 5 x 0.95, i.e. 237.5mtC during the entire commitment period or an average of 47.5 mtC per year during the commitment period.

For the purpose of calculation the base year taken was 1990 except for those Parties undergoing the process of transition to a market economy that have selected a historical base year or period other than 1990, and for those Parties that have selected 1995 as the base year for total emissions of hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride. [ref. to paragraph 3 and 5 of Article 3 of Kyoto Protocol}

Further, those Annex 1 countries in which land-use changes and forestry activities constituted in 1990 net emissions of greenhouse gases (which means the total emissions from sources were more than the total absorption of emissions by sinks) could add these net emissions to their base year emissions of 1990 and thus increase their base year emissions.

Those Parties, which form a bubble in accordance with Article 4 to fulfill their commitments under the Protocol jointly, shall use the respective emission level allocated to each of the Parties in that agreement instead of the percentage inscribed for it in Annex B.

Reporting to facilitate calculation of Assigned Amount

Each Party included in Annex I were required to facilitate the calculation of its assigned amount
for the commitment period and demonstrate their capacity to account for the emissions and assigned amount. To this end, each Party were required to submit a report, in two parts.
The Part one of the report contained the following information or references to such information where it has been previously submitted to the secretariat:
(a) Complete inventories of anthropogenic emissions by sources and removals by sinks of greenhouse gases not controlled by the Montreal Protocol for all years from 1990, or another approved base year to the most recent year available

(b) Identification of its selected base year for hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride.
(c) The agreement where the Party has reached such an agreement to fulfill its commitments jointly with other Parties;
(d) Calculation of its assigned amount based on its inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases not controlled by the Montreal Protocol.
Part two of the report contained the following information or references to such information where it has been previously submitted to the secretariat:
(a) Calculation of its commitment period reserve
(b) Identification of its selection of single minimum values for tree crown cover, land area and tree height for use in accounting for its activities together with a justification of the consistency of those values with the information that has been historically reported to the Food and Agriculture Organization of the United Nations or other international bodies, and in the case of difference, an explanation of why and how such values were chosen.
(c) Identification of its election of activities for inclusion in its accounting for the first commitment period, together with information on how its national system will identify land areas associated with the activities.
(d) Identification of whether it intends to account annually or for the entire commitment period;
(e) A description of its national system
(f) A description of its national registry

Recording of assigned amount

Article 7 of the Protocol requires Parties to provide information for ensuring compliance with the emissions reduction objectives. This information are incorporated in the annual inventory of anthropogenic emissions and is put through a review process by expert teams. After this initial review and resolution of any questions of implementation relating to adjustments or the calculation of its assigned, the assigned amount of each Party is recorded in the database for the compilation and accounting of emissions and assigned amounts. Once recorded in the compilation and accounting database, the assigned amount of each Party remains fixed for the commitment period.

Additions to, and subtractions from, assigned amount for the compliance assessment

At the end of the additional period for fulfilling commitments, the following additions to the assigned amount of a Party shall be made in for the accounting of the compliance assessment for the commitment period:

- Acquisitions by the Party of ERUs

- Net acquisitions by the Party of CERs, where it acquires more than it
- Acquisitions by the Party of AAUs
- Acquisitions by the Party of
- Issuance by the Party of RMUs on the basis of its activities where such activities result in a net removal of greenhouse gases
- Carry-over by the Party of ERUs, CERs and/or AAUs from the previous commitment period.

At the end of the additional period for fulfilling commitments, the following subtractions
from the assigned amount of a Party shall be made for the accounting of the compliance assessment for the commitment period:

- Transfers by the Party of ERUs
- Transfers by the Party of AAUs
- Transfers by the Party of RMUs
- Cancellation by the Party of ERUs, CERs, AAUs and/or RMUs on the basis of its activities where such activities result in a net source of greenhouse gas emissions
- Cancellation by the Party of ERUs, CERs, AAUs and/or RMUs following determination by the compliance committee that the Party was not in compliance with its for the previous commitment period
- Other cancellations by the Party of ERUs, CERs, AAUs and/or RMUs.

Compliance assessment

Each Party included in Annex I shall retire ERUs, CERs, AAUs and/or RMUs for demonstrating its compliance with its commitment. The assessment shall be based on the comparison of the quantity of ERUs, CERs, AAUs and/or RMUs, valid for the commitment period in question, retired by the Party with its aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases, and from the sources, listed in Annex A to the Kyoto Protocol during the commitment period as reported by the Party reviewed by expert team.

Carry-over

After expiration of the additional period for fulfilling commitments and where the final compilation and accounting report indicates that the quantity of ERUs, CERs, AAUs and/or RMUs retired by the Party is at least equivalent to its anthropogenic carbon dioxide equivalent emissions of the greenhouse gases, and from the sources, for that commitment period,
the Party may carry over to the subsequent commitment period:

- Any ERUs held in its national registry, which have not been converted from RMUs and have not been retired for that commitment period or cancelled, to a maximum of 2.5 per cent of the assigned amount of that Party;
- Any CERs held in its national registry, which have not been retired for that commitment period or cancelled, to a maximum of 2.5 per of that Party;
- Any AAUs held in its national registry, which have not been retired for that commitment period or cancelled.
- However, RMUs may not be carried over to the subsequent commitment period.

Issuance of ERUs, AAUs and RMUs

Each Party included in Annex I , prior to any transactions taking place for that commitment period, issues a quantity of AAUs equivalent to its assigned calculated and recorded in its national registry. Each AAU has a unique serial number comprising the following elements:

- Commitment period: the commitment period for which the AAU is issued;
- Party of origin: the Party issuing the AAU, identified by means of the two-letter country code defined by ISO 3166;
- Type: an element identifying the unit as an AAU;
- Unit: a number unique to the AAU for the identified commitment period and
- Party of origin.

They also issue in their national registry RMUs equivalent to the net removals of anthropogenic greenhouse gases from aforestation and reforestation activity. They elect for each activity, prior to the start of the commitment period, to issue such RMUs annually or for the entire commitment period. Each RMU has a unique serial number comprising the following elements:

- Commitment period: the commitment period for which the RMU is issued;
- Party of origin: the Party included in Annex I issuing the RMU, identified by means of the two-letter country code defined by ISO 3166;
- Type: an element identifying the unit as an RMU;
- Activity: the type of activity for which the RMU was issued;
- Unit: a number unique to the RMU for the identified commitment period and
- Party of origin.

However, the Party has to ensure that the total quantity of RMUs issued into its for the commitment period does not exceed the limits established for that Party.

Prior to their transfer, each Party has to issue ERUs into its national registry by converting AAUs or RMUs previously issued by that Party and held in its national registry. An AAU or RMU is converted into an ERU by adding a project identifier to the serial number and changing the type indicator in the serial number to indicate an ERU. Other elements of the serial number of the AAU or RMU remain unchanged. The project identifier identifies the specific Jointly Implemented project for which the ERU is issued, using a number unique to the project for the Party of origin, including whether the relevant reductions in anthropogenic emissions by sources or enhancements of anthropogenic removals by sinks were verified by supervisory committee.

Transfer, acquisition, cancellation, retirement and carry-over

ERUs, CERs, AAUs and RMUs may be transferred between registries and may be transferred within registries. Party included in Annex I will have to ensure that its net acquisitions of CERs from afforestation and reforestation for the first commitment period do not exceed the limits established for that Party. Each Party will have to cancel CERs, ERUs, AAUs and/or RMUs equivalent to the net emissions of anthropogenic greenhouse gases resulting from its afforestation and reforestation activities by transferring the ERUs, CERs, AAUs and/or RMUs to the appropriate cancellation account in its national registry. Each Party will cancel ERUs, CERs, AAUs and/or RMUs for each activity for the same period for which it has elected to issue RMUs for that activity.

Registry systems under the Kyoto Protocol

Emission targets for industrialized country Parties to the Kyoto Protocol are expressed as levels of allowed emissions, or "assigned amounts", over the 2008-2012 commitment period. Such assigned amounts are denominated in tonnes (of CO2 equivalent emissions) known informally as "Kyoto units".

The ability of Parties to add to their holdings of Kyoto units (e.g. through credits for CDM) or move units from one country to another (e.g. through emissions trading or JI projects) requires registry systems that can track the location of Kyoto units at all times.

Registry systems track and record transactions by Parties under the mechanisms. The UN Climate Change Secretariat, based in Bonn, Germany, keeps an international transaction log to verify that transactions are consistent with the rules of the Protocol.

There are two types of registry:

1. National registry (by each country): Governments of the 38 Annex B Parties to the Kyoto Protocol are implementing national registries, containing accounts within which units are held in the name of the government or in the name of legal entities authorized by the government to hold and trade units
2. CDM registry (Clean Development Mechanism registry by the UNFCC): The UNFCCC secretariat, under the authority of the CDM Executive Board, has implemented the CDM registry for issuing CDM credits and distributing them to national registries. Accounts in the CDM registry are held only by CDM project participants, as the registry does not accept emissions trading between accounts.

In addition to recording the holdings of Kyoto units, these registries "settle" emissions trades by delivering units from the accounts of sellers to those of buyers, thus forming the backbone infrastructure for the carbon market.

Each registry will operate through a link established with the International transaction log (ITL) put in place and administered by the UNFCCC secretariat. The ITL verifies registry transactions, in real time, to ensure they are consistent with rules agreed under the Kyoto Protocol. The ITL requires registries to terminate transactions they propose that are found to infringe upon the Kyoto rules.

In verifying registry transactions, the ITL provides an independent check that unit holdings are being recorded accurately in registries. After the Kyoto commitment period is finished, the end status of the unit holdings for each Annex B Party will be compared with the Party's emissions over the commitment period in order to assess whether it has complied with its emission target under the Kyoto Protocol.

Meaningful emission reductions within a trading system can only occur if they can be measured at the level of operator or installation and reported to a regulator. For greenhouse gases all trading countries maintain an inventory of emissions at national and international level.

In addition to the above, the trading groups within North America maintain inventories at the state level through The **Climate Registry**. For trading between regions these inventories must be consistent, with equivalent units and measurement techniques.

Climate registry is a nonprofit organization in North America created to record and track the greenhouse gas emissions of businesses, municipalities and other organizations in 31 states of USA and 3 provinces of Canada. The registry was launched on May 8, 2007 and became operative from January 2008. It will be used to provide data for carbon-reduction initiatives. This is similar to the California Climate Action Registry that was established by California Statute as a non-profit voluntary registry for

greenhouse gas emissions. The purpose of this registry is to help companies and organizations with operations in the State to establish greenhouse gas emissions baselines against which any future emission reduction requirements may be applied.

In some industrial processes emissions can be physically measured by inserting sensors and flowmeters in chimneys and stacks, but many types of activity rely on theoretical calculations for measurement. Depending on local legislation, these measurements may require additional checks and verification by government or third party auditors, prior or post submission to the local regulator.

Guidelines under Articles 5, 7 and 8 of the Kyoto Protocol: Methodological Issues, Reporting and Review

Articles 5, 7 and 8 of the Kyoto Protocol address reporting and review of information by Annex I Parties under the Protocol, as well as national systems and methodologies for the preparation of greenhouse gas inventories.

- Article 5 commits Annex I Parties to having in place, no later than 2007, national systems for the estimation of greenhouse gas emissions by sources and removals by sinks (Article 5.1).
- Article 7 requires Annex I Parties to submit annual greenhouse gas inventories, as well as national communications, at regular intervals, both including supplementary information to demonstrate compliance with the Protocol.
- Article 8 establishes that expert review teams will review the inventories, and national communications submitted by Annex I Parties.

European Union Emission Trading System

In January 2005 the European Union Greenhouse Gas Emission Trading Scheme (EU ETS) commenced operation as the largest multi-country, multi-sector Greenhouse Gas emission trading scheme world-wide.

Allowances traded in the EU ETS will not be printed but held in accounts in electronic registries set up by Member States. All of these registries will be overseen by a Central Administrator at EU level who, through the Community independent transaction log, will check each transaction for any irregularities. In this way, the registries system keep track of the ownership of allowances in the same way as a banking system keeps track of the ownership of money.

EU emissions trading – Registry System

Domestic or regional emissions trading schemes that use Kyoto units also undertake their settlement through these registry systems. For example, under the second phase of the European Union emissions trading scheme, EU allowances are specific Kyoto units which have been designated as being valid for trading under the scheme. Transactions in EU allowances are therefore recorded automatically as transactions under the Kyoto Protocol.

As EU trading legislation sets in place rules over and above those agreed for the Kyoto Protocol, a supplemental transaction log has been implemented by the European Commission. The Community Independent Transaction Log has been in place since the start of the scheme in 2005 and EU registries are now operating with it.

For the start of the Kyoto commitment period in 2008, EU registries are to switch their connections from the CITL to the ITL. The ITL will conduct "Kyoto checks" on transactions proposed by both EU and non-EU registries. In the case of transactions involving EU registries, the ITL will forward information to the CITL so that it can conduct "supplementary checks" defined under the EU scheme.

How the EU-ETS works

The European Union Emission Trading System (EU ETS) is the largest multi-national, emissions trading scheme in the world and is a major pillar of EU climate policy. The ETS currently covers more than 10,000 installations in the energy and industrial sectors which are collectively responsible for close to half of the EU's emissions of CO_2 and 40% of its total greenhouse gas emissions.

Under the EU ETS, large emitters of carbon dioxide within the EU must monitor and annually report their CO_2 emissions, and they are obliged every year to return an amount of emission allowances to the government that is equivalent to their CO_2 emissions in that year. In order to neutralise annual irregularities in CO_2-emission levels that may occur due to extreme weather events (such as harsh winters or very hot summers), emission allowances for any plant operator subject to the EU ETS are given out for a sequence of several years at once. Each such sequence of years is called a Trading Period. The 1st EU ETS Trading Period expired in December 2007; it had covered all EU ETS emissions since January 2005. With its termination, the 1st phase EU allowances became invalid. Since January 2008, the 2nd Trading Period is under way which will last until December 2012. Currently, the installations get the allowances for free from the EU member states' governments. Besides receiving this initial allocation on a plant-by plant basis, an operator may purchase EU allowances from others

(installations, traders, the government.) If an installation has received more free allowances than it needs, it may sell them to anybody.

Emission Markets

For trading purposes, one allowance or CER (certified emission reduction) is considered equivalent to one metric tonne of CO_2 emissions. These allowances can be sold privately or in the international market at the prevailing market price. Each international transfer is validated by the UNFCCC. Each transfer of ownership within the European Union is additionally validated by the European Commission.

Climate exchanges have been established to provide a spot market in allowances, as well as futures and options market to help discover a market price and maintain liquidity.

The spot market or cash market is a commodities or securities market in which goods are sold for cash and delivered immediately. Contracts bought and sold on these markets are immediately effective. Spot markets can operate wherever the infrastructure exists to conduct the transaction. The spot market for most securities exists primarily on the Internet.

A futures exchange is a central financial exchange where people can trade standardized futures contracts; that is, a contract to buy specific quantities of a commodity or financial instrument at a specified price with delivery set at a specified time in the future.

Options are financial instruments that convey the right, but not the obligation, to engage in a future transaction on some underlying security, or in a futures contract. In other words, the holder does not have to exercise this right, unlike a forward or future.

Carbon prices are normally quoted in Euros per tonne of carbon dioxide or its equivalent (CO_2e). Other greenhouse gasses can also be traded, but are quoted as standard multiples of carbon dioxide with respect to their global warming potential. These features reduce the quota's financial impact on business, while ensuring that the quotas are met at a national and international level. Many companies now engage in emissions abatement, offsetting, and sequestration programs to generate credits that can be sold on one of the exchanges.

Some exchanges trading in carbon allowances:

1. **Chicago Climate Exchange**

www.chicagoclimatex.com

Chicago Climate Exchange (CCX) launched in 2003, is the world's first and North America's only voluntary, legally binding integrated trading system to reduce emissions of all six major greenhouse gas (GHG) with offset projects worldwide.

CCX employs independent verification, includes six greenhouse gases, and has been trading greenhouse gas emission allowances since 2003. The companies joining the exchange commit to reduce their aggregate emissions by 6% by 2010. The exchange has more than 350 members ranging from corporations like Ford, DuPont, and Motorola, to state and municipalities such as Oakland and Chicago, to educational institutions such as University of California, San Diego and University of Minnesota, to farmers and their organizations, such as the National Farmers Union and the Iowa Farm Bureau. CCX has an aggregate baseline of 226 million metric tons of CO_2 equivalent, which is equal to the United Kingdom's annual allocation under the EU ETS. CCX is operated by the public company Climate Exchange PLC, which also owns the European Climate Exchange. The exchange trades in emissions of six gases: Carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, perfluorocarbons and hydro fluorocarbons.

The trading system of CCX consists of the following:

i. The Trading Platform is a marketplace for executing trades among Registry Account Holders. For instance, National Farmers Union's Carbon Credit Program is a multi-state program that allows farmers and landowners to earn income by storing carbon in their soil through no-till crop production and long term grass seeding practices. Farmers Union has earned approval from the Chicago Climate Exchange to aggregate carbon credits. Farmers Union is enrolling producer areas of carbon into blocks of credits that will be traded on the Exchange, much like other agricultural commodities are traded.
ii. The Clearing and Settlement Platform processes all transaction information.
iii. The Registry is the official database for Carbon Financial Instruments.

2. European Climate Exchange

www.europeanclimateexchange.com

The European Climate Exchange (ECX) manages the marketing and product development for ECX Carbon Financial Instruments (ECX CFIs), listed and admitted to trading on the ICE Futures Europe's electronic platform. ECX / ICE Futures Europe is the most liquid platform for carbon emissions trading,

attracting over 85% of the exchange-traded volume in the European carbon market. ECX CFI Contract includes standardised futures and options based on EU Allowances (EUAs) and Certified Emission Reductions (CERs). More than 90 leading businesses have signed up for membership to trade ECX products. In addition, several thousand ICE clients can access the emissions market daily via banks and brokers.
ECX is a member of the Climate Exchange Plc group of companies. Other member companies include the Chicago Climate Exchange (CCX) and the Chicago Climate Futures Exchange (CCFE). **Climate Exchange Plc (CLE)** is listed on the AIM market of the London Stock Exchange.

3. **Nord Pool**

www.nordpool.com

Nord Pool (the Nordic Power Exchange) is the single power market for Norway, Denmark, Sweden and Finland. It was the world's first multinational exchange for trading electric power. As of 2008, Nord Pool is the largest power derivatives exchange and the second largest exchange in European Union emission allowances (EUAs) and global certified emission reductions (CERs) trading.

4. **Powernext**

www.powernext.fr

Powernext is a Paris-based company operating a European energy exchange, owned by NYSE Euronext, providing an electronic market, similar to a stock market, for the trading of energy futures contracts and derivatives in Europe. Created in July 2001 with the opening of the European electricity market, Powernext has built a network of over 70 European members, including energy producers, end users, banks, brokers, traders, and retailers.

5. **Multi Commodity Exchange**

www.mcxindia.com

Multi Commodity Exchange (MCX) is an independent commodity exchange based in India. It was established in 2003 and is based in Mumbai. It has an average daily turnover of around US$1.55 billion. MCX offers futures trading in Agricultural Commodities, Bullion, Ferrous & Non-ferrous metals, Pulses, Oils & Oilseeds, Energy, Plantations, Spices and other soft commodities.

MCX also carries on future trading in carbon credits which is the first initiative in Asia. Carbon credits or carbon emission reduction certificates are issued by the

Clean Development Mechanism Executive Board which is the highest international body to register projects and issue credits.

Commodity exchanges are considered as the best vehicles for trading in carbon credit. MCX being a national level online commodity exchange offers the best platform for this market.

Trading at MCX - The parties having open positions on MCX enter into bilateral physical trade as per their futures obligation. The sellers will have to submit copies of relevant documents as a proof of holding carbon credits at the time of giving intention to the Exchange. If the documents submitted by the sellers are considered acceptable as per exchange specifications, it would result in valid delivery of carbon credit. Alternatively, buyers can also choose to invest directly in projects that will enable them get a reasonable rate of return along with emission reductions.

6. **National Commodity and Derivatives Exchange**

www.ncdex.com

National Commodity & Derivatives Exchange Limited (NCDEX) is an online commodity exchange based in Mumbai, India. It commenced its operations on December 15, 2003. NCDEX is a closely held private company which is promoted by national level institutions and has an independent Board of Directors and professionals not having vested interest in commodity markets. NCDEX is regulated by Forward Market Commission (FMC) in respect of futures trading in commodities.

NCDEX also handles futures trading in carbon credits. Carbon credit futures provides transparency to markets and help producers earn remunerative returns out of environmentally clean projects.

JOINT IMPLEMENTATION

Joint implementation is one of the three flexible mechanisms under the Kyoto Protocol that allows industrialized countries to meet part of their required cuts in greenhouse-gas emissions by paying for projects that reduce emissions in other industrialized countries. The provision for this mechanism is provided in the Article 6 of the Kyoto Protocol. However, the concept of joint implementation (JI), was first introduced in

Article 4.2(a) of the United Nations Framework Convention on Climate Change (UNFCCC) which allowed Annex I countries the option of contributing to the Convention's objectives by implementing policies and measures 'jointly' with other countries.

In 1995, the first Conference of the Parties (COP1) to the UNFCCC created a pilot phase of Activities Implemented Jointly (AIJ). This pilot phase had the objective of establishing expertise with project-based mechanisms. In 1997, the third Conference of the Parties established the Kyoto Protocol, including Article 6 which stipulates that "for the purpose of meeting its commitments… any Party included in Annex I may transfer to, or acquire from, any other such Party emission reduction units resulting from projects aimed at reducing anthropogenic emissions by sources or enhancing anthropogenic removals by sinks of greenhouse gases in any sector of the economy." Thus, any Annex I Party can be a host and/or an investor country at any one point in time. The 2001 Marrakesh Accords (Decision 16/CP.7) provide the rules and modalities relating to JI. They indicate that a JI host country can qualify for JI via either of two tracks, depending on its ability to meet certain eligibility requirements.

Therefore, the mechanism known as "joint implementation," defined in Article 6 of the Kyoto Protocol, allows a country with an emission reduction or limitation commitment under the Kyoto Protocol (Annex B Party) to earn emission reduction units (ERUs) from an emission-reduction or emission removal project in another Annex B Party, each equivalent to one tonne of CO2, which can be counted towards meeting its Kyoto target.

Joint implementation offers Parties a flexible and cost-efficient means of fulfilling a part of their Kyoto commitments, while the host Party benefits from foreign investment and technology transfer.

Advantage of the mechanism

The rationale for JI is to reduce the aggregate costs of greenhouse gas (GHG) mitigation, since the environmental impact of emissions is the same irrespective of the geographic location of the emissions source. This is because the marginal abatements costs of emissions reductions across countries and sources are likely to vary significantly. Moreover, JI enables the transfer of efficient activities, technologies and techniques to countries that are hosting the projects, thereby contributing to respecting their commitment under the Kyoto Protocol (KP), as well as to sustainable development. The general expectation for JI was that the more developed Annex I countries would invest in projects in Annex I Economies in Transition (EITs) where marginal abatements costs were expected to be lower. In practice, this will likely mean facilities built in the countries of Eastern Europe and the former Soviet Union -- the "transition economies" -- paid for by Western European and North American countries. The sponsoring

governments will receive credits that may be applied to their emissions targets; the recipient nations will gain foreign investment and advanced technology. The system has advantages of flexibility and efficiency. It often is cheaper to carry out energy-efficiency work in the transition countries, and to realize greater cuts in emissions by doing so. The atmosphere benefits wherever these reductions occur.

Eligibility Requirements

JI project must provide a reduction in emissions by sources, or an enhancement of removals by sinks, that is additional to what would otherwise have occurred. Projects must have approval of the host Party and participants have to be authorized to participate by a Party involved in the project.

Projects starting as from the year 2000 may be eligible as JI projects if they meet the relevant requirements, but ERUs may only be issued for a crediting period starting after the beginning of 2008.

Decision 9 of CMP 1, spells the guidelines for implementation of Joint Implementation Projects. The paragraph 21 of the decision sets the eligibility requirement for Parties included in the Annex I of the Convention and having commitment as specified in the Annex B of the Kyoto Protocol. The highlights of these requirements are:

- It is a Party to the Kyoto Protocol
- Its assigned amount has been calculated and recorded
- It has in place a national system for the estimation of anthropogenic emissions by sources and anthropogenic removals by sinks of all greenhouse gases not controlled by the Montreal Protocol
- It has in place a national registry
- It has submitted annually the most recent required inventory, including the national inventory report and the common reporting format. For the first commitment period, the quality assessment needed for the purpose of determining eligibility to use the mechanisms shall be limited to the parts of the inventory pertaining to emissions of greenhouse gases from sources/sector categories from Annex A to the Kyoto Protocol and the submission of the annual inventory on sinks
- It submits the supplementary information on assigned amount and makes any additions to, and subtractions from, assigned amount according to requirements of the Protocol

As per the paragraph A Party is considered to meet the eligibility requirements referred above only after 16 months have elapsed since the submission of its report to facilitate the calculation of its assigned amount and to demonstrate its capacity to account for its emissions and assigned amount, in accordance with the modalities adopted for the

accounting of assigned amount. Moreover, a Party is considered to continue to meet the eligibility requirements referred above unless and until the enforcement branch of the compliance committee decides that the Party does not meet one or more of the eligibility requirements, has suspended the Party's eligibility and has transmitted this information to the secretariat.

A Party involved in a JI project are required to inform the secretariat of:

- Its designated focal point for approving projects
- Its national guidelines and procedures for approving JI projects, including the consideration of stakeholders' comments, as well as monitoring and verification.

Types of Procedures

If a host Party meets all of the eligibility requirements to transfer and/or acquire ERUs, it may verify emission reductions or enhancements of removals from a JI project as being additional to any that would otherwise occur. Upon such verification, the host Party may issue the appropriate quantity of ERUs. This procedure is commonly referred to as the "Track 1" procedure."

Under Track I, host country requirements are stricter, but there is less international oversight. Track I requires a Party to the Kyoto Protocol to establish an assigned amount and create a national registry for tracking the transfer of any assigned amounts. Countries eligible for Track I must also have a national system in place to estimate emissions and removals by sinks, they must submit an annual inventory to estimate GHG emissions and have accurate accounting of their assigned amount and submissions of information.

If a host Party does not meet all, but only a limited set of eligibility requirements, verification of emission reductions or enhancements of removals as being additional has to be done through the verification procedure under the Joint Implementation Supervisory Committee (JISC). This is known as the "Track 2" procedure.

Under this "Track 2" procedure, an independent entity accredited by the JISC has to determine whether the relevant requirements have been met before the host Party can issue and transfer ERUs. A host Party which meets all the eligibility requirements may at any time choose to use the verification procedure under the JISC (Track 2 procedure).

Hence, where a host Party does not meet all of the eligibility requirements, "Track II" has to be applied. Otherwise, it has the choice between "Track I" and "Track II".

If a host country meets all the eligibility requirements and qualifies for Track I, it is allowed to set its own national guidelines and procedures for the approval of JI projects, verification, and transaction of emission reduction units (ERUs).

If a host country does not meet all the eligibility requirements and therefore follows Track II, the host country must follow the international rules for JI project approval and verification of ERUs and be supervised by the JI Supervisory Committee (JISC).

The role of the JISC is to establish the rules of procedures for JI including the elaboration of standards and procedures for the accreditation of independent entities, and the accreditation of independent entities. These accredited independent entities (AIE) are required to undertake third party verification of a JI project under Track II. Track I guidelines are therefore more flexible than Track II because host countries can decide on the methodologies themselves without the involvement of the JISC. However, Track I JI requires a stronger capacity of the host country government and more elaborate technical requirements for baseline setting. Another important provision of the Marrakech Accords stipulates that JI projects may begin as of the year 2000, but can only generate ERUs beginning in 2008.

Joint Implementation Supervisory Committee (JISC)

The Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (COP/MOP) shall provide guidance regarding the implementation of Article 6 and exercise authority over the Article 6 Supervisory Committee.

The Joint Implementation Supervisory Committee (JISC), under the authority and guidance of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol, inter alia, supervises the verification procedure defined in paragraphs 30-45 of the JI guidelines. At its first meeting, the JISC adopted draft rules of procedure and applied them provisionally until adoption by the CMP at its second session.

The JI Supervisory Committee shall supervise, inter alia, the verification of ERUs generated by Article 6 project activities, and be responsible for:

(a) Reporting on its activities to each session of the COP/MOP;
(b) The accreditation of independent entities in accordance with specified standards and procedures
(c) The review of standards and procedures for the accreditation of independent entities giving consideration to relevant work of the Executive Board of the clean development mechanism (CDM) and, as appropriate, making recommendations to the COP/MOP on revisions to these standards and procedures;
(d) The review and revision of reporting guidelines and criteria for baselines and monitoring
in appendix B below, for consideration by the COP/MOP, giving consideration to relevant work of the Executive Board of the CDM, as appropriate;
(e) The elaboration of the Article 6 project design document, for consideration by the

COP/MOP, taking into consideration the annex on modalities and procedures for a clean development mechanism and giving consideration to relevant work of the Executive Board of the CDM, as appropriate;
(f) The review procedures set out in the Verification Procedure;
(g) The elaboration of any rules of procedure additional to those contained in the annex, for consideration by the COP/MOP.

Accredited Independent Entities (AIEs)

According to paragraphs 3 (b) and (c) of the JI guidelines the Joint Implementation Supervisory Committee (JISC) shall be responsible for the "accreditation of independent entities in accordance with standards and procedures contained in appendix A", as well as the "review of standards and procedures for the accreditation of independent entities in appendix A... , giving consideration to relevant work of the Executive Board of the clean development mechanism (CDM) and, as appropriate, making recommendations to the CMP on revisions to these standards and procedures".

Appendix A of the JI guidelines defines standards and procedures for the accreditation of independent entities.

Text of APPENDIX A of the JI GUIDELINES
Standards and procedures for the accreditation of independent entities

1. An independent entity shall:
(a) Be a legal entity (either a domestic legal entity or an international organization) and provide documentation of this status;
(b) Employ a sufficient number of persons having the necessary competence to perform all
necessary functions relevant to the verification of emission reduction units (ERUs) generated by Article 6 projects relating to the type, range and volume of work performed,
under a responsible senior executive;
(c) Have the financial stability, insurance coverage and resources required for its activities;
(d) Have sufficient arrangements to cover legal and financial liabilities arising from its activities;
(e) Have documented internal procedures for carrying out its functions including, inter alia,
procedures for the allocation of responsibilities within the organization and for handling
complaints. These procedures shall be made publicly available;

(f) Have the necessary expertise to carry out the functions specified in this and relevant decisions by the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (COP/MOP), and, in particular, have sufficient knowledge and understanding of:
(i) The guidelines for the implementation of Article 6 of the Kyoto Protocol, and relevant decisions of the COP/MOP and of the Article 6 Supervisory Committee;
(ii) Environmental issues relevant to the verification of Article 6 projects;
(iii) The technical aspects of Article 6 activities relevant to environmental issues, including expertise in the setting of baselines and monitoring of emissions and other environmental impacts;
(iv) Relevant environmental auditing requirements and methodologies;
(v) Methodologies for the accounting of anthropogenic emissions by sources and/or anthropogenic removals by sinks;
(g) Have a management structure that has overall responsibility for performance and implementation of the entity's functions, including quality assurance procedures, and all
relevant decisions relating to verification. The applicant independent entity shall make available:
(i) The names, qualifications, experience and terms of reference of the senior executive, board members, senior officers and other relevant personnel;
(ii) An organization chart showing lines of authority, responsibility and allocation of functions stemming from the senior executive;
(iii) Its quality assurance policy and procedures;
(iv) Administrative procedures, including document control;
(v) Its policy and procedures for the recruitment and training of independent entity personnel, for ensuring their competence for all necessary functions and for monitoring their performance;
(vi) Its procedures for handling complaints, appeals and disputes;
(h) Not have pending any judicial process for malpractice, fraud and/or other activity incompatible with its functions as an accredited independent entity.

2. An applicant independent entity shall meet the following operational requirements:
(a) Work in a credible, independent, non-discriminatory and transparent manner, complying with applicable national law and meeting, in particular, the following requirements:
(i) An applicant independent entity shall have a documented structure, which safeguards impartiality, including provisions to ensure the impartiality of its operations
(ii) If it is part of a larger organization, and where parts of that organization are, or may become, involved in the identification, development or financing of any Article 6 project, the applicant independent entity shall:
− Make a declaration of all the organization's actual and potential Article 6 activities;
− Clearly define the links with other parts of the organization, demonstrating that no conflicts of interest exist;

− Demonstrate that no actual or potential conflict of interest exists between its functions as an accredited independent entity and any other functions that it may have, and demonstrate how business is managed to minimize any identified risk to impartiality. The demonstration shall
cover all potential sources of conflict of interest, whether they arise from within the applicant independent entity or from the activities of related bodies;
− Demonstrate that it, together with its senior executive and staff, is not involved in any commercial, financial or other processes which might influence its judgement or endanger trust in its independence of judgement and integrity in relation to its activities, and that it complies
with any rules applicable in this respect;
(b) Have adequate arrangements to safeguard confidentiality of the information obtained
from Article 6 project participants in accordance with provisions contained in the present
annex on guidelines for the implementation of Article 6.

Verification procedure under Supervisory Committee

The verification procedure under the Article 6 Supervisory Committee is the determination by an accredited independent entity, of whether a project and the ensuing reductions of anthropogenic emissions by sources or enhancements of anthropogenic removals by sinks meet the relevant. The following processes are involved in it.

1. Submission of PDD

The project participants must submit to an accredited independent entity a project design document that contains all information needed for the determination of whether the project:

- Has been approved by the Parties involved;
- Would result in a reduction of anthropogenic emissions by sources or an enhancement of anthropogenic removals by sinks that is additional to any that would otherwise occur
- Has an appropriate baseline and monitoring plan

2. Validation by AIE

The accredited independent entity then makes the project design document publicly available through the secretariat, subject to certain confidentiality provisions and receives comments from Parties, stakeholders and UNFCCC accredited observers on the project design document and any supporting information for 30 days from the date the project design document is made publicly available.
The accredited independent entity determines whether:

- The project has been approved by the Parties involved;
- The project would result in a reduction of anthropogenic emissions by sources or an enhancement of anthropogenic removals by sinks that is additional to any that would otherwise occur
- The project has an appropriate baseline and monitoring
- Project participants have submitted to the accredited independent entity documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, in accordance with procedures as determined by the host Party, and, if those impacts are considered significant by the project participants or the host Party, have undertaken an environmental impact assessment.

The accredited independent entity shall make its determination publicly available through the secretariat, together with an explanation of its reasons, including a summary of comments received and a report of how due account was taken of these. The determination regarding a project design document shall be deemed final 45 days after the date on which the determination is made public, unless a Party involved in the project or three of the members of the JI Supervisory Committee request a review by the JI Supervisory Committee. If such a review is requested, the JI Supervisory Committee shall finalize the review as soon as possible, but no later than six months or at the second meeting following the request for review. The JI Supervisory Committee shall communicate its decision on the determination and the reasons for it to the project participants and the public. Its decision shall be final.

3. Verification of Project by AIE

Project participants submits to an accredited independent entity a report in accordance with the monitoring plan on reductions in anthropogenic emissions by sources or enhancements of anthropogenic removals by sinks that have already occurred. The report is made publicly available. The accredited independent entity, upon receipt of a report, make a determination of the reductions in anthropogenic emissions by sources or enhancements of anthropogenic removals by sinks reported by project participants provided that they were monitored and calculated in accordance guidelines. Then it makes its determination publicly available through the secretariat, together with an explanation of its reasons. This determination is deemed final 15 days after the date on which it is made public, unless a Party involved in the project or three of the members of the JI Supervisory Committee request a review by the JI Supervisory Committee. If such a review is requested, the JISC:

- At its next meeting or no later than 30 days after the formal request for the review decides on its course of action. If it decides that the request has merit, it performs a review;
- Completes its review within 30 days following its decision to perform the review;

- Informs the project participants of the outcome of the review, and make public its decision and the reasons for it.

4. Confidentiality of Report

Information obtained from project participants marked as proprietary or confidential are not to be disclosed without the written consent of the provider of the information, except as required by applicable national law of the host Party. Information used to determine whether reductions in anthropogenic emissions by sources or enhancements of anthropogenic removals by sinks are additional, to describe the baseline methodology and its application, and to support an environmental impact assessment cannot be considered as proprietary or confidential.

5. Commitment Period Reserve

Any provisions relating to the commitment period reserve or other limitations to transfers under

Article 17 does not apply to transfers by a Party of ERUs issued into its national registry that were verified in accordance with the verification procedure under the JISC.

CLEAN DEVELOPMENT MECHANISM

Clean Development Mechanism (CDM) is one of the flexible mechanisms following the Kyoto Protocol. Article 12 of this protocol states all the regulating framework of the CDM. The CDM offers industrialized countries the possibility to engage in economically and environmentally competitive emission reduction projects in developing countries (the Non-Annexure I countries). Through the CDM, certified emission reductions (**CERs**) will be generated. These certified emission reduction (CER) credits, each equivalent to one tonne of CO2, can be can be traded and sold, and used by industrialized countries for the purpose of being counted towards meeting Kyoto targets. Projects that will be implemented through the CDM have to fulfill additional criteria that will be defined by a national framework of the host countries (developing countries, where the project will be implemented). A CDM project has a pre-defined project-cycle that was defined by the UNFCCC, the official executive institution concerning these questions.

India is seen as one of the Non-Annex I countries offering the largest potential for CDM development, besides China and Brazil.

However, operational since the beginning of 2006, the CDM mechanism has already registered more than 1,000 projects and is anticipated to produce CERs amounting to

more than 2.7 billion tonnes of CO2 equivalent in the first commitment period of the Kyoto Protocol, 2008–2012.

The mechanism is seen by many as a trailblazer. It is the first global, environmental investment and credit scheme of its kind, providing a standardized emissions offset instrument, CERs.

Current Scenario of CDM

India could emerge as one of the largest beneficiaries accounting for 25 per cent of the total world carbon trade. India is considered one of the largest beneficiaries in carbon credit trade accounting for about $5bn.
Some Facts:

- CDM projects in the pipeline are > 4200 as on 23.7.2009, which are expected to generate > 2,900,000,000 CERs until end of 2012 subject to the assumption that there is No renewal of crediting periods
- Out of the approx. 4200 projects 1740 are registered which are expected to generate > 1,630,000,000 CERs until end of 2012 subject to the assumption that there is No renewal of crediting periods.
- India is the largest supplier of CERs after China.
- As on 23rd July 2009, 446 out of total 1740 projects registered by the CDM Executive Board are from India, which is next only to China with 594 projects.
- Expected Average Annual CERs from registered projects by India as on 23.7.2009 is 11.62%
- As on 24.07.2009, India has issued 68,812,951 CERs out of the total 314,550,482 CERs issued globally amounting to an average of 21.88%.
- The National CDM Authority (NCDMA) in India has accorded Host Country Approval to 1226 projects facilitating an investment of more than Rs.151,397 crores
- Projects accorded approval are in the sectors of energy efficiency, fuel switching, industrial processes, municipal solid waste and renewable energy.
- If all the 1226 projects approved by NCDMA get registered by the CDM Executive Board, they have the potential to generate 573 million Certified Emission Reductions (CERs) by the year 2012. At a conservative price of US $ 10 per CER, it corresponds to an overall inflow of approximately US $ 5.73 billion in the country by the year 2012.

Certified Emission Reduction

Certified Emission Reductions (CERs) are climate credits (or carbon credits) issued by the Clean Development Mechanism (CDM) Executive Board for emission reductions achieved by CDM projects and verified by a Designated Operational Entity (DOE) under the rules of the Kyoto Protocol. CERs can be used by Annex 1 countries in order to comply with their emission limitation targets or by operators of installations covered by the European Union Emission Trading Scheme (EU ETS) in order to comply with their obligations to surrender EU Allowances, CERs or Emission Reduction Units (ERUs) for the CO2 emissions of their installations. CERs can be held by governmental and private entities on electronic accounts. CERs are split into long-term (lCER) or temporary (tCER), depending on the likely duration of their benefit. At present, most of the approved CERs are recorded in CDM Registry accounts only. It is only when the CER is actually sitting in an operator's trading account that its value can be monetized through being traded. The UNFCCC's International Transaction Log has already validated and transferred CERs into the accounts of some national climate registries, although European operators are waiting for the European Commission to facilitate the transfer of their units into the registries of their Member States.

CDM Projects

The Clean Development Mechanism allows emission-reduction (or emission removal) projects in developing countries to earn certified emission reduction (CER) credits, each equivalent to one tonne of CO2. These CERs can be traded and sold, and used by industrialized countries to a meet a part of their emission reduction targets under the Kyoto Protocol.

The mechanism stimulates sustainable development and emission reductions, while giving industrialized countries some flexibility in how they meet their emission reduction limitation targets. While investors profit from CDM projects by obtaining reductions at costs lower than in their own countries, the gains to the developing country host parties are in the form of finance, technology, and sustainable development benefits.

The basic rules for the functioning of the CDM were agreed on at the seventh Conference of Parties (COP-7) to the UNFCCC held in Marrakesh, Morocco in October-November 2001. Projects starting in the year 2000 are eligible to earn CERs if they lead to "real, measurable, and long-term" GHG reductions, which are additional to any that would occur in the absence of the CDM project. This includes afforestation and reforestation projects, which lead to the sequestration of carbon dioxide.

At COP-7, it was decided that the following types of projects would qualify for fast-track approval procedures:

- Renewable energy projects with output capacity up to 15 MW
- Energy efficiency improvement projects which reduce energy consumption on the supply and/or demand side by up to 15 GWh annually
- Other project activities that both reduce emissions by sources and directly emit less than 15 kt CO2 equivalent annually.

The projects must qualify through a rigorous and public registration and issuance process designed to ensure real, measurable and verifiable emission reductions that are additional to what would have occurred without the project.

The mechanism is overseen by the CDM Executive Board, answerable ultimately to the countries that have ratified the Kyoto Protocol. The CDM Executive Board supervises the CDM, under the authority and guidance of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP)

In order to be considered for registration, a project must first be approved by the Designated National Authorities (DNA) of the Host country where the project is being set up.

The Designated National Authority (DNA) in India is the NCDMA:-
National Clean Development Mechanism (CDM) Authority,
Ministry of Environment and Forests
Member Secretary ,
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The projects which would be eligible to be set up as CDM projects should lead to reductions of greenhouse gases (CO2, CH4, N2O, HFC, PFC and/or SF6), for example:

- Renewable energy projects, such as: wind, solar, geothermal, (clean) biomass and hydro energy.
- Energy efficiency improvement projects.
- Transportation improvement projects.

- Projects concerning recovery and utilisation of methane, for example from waste landfills or coal mines.
- Projects concerning fossil fuel switching to less carbon-intensive sources.

Eligibility Criteria for CDM Project Activity

The Clean Development Mechanism allows industrialized nations to gain emission offsets through investing in project activities in non-industrialized nations. The purpose is both to assist in the sustainable development of non-industrialized nations and to assist industrialized nations in meeting their targets.
CDM Mechanism grants project-based emission reductions. Project-Based Emission Reductions are Emission reductions that occur from projects pursuant to JI or CDM (as opposed to "emissions trading" or transfer of assigned amount units under Article 17 of the Kyoto Protocol).

CDM Project requirements:
1. The CDM Project must promote sustainable development as defined by host countries
2. Emission reductions must be:
a. Real
b. Measurable
c. Additional
3. Funding for CDM must not divert funds from existing government development programs

CDM Projects have to satisfy the "additionality" criteria, which means – " The emission reductions of the proposed project must be additional to any that would occur in absence of the project".

Additionality: According to the Kyoto Protocol, gas emission reductions generated by Clean Development Mechanism and Joint Implementation project activities must be additional to those that otherwise would occur. Additionality is established when there is a positive difference between the emissions that occur in the baseline scenario, and the emissions that occur in the proposed project.

The project proposal should establish the following in order to qualify for consideration as CDM project activity:

- Emission Additionality: The project should lead to real, measurable and long term GHG mitigation. The additional GHG reductions are to be calculated with reference to a baseline
- Financial Additionality: The procurement of Certified Emission Reduction (CERs) should not be from Official Development Assistance (ODA)

There are other sustainable development indicators which is the prerogative of the host Party to confirm whether a clean development mechanism project activity assists it in achieving sustainable development. The CDM projects should also be oriented towards improving the quality of life of the poor from the environmental standpoint. Following aspects should be considered while designing CDM project activity:

- **Social well being:** The CDM project activity should lead to alleviation of poverty by generating additional employment, removal of social disparities and contribution to provision of basic amenities to people leading to improvement in quality of life of people.
- **Economic well being:** The CDM project activity should bring in additional investment consistent with the needs of the people
- **Environmental well being:** This should include a discussion of impact of the project activity on resource sustainability and resource degradation, if any, due to proposed activity; bio-diversity friendliness; impact on human health; reduction of levels of pollution in general
- **Technological well being:** The CDM project activity should lead to transfer of environmentally safe and sound technologies that are comparable to best practices in order to assist in upgradation of the technological base. The transfer of technology can be within the country as well from other developing countries also

Eligible Host Countries for CDM Projects

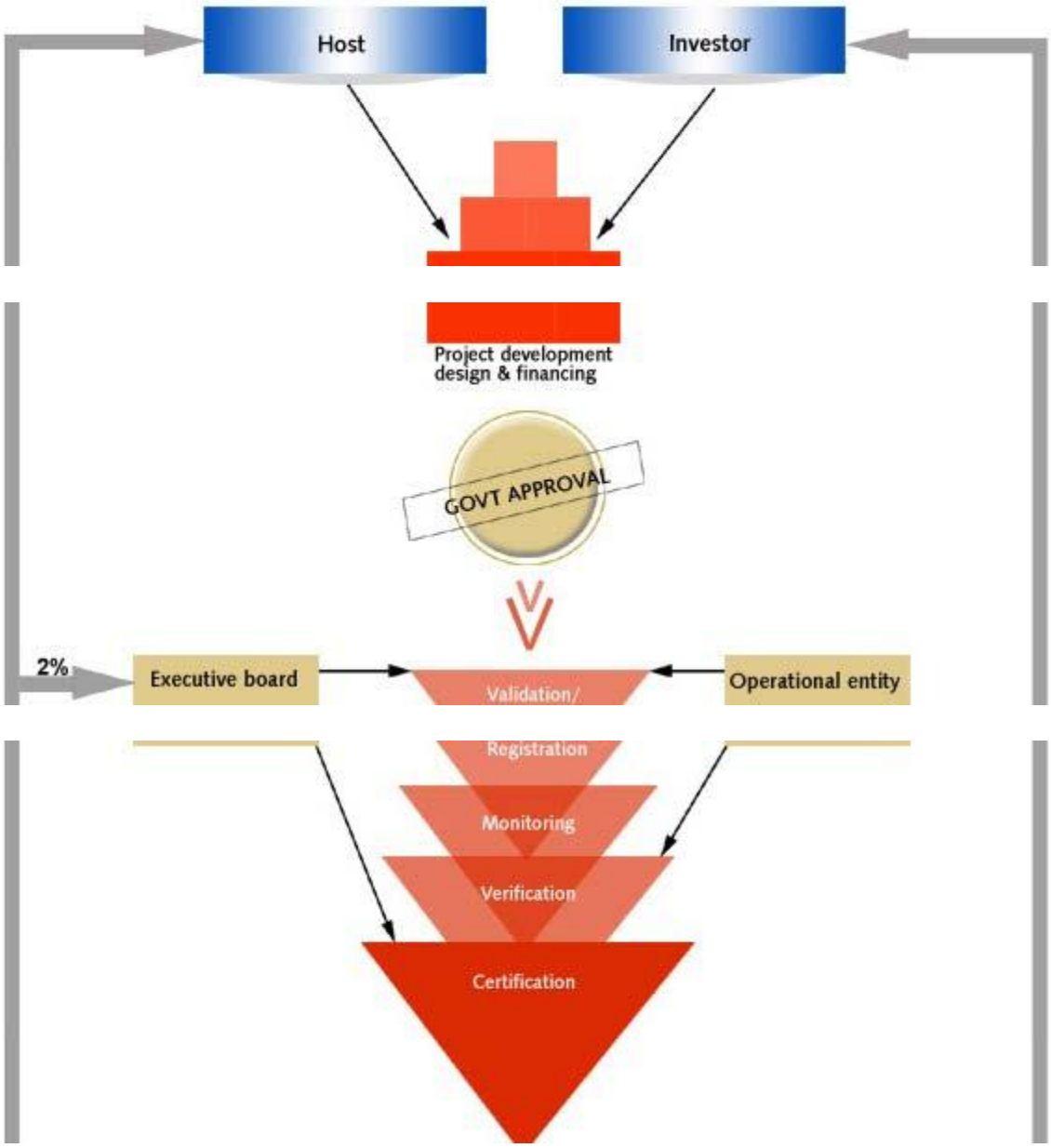
CDM projects are possible in countries that (1) have ratified the Kyoto Protocol, (2) have satisfactorily established the amount to which the country must reduce its emissions over the 2008-2012 commitment period, (3) have in place its national system for estimating emissions and removals, (4) have in place a national registry, (5) have submitted its most recent required inventory (the inventory must also be assessed for quality) and (6) submit any supplementary information required to show that it is in compliance with its emissions commitments.

Eligible CDM host countries must have designated a national authority (DNA) for the CDM. The DNA is additional to the UNFCCC Focal Point, although in reality they may

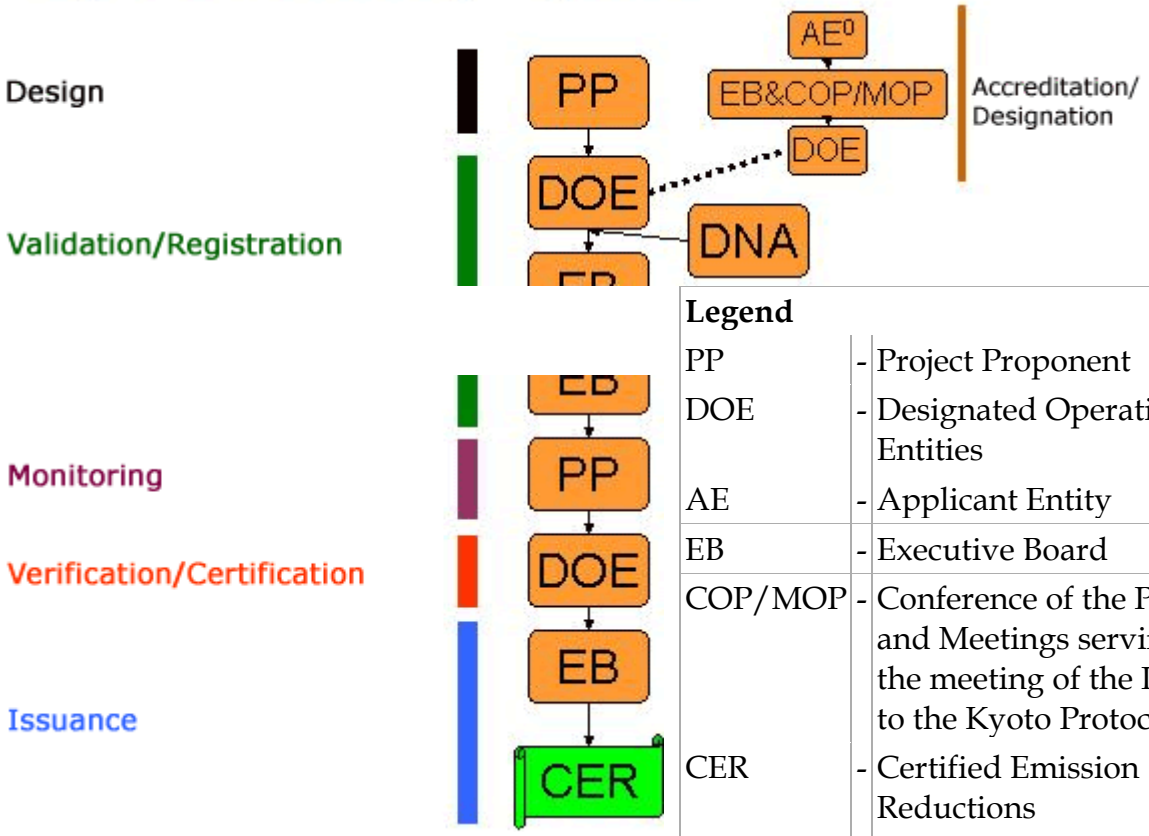
be the same organisation. The DNA is responsible for approval of hosted CDM projects and for setting national guidelines for CDM implementation. The approval of CDM projects are done in the form of Letter of Approvals (LoAs), which include a statement for voluntary participation in CDM and a declaration confirming the project's contribution to sustainable development in the host country.

The CDM Project Cycle

CDM project cycle



Full CDM Cycle Time Frame:



Legend		
PP	-	Project Proponent
DOE	-	Designated Operational Entities
AE	-	Applicant Entity
EB	-	Executive Board
COP/MOP	-	Conference of the Parties and Meetings serving as the meeting of the Parties to the Kyoto Protocol
CER	-	Certified Emission Reductions
DNA	-	Designated National Authority

1. Registration Process = TOTAL 8 –12 Months [Existing Methodology], 24 Months [for New Methodology]

- Project Design Document: Large scale - 3 to 4 months, Small scale PDD : 1 to 2 months
- Host country approval : 2 to 4 months
- Validation
  - Adopt an approved methodology : about 2 months
  - Propose a new methodology : 6 to 12 months
- Registration
  - Large scale PDD: 8 weeks after submission unless revision required.
  - Small scale PDD: 4 weeks after submission unless revision required.

2. Accrual Process Accrual Process = TOTAL about 14 Months
Data Generation – e.g Duration maybe for 1 year
Certification –About 1 Month
International Trading & Final Receipt of funds–About 1 Month

Steps in Development of CDM project

In India, clearance for a CDM project is granted by the National CDM Authority (NCDMA)and is spearheaded by the Union Ministry of Environment and Forests.

Irrespective of whether CDM projects are initiated by the private sector, non-government organisations or government agencies, their development will involve a number of essential steps. This section outlines these requirements, from a project developer's perspective.

1. Identify project and develop project concept note

The process of developing a CDM project starts by identifying an idea that will reduce GHG emissions. The initial steps require the project proponent to examine the emissions reduction resulting from the project and to ascertain if it contributes to the development priorities of the nation. This will need to take into account any national or regional requirements for project eligibility. Project developers should note that potential investors and verification bodies will also operate their own screening procedures. It is important that local stakeholders' needs and aspirations are considered at this early stage.

A **Project Concept Note (PCN)** needs to be submitted. The National CDM Authority in India has specified format for the project Concept note. PCN is a brief description of a project prepared by the project proponent entity or intermediary.

2. Project Development and Project Design Document.

Each project plan should include details of how the greenhouse gas benefits are calculated and how they will be monitored over time. In most cases the quantification of benefits will begin prior to submission to the National CDM Authority. Quantification involves the following steps:

- *Definition of the boundaries of the project* - this will result in a list of all the processes that result in uptake or release of carbon (and other greenhouse gases covered by the Kyoto Protocol) as a result of the project activities.

- *Description of the baseline and additionality* - the effect of the project is measured relative to a 'baseline scenario' that represents what would happen in the absence of the project. Additionality is the extent to which the activities promoted by the project (e.g. the planting of trees) can only have happened with the project's specific intervention

- *Quantification of baseline emissions and crediting period* - the emissions that would occur with the baseline scenario, and the number of years over which the project may take credit, will be defined using one of the procedures approved by the CDM Executive Board.

The project proposal must clearly and transparently describe methodology of determination of baseline. It should confirm to following:

• Baselines should be precise, transparent, comparable and workable;

• Should avoid overestimation;

• The methodology for determination of baseline should be homogeneous and reliable;

• Potential errors should be indicated;

• System boundaries of baselines should be established;

• Interval between updates of baselines should be clearly described;

• Role of externalities should be brought out (social, economic and environmental);

- Should include historic emission data-sets wherever available;

- Lifetime of project cycle should be clearly mentioned;

The project proponent could develop a new methodology for its project activity or could use one of the approved methodologies by the CDM Executive Board. For small scale CDM projects, the simplified procedures can be used by the project proponent. The project proposal should indicate the formulae used for calculating GHG offsets in the project and baseline scenario. Leakage, if any, within or outside the project boundary, should be clearly described. Determination of alternative project, which would have come up in absence of proposed CDM project activity should also be described in the project proposal.

- *The emissions and uptake of carbon by the project* - in the case of afforestation and reforestation projects, the uptake of carbon will be calculated using forestry growth data. The net benefit of the project is then calculated by subtracting the emissions that would have occurred in the baseline scenario.

- *Adjustment for leakage and risk* - The amount of benefit for which a project will be allowed to take credit may need to be adjusted to take account of leakage and risks. Creating a reserve or buffer of carbon offsets is one method that has been proposed for dealing with project risks. The best approach to managing leakage is to avoid it in the first place. This is best done at the project design stage, notably by:
    - Consultation with local stakeholders;
    - Integration of project design with local, regional and/or national priorities and legislation;
    - Participation of landowners or managers in the project, avoiding their exclusion or displacement;
    - Clear and fair benefit sharing through the project;
    - Awareness building of carbon project needs;
    - Effective monitoring of project activities and likely sources of leakage.

The results and methodologies used in the quantification of the greenhouse gas benefits will need to be presented in a Project Design Document.

Project Design Document (PDD) is a project specific document required under the CDM rules which will enable the Operational Entity to determine whether the project (i) has been approved by the parties involved in a project, (ii) would result in reductions of greenhouse gas emissions that are additional, (iii) has an appropriate baseline and monitoring plan.

A report summarising comments by local stakeholders and how these are taken into account in the project design must also be included in this document.

Baseline and Methodologies

The baseline is the basis for calculation of the emission reductions generated by a CDM project.
The baseline-or reference scenario-of a CDM project comprises the current level and the evolution of GHG emissions which might occur if the CDM activity were not implemented. This scenario is used for calculating emission reductions (carbon credits) to be generated by the project.
The amount of emission reduction, obviously, depends on the emissions that would have occurred without the project minus the emissions of the project. The construction of such a hypothetical scenario is known as the baseline of the project.
The baseline may be estimated through reference to emissions from similar activities and technologies in the same country or other countries, or to actual emissions prior to project implementation. The partners involved in the project could have an interest in establishing a baseline with high emissions, which would yield a risk of awarding spurious credits. Independent third party verification is meant to ameliorate this potential problem.
Project baselines must be established using one of the existing methodologies approved by the CDM Executive Board, or a new methodology. A new methodology needs to be approved by the CDM Executive Board before validation can take place.

Methodologies rely on one of the following three underlying approaches, or on a combination of them:

- Existing actual or historical emissions, as applicable.
- Emissions from a technology that represents an economically attractive course of action, taking into account barriers to investment.
- The average emissions of similar project activities undertaken in the previous five years in similar social, economic, environmental and technological circumstances, and whose performance is among the top 20% of their category.

3. ***Host country approval***

Any project wishing to participate in the CDM must obtain approval from the host government. A pro-active government National Authority for CDM will facilitate this. In addition, the host government should determine whether or not the project will lead to sustainable development benefits.

The National CDM Authority is a single window clearance for CDM projects in the country. The project proponents are required to submit one soft copy of Project Concept Note (PCN) and Project Design Document (PDD) through online form and 20 hardcopies each of PCN and PDD along with two CDs containing all the information in each of them.

The project report and CDs should be forwarded through covering letter signed by the project sponsors. The project report submitted should be properly bound. The National CDM Authority examines the documents and if there are any preliminary queries the same are asked from the project proponents. The project proposals are then put up for consideration by the National CDM Authority. The project proponent and his consultants are normally given about 10-15 days notice to come to the Authority meeting and give a brief power point presentation regarding their CDM project proposals. Members seek clarifications during the presentation and in case the members feel that some additional clarifications or information is required from the project proponent the same is informed to the presenter. Once the members of Authority are satisfied, the Host Country Approval (HCA) is issued by the Member-Secretary of the National CDM Authority.

4. Validation of the project

A CDM project must be checked by two processes – **Validation** and **Verification**. Validation is done once before initial project approval. Verification is done periodically after the project has been approved or registered.

Before projects can produce emission reductions that will be recognised by the CDM, they must be 'validated' by one of the independent companies approved by the CDM Executive Board. The project developer must submit the Project Design Document and any related documentation to the 'Designated Operational Entity'. The process will involve detailed scrutiny of the institutional capacity of the project stakeholders, the evidence underlying the calculations of carbon benefits, the systems to be used for monitoring, and of course the relevant government approvals. During this period, the Project Design Document will be made publicly available for comments.

A Designated Operational Entity (DOE) is an organization accredited provisionally by the CDM Executive Board (until confirmed by the meeting of the Parties to the Kyoto Protocol) that checks whether projects are fulfilling CDM criteria. There are currently 11 DOE's globally, and 5 represented in India.

A Designated Operational Entity under the CDM is either a domestic legal entity or an international organization accredited and designated, on a provisional basis until confirmed by the CMP, by the Executive Board (EB).

It has two key functions:

1. It validates and subsequently requests registration of a proposed CDM project activity which will be considered valid after 8 weeks if no request for review was made.

2. It verifies emission reduction of a registered CDM project activity, certifies as appropriate and requests the Board to issue Certified Emission Reductions accordingly. The issuance will be considered final 15 days after the request is made unless a request of review is made

Designated Operational Entities in India:

- TUV Suddeutschland India (www.tun-sud.in/CDM.asp)
- Det Norske Veritas (www.dnv.com/services/certification/climate_change/index.asp) (email:climatechangr@dnv.com))
- SGS United Kingdom Limited (www.sgs.com)
- tüv Rheinland India (www.tuv.com)(E-Mail: info-ind@ind.tuv.com)
- BVQI(Bureau Veritas Quality International) (www.**bureauveritas**.co.in)

Validation
Based on the project design document (PDD), the DOE will evaluate and validate the proposed CDM project, confirming :

1 - Voluntary participation of parties

2 - Comments by stakeholders have been invited

3 – Project participants have submitted documentation on environmental impacts to the DOE

4 – The project will result in reduction in greenhouse gas that are additional

5 – A methodology has been adopted in accordance with CDM rules

6 – Provisions for monitoring, verification and reporting are in accordance with CDM rules

7 - The project complies with all other CDM rules

The DOE then issues a validation report, and requests the CDM Executive Board for **registration** of the project based on this report.

5. Registration with the CDM

The validation report and Project Design Document will be submitted to the CDM Executive Board by the operational entity. Registration will be finalised after a maximum of 8 weeks from receipt, unless a review is requested. The detailed procedure for registration is stated below:

1. In accordance with paragraph 40 (f) of the CDM modalities and procedures (CDM M&P), the request for registration of a proposed CDM project activity shall be in the form of a validation report which includes the project design document, the written approval of the host Party and an explanation of how the DOE has taken due account of public comments received on the CDM-PDD.

2. A designated operational entity shall submit its validation report using the "CDM project activity registration and validation report form" (F-CDM-REG) (attached to these procedures) to request for registration of a proposed project activity.

3. In order to ensure transparency and efficiency of the registration process:
(a) A request for registration will only be processed after the secretariat has determined that all information and documentation requested in the registration form has been provided by the DOE;

(b) The date of receipt of a request for registration is the date when the deposit of the registration fee indicated in the registration form has been received by the secretariat;

(c) A request for registration" (as defined in paragraph 40 (f) of the CDM modalities and procedures) shall be made publicly available through the UNFCCC CDM web site (either by a link to the DOE web site or by being directly posted) for a period of eight (8) weeks. The secretariat shall announce a request for registration of a proposed CDM project activity on the UNFCCC CDM web site and in the CDM news facility. The announcement shall specify where the request for registration can be found, the name of the proposed CDM project activity and the first and last day of the eight-week period. The secretariat shall notify the DOE requesting a registration when and where the request for registration is posted.

(d) Unless there is a request for review, a request for registration shall, after eight weeks, bemarked in the UNFCC CDM web site as "registration completed" and the corresponding proposed CDMproject activity and related public documents recorded/displayed as registered.

Registration Fee to be paid:

A registration fee is payable by project proponents in order to have a project considered for registration. The registration fee is an upfront payment of the estimated amount due for the Administration Share of Proceeds for the first year of the project. The amount paid as a registration fee is deducted from the Administration Share of Proceeds that is due at the time of the issuance of the first year's certified emission reductions (CERs). The registration fee is calculated using the following scale:

a. USD 0.10 per certified emission reduction issued for the first 15,000 tonnes of CO2 equivalent for which issuance is requested in a given calendar year;
b. USD 0.20 per certified emission reduction issued for any amount in excess of 15,000 tonnes of CO2 equivalent for which issuance is requested in a given calendar year (EB 37, Annex 20, paragraph 1).

The fee that is actually payable is based on an average of the estimated annual quantities of CERs that will be generated over the crediting period, as set out in the PDD. The revised registration fee shall be the share of proceeds applied to the expected average annual emission reduction for the project activity over its crediting period. However, the maximum registration fee payable is capped at USD 350,000 and no registration fee has to be paid for CDM project activities with expected average annual emission reduction over the crediting period below 15,000 t CO2-equivalent.

6. Project implementation and monitoring

Registered projects, and those that have entered the implementation phase, will be required to maintain internal monitoring systems to demonstrate they are achieving the emission reductions specified in the Project Design Document

7. Verification and certification

Once the project is being implemented, it will undergo additional scrutiny by the operational entities in the form of verification and certification. The verification report is then made available to the CDM Executive Board and the general public, after which

the Certified Emission Reductions will be issued to the project developer within 15 days, unless the Executive Board requests a review.

Registration Procedure for Small Scale CDM Projects

Projects registered as small-scale CDM projects are entitled to use the simplified modalities and procedures for small-scale CDM project activities set out in 4/CMP.1, Annex II. To qualify as small scale a project activity must meet the eligibility requirements. The proposed project activity shall:

1. Meet the eligibility criteria for small-scale CDM project activities set out in paragraph 6 (c) of decision 17/CP.7. There are **three types of projects** referred to in paragraph 6(c) of decision 17/CP.7. The updated small-scale project types are as follows:

    a. Type (i): renewable energy project activities with a maximum output capacity equivalent to up to 15 megawatts (or an appropriate equivalent);
    b. Type (ii): energy efficiency improvement project activities which reduce energy consumption, on the supply and/or demand side, by up to the equivalent of 60 gigawatt hours per year; and
    c. Type (iii): other project activities that both reduce anthropogenic emissions by sources and directly emit less than 60 kilotonnes of carbon dioxide equivalent annually (17/CP.7, paragraph 6(c) as amended by 1/CMP.2, paragraph 28).

2. Conform to one of the project categories in appendix B to Annex II. This list shall not preclude other types of small-scale CDM project activities. If a proposed small-scale CDM project activity does not fall into any of the categories in appendix B, the project participants may submit a request to the Executive Board for approval of a simplified baseline and/or monitoring plan developed. The following table, showing the 14 project types, is extracted from 4/CMP.1, Annex II, Appendix B:

Project types	**Project categories**
Type (i): Renewable energy projects	A. Electricity generation by the user/household
	B. Mechanical energy for the user/enterprise
	C. Thermal energy for the user
	D. Electricity generation for a system
Type (ii): Energy efficiency improvement projects	E. Supply-side energy efficiency improvements - transmission and distribution activities

	F. Supply-side energy efficiency improvements - generation
	G. Demand-side energy efficiency programmes for specific technologies
	H. Energy efficiency and fuel switching measures for industrial facilities
	I. Energy efficiency and fuel switching measures for buildings
Type (iii): Other project activities	J. Agriculture
	K. Switching fossil fuels
	L. Emission reductions in the transport sector
	M. Methane recovery

These categories are reviewed at least once a year and updated as necessary. Any such amendments to appendix B will not apply retroactively. Moreover, these three project types are mutually exclusive - that is, project activities that contain more than one component must meet the eligibility criteria relevant to each component. It is not sufficient that a project activity come within the Type (i) limits for its renewable energy component if it exceeds the Type (iii) limits for its agricultural component. Where a project activity comprises multiple components of the same type, the combined size of the components must not exceed the limits set out above:

3. Not be a debundled component of a larger project activity.

Examples of CDM Projects

The CDM projects may vary much in their nature and context, but as the market develops further the diversity of project types is likely to grow. Examples of projects are given below, classified in 12 categories:

1. Installations based on renewable energy sources
Utilization of wind, wave/tidal, solar, hydro, biomass or geothermal energy sources in order to generate electricity or heat. In such projects the emission reductions occur by substituting electricity and/or heat generated by combustion of fossil fuels with electricity and/or heat from zero-emission sources.

2. Fuel switch to lower carbon intensive fuels
If one fossil fuel is substituted with another less carbon intensive fuel this would lead to emission reductions. An example could be switching from coal to gas-fired power or heat generation at a heat and power station or in industry.

3. Energy efficiency at supply side of energy systems
The energy industry can mitigate emissions if improving the efficiency of energy generation and distribution by reducing losses in these processes. Reducing electricity losses in transmission and distribution grid would lead to a lower consumption of fossil fuels per kWh electricity delivered and thus lower emissions.

4. Energy efficiency at the demand side.
Manufacturing industries can reduce emissions by cutting direct consumption of fossil fuels such as coal or gas, or indirectly, by minimizing energy and electricity use. These projects could be best fitted to large heavy industries, such as metallurgical, cement, glass, etc. Programmes for energy efficiency in buildings could also generate CERs.

5. Combined heat and power projects
By implementing cogeneration projects the waste heat from a conventional power plant could be utilized for industrial heating processes or supply heat to a district heating network. If the district heating is based on i.e coal combustion the heat that otherwise would have been wasted can reduce the consumption of coal, thus reducing GHG emissions.
Note: Cogeneration is the use of a heat engine or a power station to simultaneously generate both electricity and useful heat.

6. Chemical Industries
In nitric acid/ammonia production processes, N20 waste gases are often emitted. Given high GHG potential of nitrous oxide, destroying or catalysing this gas yields a high volume of CERs. Another example is reducing PFCs emissions as a result of "anode effect" in smelting of aluminium.

7. Mining and minerals production
Methane is often emitted from coal beds and mines. If it is captured it could be flared or used for electricity generation, reducing the fugitive emissions that would otherwise occur. Each ton methane abated could generate 21 CERs.

8. Reduction of methane emissions from waste handling facilities
When municipal solid waste is deposited in land-fills, methane is generated due to anaerobic decomposition processes. Similar type of processes happens in treatment of municipal wastewater and wastewater resulting from production of starch. These methane streams could be collected in order to simply flare or to generate heat/electricity in addition to reducing methane emissions to the atmosphere.

9. Fugitive emissions from fuels
This category of projects includes recovery and utilization of gas flared from oils wells and reduction of fugitive emissions from leaking gas pipelines.

10. Transport
Transport is responsible for approximately 30% of the global GHG emissions. CDM projects in this sector focus on decreasing the consumption of diesel and petrol by using more efficient vehicles and utilizing fuels such as bio-gas, bio-ethanol or bio-diesel.

11. Reduction of methane emissions from biomass
In agriculture and timber industry, biomass is often considered as waste and dumped landfills where the anaerobic decomposition leads to emission of methane. The methane emissions can be avoided by combusting of the biomass to generate heat and/or electricity.

12. Other type of projects
Other types of projects are planting of trees (afforestation /reforestation), reducing use of solvents and destruction of HFCs.

VOLUNTARY CARBON OFFSET MARKET

An emerging global market is developing for "verified emission reductions" (VERs), emission reductions that are created outside of the standardized procedures and methodologies for certified emission reductions (CERs) under the Clean Development Mechanism (CDM) of the Kyoto Protocol. International companies are trading these VERs.

VERs are non-Kyoto compliant emission reductions. Non-compliance might include “additionality” or “leakage” criteria, organizations that lack host country approval and projects that are just too small to meet the criteria that traditionally apply for certified emission reductions (CERs).

In the absence of approved protocols and procedures for these types of emission reductions, VERs are now being standardized by several companies and organizations for use in the voluntary market.

VERs are non compliant reductions, being taken up by a rising number of companies, mainly as a part of the corporate social responsibility, or for the marketing and promotional value to their business (‘green image’), or purely out of a desire to establish

more sustainable practices in the face of global warming. Verified Emissions Reductions (VERs) are not regulated by the UNFCCC.

A VER project is the voluntary world's equivalent of Certified Emission Reduction certificates (CERs) offered under the Kyoto Protocol's Clean Development Mechanism. Like CERs, a VER makes it possible for a company to reduce its greenhouse gas footprint by funding a carbon-offset project that reduces emissions. Unlike the Kyoto Market, however, the voluntary market is still struggling to come up with generally agreed upon standards and practices

Verified or Voluntary Emission Reductions

VERs are commonly understood as tradable emission reductions that have been generated according to defined standards and requirements other than the Kyoto Protocol.

VER are a unit of greenhouse gas emission reductions that has been verified by an independent auditor, but that has not yet undergone the procedures and may not yet have met the requirements for verification, certification and issuance of CERs (in the case of the CDM) or ERUs (in the case of JI) under the Kyoto Protocol.

Buyers of VERs assume all carbon-specific policy and regulatory risks (i.e. the risk that the VERs are not ultimately registered as CERs or ERUs). Buyers therefore tend to pay a discounted price for VERs, which takes the inherent regulatory risks into account.

Carbon Offset Projects

A "carbon offset" is an emission reduction credit from another organization's project that results in less carbon dioxide or other greenhouse gases in the atmosphere than would otherwise occur. Carbon Offsets are typically measured in tons of CO2 equivalents (or 'CO2e') and are bought and sold through a number of international brokers, online retailers, and trading platforms.

It is a reduction of one metric ton of greenhouse gas emissions (expressed as a CO2 equivalent, or CO2e) below a baseline or business-as-usual level.

Many types of activities can generate carbon offsets. Renewable energy such as wind energy, or installations of solar, small hydro, geothermal, and biomass energy can all create carbon offsets by displacing fossil fuels. Other types of offsets available for sale on the market include those resulting from energy efficiency projects, methane capture from landfills or livestock, destruction of potent greenhouse gases such as halocarbons,

and carbon sequestration projects (through reforestation, or agriculture) that absorb carbon dioxide from the atmosphere.

Parties Involved in a Carbon Offset Project

Even though the parties involved differ from project to project some general categories and types of stakeholders are:

1. Project Owner
The operator and owner of the physical installation where the emission reduction project takes place can be any private person, company or other organisation.

2. Project Developers
A person or organisation with the intention to develop an emission reduction project could be the project owner, a consultant or specialized services provider.

3. Project Funders
Banks, private equity firms, private investors, non-profit organizations and other organizations may lend or invest equity to fund a project. Some of the standards have rules to what kind of funding, aside from the offset revenue, are acceptable for an offset project.

4. Stakeholders
Stakeholders are individuals and organizations that are directly or indirectly affected by the emission reduction project. Stakeholders include the parties interested in developing a specific project (e.g. owner, developer, funder, local population, host community), parties affected by the project (e.g. local population, host community environmental and human rights advocates) and national and international authorities.

5. Third Party Auditors
The CDM and many of the voluntary offset standards require a third-party auditor to validate and verify a project's climate saving potential and achieved emission reductions. Under CDM the auditors are called Designated Operational Entities (DOEs). To minimize conflict of interest, the validating DOE cannot also conduct project verification.

6. Standards Organisation
In the absence of national and international legislation, standard organizations define a set of rules and criteria for voluntary emission reduction credits.

7. Brokers and Exchanges

In the wholesale market, emission offset buyers and sellers can have a transaction facilitated by brokers or exchanges. Exchanges are usually preferred for frequent trades or large volumes of products with standardized contracts or products, while brokers typically arrange transactions for non-standardized products, occasionally traded and often in small volumes.

8. Trader
Professional emission reduction traders purchase and sell emission reductions by taking advantage of market price distortions and arbitrage possibilities.

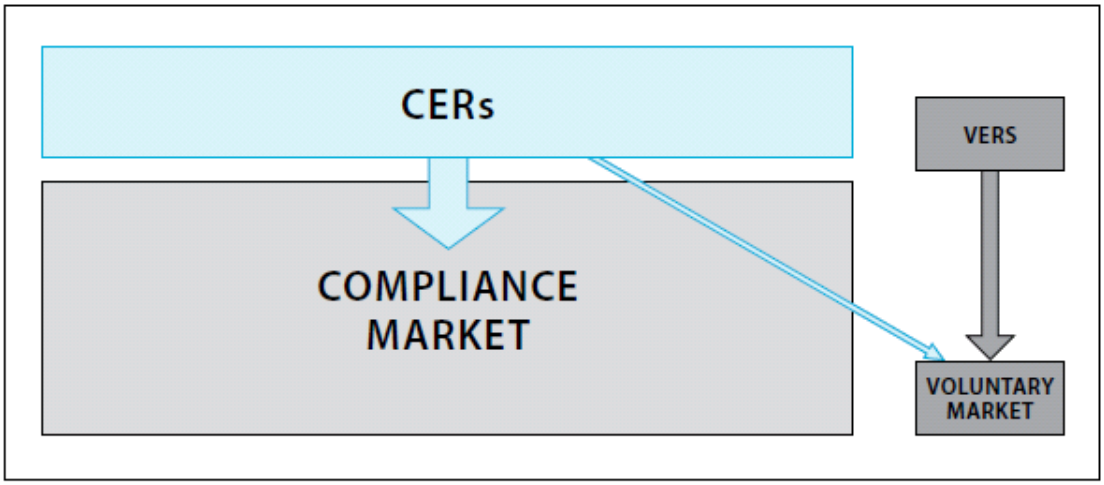
9. Offset Providers
Offset providers act as aggregators and retailers between project developers and buyers. They provide a convenient way for consumers and businesses to access a portfolio of project offsets.

10. Final buyers
Individuals and organizations purchase carbon offsets for counterbalancing GHG emissions. Therefore, the final buyer has no interest in reselling the offset but will prompt the retirement of the underlying carbon offset.

Voluntary Carbon Offset Market

The voluntary carbon markets function outside of the compliance market. They enable businesses, governments, NGOs, and individuals to offset their emissions by purchasing offsets that were created either through CDM or in the voluntary market . The latter are called VERs (Verified or Voluntary Emissions Reductions). About 17% of the offsets sold in the voluntary market in 2006 were sourced from CDM projects (Hamilton, 2007).

Carbon Offsets in the Compliance and Voluntary Markets:



[Source: Making Sense of the Voluntary Carbon Market: A Comparison of Carbon Offset Standards; by the Stockholm Environment Institute and Tricorona. March 2008.]

Carbon offsetting is an increasingly popular means of taking action. By paying someone else to reduce GHG emissions elsewhere, the purchaser of a carbon offset aims to compensate for – or "offset" – their own emissions.

Carbon offset markets exist both under compliance schemes and as voluntary programs.
Compliance markets are created and regulated by mandatory regional , national, and international carbon reduction regimes, such as the Kyoto Protocol and the European Union's Emissions Trading Scheme. Voluntary offset markets function outside of the compliance markets and enable companies and individuals to purchase carbon offsets on a voluntary basis.

Carbon offset markets have been promoted as an important part of the solution to the climate crisis because of their economic and environmental efficiency and their potential to deliver sustainability co-benefits through technology transfer and capacity building.

The voluntary carbon offset market in particular has been promoted for the following reasons:

1. Possibility of Broad Participation
The voluntary carbon market enables those in unregulated sectors or countries that have not ratified Kyoto, such as the US, to offset their emissions.

2. Preparation for Future Participation

The voluntary carbon market enables companies to gain experience with carbon inventories, emissions reductions and carbon markets. This may facilitate future participation in a regulated cap-and-trade system.

3. Innovation and Experimentation
Because the voluntary market is not subject to the same level of oversight, management, and regulation as the compliance market, project developers are more flexible to implement projects that might otherwise not be viable (e.g. projects that are too small or too disaggregated).

4. Corporate Goodwill
Corporations can benefit from the positive public relations associated with the voluntary reduction of emissions.

5. Voluntary and compliance offset mechanisms have the potential to strengthen climate policies and address equity concerns.

The voluntary market can help achieve emissions reductions with projects that are too small for CDM, projects set in countries without a Kyoto target, or reductions that are ineligible for CDM for formal reasons other than quality (e.g. China CDM requires major Chinese ownership in project).

Purchasing Carbon Offsets / VERs

As with any purchase, buyers need to choose their offsets carefully, particularly as the voluntary offset market is largely unregulated.

Issues to consider when purchasing offsets include:
1. Carbon Offset project type.
For example, although quite popular, offsets from tree-planting projects are problematic for a number of reasons, including their lack of permanence and the fact that these projects do not address our dependence on fossil fuels. Similarly, offset projects involving the destruction of halocarbon gases such as HFC-23 have sustained numerous criticisms, including the fact that they actually result in a perverse incentive (due to the sheer volume of offsets - and profits - that they generate) for more of the ozone-depleting gas to be created. The price of offsets from these projects is also so low (due to the very high global warming potential of the gas) that they tend to flood the market and squeeze out more sustainable offset projects, like solar and wind.

2. Additionality
An offset project is considered additional if it isn't business as usual. Typically this means that the project wouldn't have happened without the extra funding from the sale

of offsets. Additionality is extremely important, as the entire concept of offsetting - i.e. purchasing greenhouse gas reduction credits from a project elsewhere to neutralize one's own emissions - is based on the premise that those reductions wouldn't have happened otherwise. Only by buying offsets that have met additionality criteria can you be assured that your purchase is resulting in a net benefit for the climate.

3. Validation and verification of the project by reputable third-parties; steps by the project developer to ensure that each offset is only sold once (e.g. by listing the offsets on a public registry); and systems in place to control 'leakage', where the creation of a GHG reduction in one region causes an unintended increase in GHG emissions somewhere else (for example, protecting a forest in one location could simply shift logging to a forested area in a new location).

Some questions that potential buyers can ask of offset vendors are:

- Do your offsets result from specific projects?
- Do you use an objective standard to ensure the additionality and quality of the offsets you sell?
- How do you demonstrate that the projects in your portfolio would not have happened without the greenhouse gas offset market?
- Have your offsets been validated against a third-party standard by a credible source?
- Do you sell offsets that will actually accrue in the future? If so, how long into the future, and can you explain why you need to 'forward sell' the offsets?
- Can you demonstrate that your offsets are not sold to multiple buyers?
- What are you doing to educate your buyers about climate change and the need for climate change policy?

Because it can be difficult for offset buyers to get clear answers to each of the above questions, a good way to ensure that your offset purchase is making a positive contribution to the climate is to purchase offsets that meet recognized standards. Just as consumers can feel confident when purchasing food products that meet strict third-party standards for organic agriculture, standards for carbon offsets provide assurance that certain criteria are met when the offset is developed and sold.

Standards for measurement and recognition of VERs

The voluntary offset market in particular has been criticised for its lack of transparency,

quality assurance and third-party standards. To address these shortcomings, over a dozen voluntary offset standards have been developed in the last few years. Each standard has a slightly different focus and none has so far managed to establish itself as the industry standard. Some closely mirror compliance market standards, while others take a more lenient approach in order to lessen the administrative burden and enable as many credits as possible to enter the market. Certain standards are limited to particular project types (e.g. forestry) while others exclude some project types in order to focus on the social benefits of carbon projects. It is important to note that the vast majority of voluntary offsets are currently not certified by any third-party standard.

Well-designed standards will help the voluntary market mature and grow

1. *Voluntary Carbon Standard*
   http://www.v-c-s.org

   The Voluntary Carbon Standard (VCS), a standard for measurement and recognition of VERs was established by The Climate Group (TCG), the International Emissions Trading Association (IETA) and the World Economic Forum (WEF) in 2006. It created a trusted and tradable voluntary offset credit; the Voluntary Carbon Unit. (VCU).

   The VCS Program provides a robust, new global standard and program for approval of credible voluntary offsets. It focuses on GHG reduction attributes only and does not require projects to have additional environmental or social benefits. The VCS 2007 is broadly supported by the carbon offset industry. VCS approved carbon offsets are registered and traded as Voluntary Carbon Units (VCUs) and represent emissions reductions of 1 metric tonne of CO2.
   VCS offsets must be real (have happened), additional (beyond business-as-usual activities), measurable, permanent (not temporarily displace emissions), independently verified and unique (not used more than once to offset emissions).

   The purpose is to provide a detailed description of the minimum quality level that any voluntary emission reduction project needs to satisfy in order for its reductions to meet the Voluntary Carbon Standard, be recognized as a source of Voluntary Carbon Units (VCU) and to become eligible for registration into a VCU Registry. Once registered in a VCU Registry, the VCUs become fundable and tradable instruments between market participants. In addition, they provide a guide for certification entities on how to verify compliance of voluntary emission reduction projects with the Voluntary Carbon Standard. The VCS will initially reference current CDM accounting and verification standards.

2. The Gold Standard
   http://www.cdmgoldstandard.org

Founded by the World Wildlife Foundation (WWF), SSN and Helio International, In 2003, the Gold Standard is a non-profit foundation under Swiss Law and funded by public and private donors. A methodology for voluntary offset projects was launched in May 2006. The Gold Standard Foundation offers labeling for voluntary offset projects.

Individuals and organisations may choose to buy carbon credits to offset their greenhouse gas impact, even if they are not bound to do so under the Kyoto Protocol.

The Gold Standard is widely considered to be the highest standard in the world for carbon offsets. It ensures that key environmental criteria have been met by offset projects that carry its label. Significantly, only offsets from energy efficiency and renewable energy projects qualify for the Gold Standard, as these projects encourage a shift away from fossil fuel use and carry inherently low environmental risks. Tree planting projects are explicitly excluded by The Gold Standard.

Gold Standard projects must meet very high additionality criteria to ensure that they contribute to the adoption of additional sustainable energy projects, rather than simply funding existing projects. The Gold Standard also includes social and environmental indicators to ensure the offset project contributes to sustainable development goals in the country where the project is based. All Gold Standard projects have been independently verified by a third party to ensure integrity.

Currently, The Gold Standard is restricted to offset projects in countries that don't have emission reduction targets under the Kyoto Protocol, which are primarily developing countries.

3. *American Carbon Registry (formerly known as the GHG Registry) by Environmental Resources Trust (ERT)*

   Founded by the Environmental Defense Fund in 1996, Environmental Resources Trust (ERT) created the world's first private greenhouse gas emissions registry in 1997, the GHG Registry. The GHG Registry was officially re-launched as the American Carbon Registry (www.americancarbonregistry.org). This US registry includes the American Carbon Registry Operating Standard, a corporate inventory protocol and various industry and project protocols as well as an upgraded trading platform.

   The American Carbon Registry® is designed to:

- Provide transparency over ownership claims concerning emission reductions
- Support market transactions of verified emission reductions
- Record validated greenhouse gas emissions profiles
- Document the environmental integrity of registered GHG emissions
- American Carbon Registry utilizes ERT's rigorous screening process (www.ert.net), which enables cost-effective registration of high quality GHG inventories and Verified Emission Reductions, denominated in units of metrics tons and labeled as Emissions Reduction Tons ("ERTs").

  Buyers of verified project-based carbon offsets may use the American Carbon Registry® to identify and contact potential sellers and to support and document their purchases. Sellers of verified project-based carbon offsets may use the American Carbon Registry® to advertise and promote their projects, document their validity and support the sales process.

4. *VER+ Standard by TÜV SÜD*
   www.tuev-sued.de/climatechange

VER+ is the TÜV SÜD standard for projects targeting at Verified Emission Reductions. The VER+ closely follows the Kyoto Protocol's project-based mechanisms (CDM and JI). The VER+ standard was developed by TÜV SÜD, a Designated Operational Entity (DOE) for the validation and verification of CDM projects. It was designed for roject developers who have projects that cannot be implemented under CDM yet who want to use very imilar procedures as the CDM. The VER+ was launched n mid 2007.

In principle the criteria for VER+ are in line with those for the Kyoto Protocol project based mechanisms (JI and CDM), including the requirement on project additionality proving that the project is not a business as usual scenario. The main difference to regular JI and CDM activities comprises that VER+ projects are not brought to registration with UNFCCC and therefore will not be accounted on any Annex-I-country's Kyoto balance. For projects in developing countries larger flexibility is provided on the choice of the applied methodologies, which may be composed according to the guidelines applied for JI projects.

5. *Green-e Standard by the Center for Resource Solutions (CRS)*

Green-e Climate is the America's first certification program for carbon offsets sold to consumers on the retail market. This consumer-protection program strengthens the voluntary market by providing credible oversight and transparency to retail greenhouse gas (GHG) emission reduction products (offsets), from beginning to end. Consumers purchasing Green-e Climate Certified offsets have clear information about the projects their GHG reductions are sourced from, and are guaranteed that no one else can claim their offset. The program verifies that a seller's supply of offsets equals their sales, that GHG reductions are independently certified, and that consumer disclosures are accurate.

The Center for Resource Solutions initiated a greenhouse gas product certification program in 2006, followed by comprehensive stakeholder input. The program is designed to certify carbon offsets that are created for projects that already have accounting and verification systems in place. The Green-e program provides consumer protection by providing an enforcement mechanism, requiring disclosure of offset marketer information to buyers.

6. *The GHG CleanProjects™ Registry by the Canadian Standards Association (CSA)*

   The Canadian Standards Association (CSA) designed The GHG CleanProjects™ Registry. The GHG CleanProjects™ Registry's focused mandate relates to the listing and delisting of greenhouse gas projects and resulting verified emission reductions and removals. Through its serialization engine, the GHG CleanProjects™ Registry's tags each tonne of verified emission reductions/removal with a unique serial number. Information displayed in the GHG CleanProjects™ Registry may be useful for corporate risk management, voluntary initiatives, GHG markets and regulatory reporting/compliance. It offers a web-based public location that is accessible world-wide.

   The GHG CleanProjects™ Registry's is based on ISO 14064 standards for greenhouse gas inventory and reporting, which were adopted in March 2006 by the international community:
   - ISO 14064–2 specifies principles, requirements and provides guidance at the project level for quantifying and reporting activities intended to cause GHG emission reductions or removal enhancements.
   - ISO 14064–3 specifies principles and requirements and provides guidance for those conducting or managing the validation and or verification of a project's GHG emission reductions/removals.

   CSA continues to offer the 2 following products since acquiring Canada's Climate Change Voluntary Challenge & Registry Inc. (VCR Inc.) on January 1, 2005:

a. Canadian GHG Challenge Registry © - Showcases organizations' actions which contribute towards the reduction of GHG emissions and allows for the comparison and publishing of best practices.
b. Canadian GHG Reductions Registry © - Provides a service for organizations that wish to have GHG reduction projects posted.

7. The Climate, Community & Biodiversity Standards (CCBS)
http://www.climate-standards.org/

The Climate, Community & Biodiversity Standards (CCBS) focuses exclusively on biosequestration projects and emphasizes the social and environmental benefits of such projects. CCBS is a project design standard and offers rules and guidance for project design and development. It has a very well developed stakeholder process and stresses environmental cobenefits.

The CCBS was developed by the Climate, Community and Biodiversity Alliance (CCBA) with feedback and suggestions from independent experts. CCBA is a partnership of non-governmental organizations, corporations and research institutes, such as Conservation International, The Nature Conservancy, CARE, Sustainable Forestry Management, BP and CATIE. The first edition was released in May 2005.

8. Plan Vivo
Plan Vivo is a standard for community-based agro forestry projects and focuses on promoting sustainable livelihoods in rural communities.

9. *Chicago Climate Exchange*
http://www.chicagoclimatex.com

The Chicago Climate Exchange (CCX) is a voluntary GHG emissions cap-and-trade scheme based in North America. Although participation is voluntary, compliance with emission reduction objectives is legally binding once a member joins. CCX has as part of its cap-and-trade scheme an offset programme with full-fledged carbon offset standard. CCX members commit to reduce their emissions by a fixed amount below the established baseline level. Members who cannot achieve the reduction target through cutting their emissions internally can meet their compliance commitment by purchasing emission allowances called Carbon Financial Instruments; CFI) through CCX's electronic trading platform from other CCX Members that reduce their emissions beyond the reduction target. Offsets from projects implemented through the CCX offset programme can also be used to comply with reduction targets. Total use of offsets for compliance is limited to no more that one half of the required reductions.

10. *Voluntary Offset Standard*
http://www.carboninvestors.org/

The Voluntary Offset Standard (VOS) is a carbon offset screen. Offset Standard Screens are not full-fledged standards by themselves but accept projects that were implemented under other standards and adhere to their screening standards.

VOS accepts other standards and methodologies using certain screening criteria. It currently accepts Gold Standards VER projects and projects that employ CDM procedures but which are implemented in countries that have not ratified the Kyoto Protocol and are
therefore not eligible for CDM.

The International Carbon Investors and Services (INCIS) launched the VOS in June 2007. INCIS is a not-for-profit association of large investment companies that provide carbon-related investments and services. INCIS has 26 members (as of November 2007).

INCIS was initially set up as the "European Carbon Investors and Services" but has since its launch expanded to represent the interests of 26 members based both within and outside of Europe. These include, among others, ABN AMRO, Baker & McKenzie, Barclays Capital, Climate Change Capital, Credit Suisse, Deutsche Bank, Fortis, ING, MGM International, Morgan Stanley, and Standard Bank.

Key Elements of Carbon Offsets Standards

No standard can ever be perfect, and each of the available standards is based on a particular view of the voluntary offset market. However notwithstanding these differences, the best and most successful standards will be those that are simple yet rigorous and have very wide support from carbon project developers, offset traders and buyers, environmental NGOs and the financial industry.

A complete and fullfledged carbon offset standard must include the following three components :

1. Accounting Standards
Accounting standards ensure that offsets are "real, additional, and permanent." They include definitions and rules for the elements that are essential during the design and early implementation phase of a project. These include additionality and baseline

methodologies, definitions about accepted project types and methodologies, validation of project activity etc

2. Monitoring, Verification and Certification Standards
Ensure that offset projects perform as was predicted during the project design. Certification rules are used to quantify the actual carbon savings that can enter the market once the project is running. Verification and certification are ex-post assessments of what has actually been produced, as opposed to validation which is the ex-ante assessment of whether a project qualifies against a standard, provided it is going to do what it promises in the project design documentation.

3. Registration and Enforcement Systems
Registration and Enforcement Systems ensure that carbon offsets are only sold once and clarify ownership and enable trading of offsets. They must include a registry with publicly available information to uniquely identify offset projects and a system to transparently track ownership of offsets.

Conclusion

In 2007, the World Bank Institute reported that the total global market in 2006 for voluntary offsets was over $100 million with prices ranging from $1 to $80 for over 10 million tons of CO2 equivalent emission reductions.

Companies like 3C based in Frankfurt, Germany have developed a carbon fund available for the purchase of voluntary emission reduction credits around the world; they are specifically looking for projects that fall outside of CDM criteria. They work with companies like The Climate Trust in Oregon that supplies the offsets that 3C seek, including projects that power truck stops at night, supplying an electric energy source that emits fewer emission than idling trucks.

It is estimated that the voluntary market may be almost equal to the market value of today's CDM market by 2011. With this growth prospect and a buyers market that currently seeks emission offsets, a global standard for VERs is most certainly on the way, one that provides input to any mandatory schemes that are developed, and oversight for credible VERs in the future.

THE ROAD AHEAD

Addressing climate change can be considered an integral element of sustainable development policies of Nations. National circumstances and the strengths of

institutions determine how development policies impact GHG emissions. The concept of carbon credits came into existence as a result of increasing awareness of the need for controlling emissions.

We are running out of time. New scientific research suggests that climate change is taking place faster than foreseen in studies considered so far.

As the 2012 deadline is drawing close, countries are in a hurry to meet their commitments. By the end of the first commitment period of the Kyoto Protocol in 2012, a new international framework needs to have been negotiated and ratified that can deliver the stringent emission reductions the Intergovernmental Panel on Climate Change (IPCC) has clearly indicated are needed. The IPCC is currently starting to outline its Fifth Assessment Report (AR5) which will be finalized in 2014. The IPCC is also preparing two new Special Reports, one on Renewable Energy Sources and Climate Change Mitigation, due in 2010, and one on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation, due in 2011. Mega UNFCCC meeting due at Copenhagen in December 2009, where a new roadmap to a low carbon destination is supposed to be finalied.

USEFUL WEBSITES

Websites

http://www.cseindia.org/programme/geg/cdm_faq.htm
http://www.cseindia.org/programme/geg/cdm_guide.htm
http://www.cdmindia.nic.in/
http://envfor.nic.in/cc/index.htm
http://cdm.unfccc.int/index.html
http://www.ficci.com
http://www.mcxindia.com
http://www.worldbank.org
http://www.cdmindia.com
http://www.cdmindia.nic.in
http://www.teriin.org/
http://www.iexindia.com
http://www.ipcc.ch/

Websites Links

UN Gateway to Climate Change
Convention on Biological Diversity (CBD)
Convention on Long-Range Transboundary Air Pollution
Global Environment Facility (GEF)
Linkages by International Institute for Sustainable Development (IISD)
IPCC Data Distribution Centre
IPCC National Greenhouse Gas Inventories Programme
IPCC Working Group I
IPCC Working Group II
IPCC Working Group III
The Ozone Secretariat, UNEP
United Nations Convention to Combat Desertification
United Nations Environment Programme, Geneva (UNEP)
United Nations Environment Programme, Nairobi (UNEP)
United Nations Framework Convention on Climate Change (UNFCCC)
World Meteorological Organization (WMO)

• Ministry of Environment & Forests
• Ministry of Power • Ministry of Commerce & Industry • Ministry of Non-Conventional Energy Sources
• Central Electricity Authority • Bureau of Energy Efficiency
• Central Electricity Regulatory Commission