

Carbon Credits: International Demand and Economic Possibilities for the Indian Industry

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Introduction

On Earth **CO₂** and other greenhouse gases (**GHGs**) helped stabilize temperatures to a level that is suitable for organic life. This is known as the [greenhouse effect](#). This takes place when heat energy from the sun passes unimpeded through the atmosphere and warms up the Earth. In turn, the Earth radiates this energy back towards space. The greenhouse gases – water vapour (the main greenhouse gas), methane, ozone, carbon monoxide, nitrous oxide and CO₂ – absorb some of this energy and emit it in all directions, including back towards the earth. As a result Earth's temperature is about 34 degree Celsius warmer.

Through a system of sources and sinks Earth has managed to regulate concentrations of greenhouse gases. In the form of CO₂ and methane, carbon is emitted by volcanoes and by rotting vegetation and other organic matter. But CO₂ is sequestered, or absorbed, by trees, soil, water bodies. Through various conservation practices, CO₂ can be captured and stored in soil and vegetation. This process is termed as '**carbon sequestration**'. Such conservation practice includes:

- (1) CO₂ can be diverted to secure storage in plant material, more plants equal more carbon stored
- (2) Decrease organic carbon mineralization – which is managing crops and soil to restrict conditions that accelerate the oxidation of soil organic matter & leading to release of CO₂
- (3) Since eroded soil is exposed soil & exposed carbon, reduction of soil erosion will keep carbon trapped in the soil.

Great amount of research has been done which revealed the benefits of organic matter or soil carbon in improving the soil quality & sustainability of balanced agricultural productivity. Indeed, scientists have become aware that increased concentrations of CO₂ actually stimulate the growth of many different types of plant, including trees – this is called the **CO₂ fertilization effect**. Although some of the CO₂ will be released back into the atmosphere through increased respiration, more carbon should be sequestered. If series of volcanic eruptions or burning of fossil fuels emitted excess CO₂, into the atmosphere, in time it would be partly absorbed by increased growth of forests, and partly dissolved in the oceans.

Over the last century, burning of fossil fuels like coal, oil and natural gas – in which carbon has been stored for millions of years – along with accelerated land clearance has led to unprecedented levels of greenhouse gas emissions. Nearly 60-70% of GHG emission is through use of fuels in industries such as steel, cement, fertilizers and textiles. Some GHG such as hydro fluorocarbons, methane, and nitrous oxide are released as by product of certain industrial process, which adversely affect the ozone layer, leading to global warming. Carbon sinks are not sufficient, and concentrations of greenhouse gases in the atmosphere have risen dramatically. This will lead to general and very rapid warming of the world's climate. It is predicted that it will result in widespread ecological changes in agricultural production, and rising sea levels. This calls for greater attention and precautionary measures to be put in place.



People have become increasingly concerned about the possible effects of global warming. Although the annual rate of emissions has been decreasing, the CO₂ concentration in the atmosphere is still increasing. In 1992, most developed countries in the world agreed to the **United Nations Framework Convention on Climate Change (UNFCCC)**, which is designed to impose limits on greenhouse gas emissions and thus minimize the adverse effects of climate change. Scientists predict that we need to decrease global CO₂ emissions by at least 50 per cent of current levels by 2050 to stabilize global carbon dioxide levels and prevent further climate change. But decreasing the use of fossil fuels is a slow process. Looking for other alternatives such as growing more trees or not cutting more trees, which we would otherwise be, will solve only part of the problem. Therefore negotiations conducted by all the countries that have signed the UNFCCC have paved the way for this possibility.

Concept of Carbon Credits

While finding solution to the problem, the concept of ‘carbon credit’ came into vogue as part of an international agreement, popularly known as the Kyoto Protocol. Carbon

Credits (CCs) is a relatively new concept, and these are bought by a buyer in the industrial sector needing to offset the CO₂ emitted in the atmosphere through their manufacturing activities. These are bought through a mediator who collects the contracts from various farmers who meet the criteria of carbon sequestration through various conservation practices. They are issued for afforestation and reforestation activities undertaken.

Carbon credits are measured in units of certified emission reductions (CERs), equivalent to one tonne of CO₂ reduction.

Carbon credits are certificates issued to countries that reduce their emission of greenhouse gases (GHG) that leads to global warming. Developed countries that have exceeded the prescribed CO₂ levels can either cut down emissions, or borrow or buy carbon credits from developing countries as it is considered that the major responsibility of curbing emission rests with the developed countries, which have accumulated emissions over a long period of time.

Carbon transactions are defined as purchase contracts or ERPAs (Emission Reductions Purchase Agreements) whereby one party pays another party in return for GHG emissions reductions, that the buyer can use to meet its compliance – or corporate citizenship – objectives vis-à-vis greenhouse gas mitigation. Payment is made using one or more of the following forms: cash, equity, debt, or in-kind contributions.

Carbon transactions can be grouped into two main categories:

- *Allowance-based transactions*, in which the buyer purchases emission allowances created and allocated (or auctioned) by regulators under cap-and-trade regimes, such as Assigned Amount Units (AAUs) under the Kyoto Protocol, or EUAs under the EU ETS;
- *Project-based transactions*, in which the buyer purchases emission credits from a project that can verifiably demonstrate that it reduces GHG emissions compared with what would have happened otherwise. The most notable examples of such activities are under the CDM and the JI mechanisms of the Kyoto Protocol, generating CERs and ERUs respectively. Carbon cap-and-trade regimes currently in place allow, for the most part, for the import of credits from project-based transactions for compliance purposes. Once project-based credits are issued and are finally delivered where and when desired for compliance, then they are fundamentally the same as allowances. Unlike allowances however, project-based credits are compliance assets that need to be “created” through a process that has certain risks inherent with it (regulation, project development and performance, for instance) and involve significantly higher transaction costs.

Accurately recording the project-based transactions market is becoming more difficult each year since the number of transactions together with the diversity of players involved is increasing dramatically. Prices and contract structures, in particular, are confidential in an increasingly competitive market. The authors have collected information from direct interviews and a survey of major market participants as well as a review of the major relevant carbon-industry publications. Our focus is on regulatory compliance; therefore our coverage of the voluntary and retail segments (individuals and companies seeking to offset their own carbon emission footprints) is not exhaustive. Retail price data are reported to show how they differ from the biggest segments of the market.

The information gathered has been aggregated in a database of more than 750 project-based transactions between 1996 and end of September 2006. Only *signed ERPAs* are included. Although the study received a very high level of cooperation from most market players, the authors were not able to obtain complete data for all reported transactions. The completeness of data exceeds 80% in most cases except for information related to contractual terms, especially prices, where reliable data were obtained for only slightly more than 60% of the volume. In between the periodic reports in this series, the authors have occasionally become aware of unrecorded transactions from previous years that have now been included in the database. This (upward) revision explains why data for the previous years may be slightly different from previous publications in this series.

The authors are relatively confident that the projects database for this series captures most transaction activity entered into by governments and a high proportion of all primary transactions. This confidence does not extend to the many secondary market project transactions that have not been captured by the database. Rather than estimate these, only those have been reported for which reliable data exists. For this reason, the authors consider that the analysis in this series provides a rather conservative estimate of the carbon market, one that provides a good representative view of the carbon market.

In contrast to the projects-based market, daily price and volume information on allowances markets is available online. The report draws on data collected from the various trading platforms as well as aggregated information on the volume known to have been exchanged over-the-counter for the EU ETS. The authors have also obtained detailed information on transactions conducted under the CCX, as well as aggregate information on transactions under the UK Trading Scheme and under the NSW Trading Scheme.

Kyoto Protocol - A formula to limit emissions

United Nations Conference on Environment and Development (UNCED), Rio de Janeiro, 3-14 June 1992 also called the 'Earth Summit' was held with the principle theme of environment and sustainable development .This conference laid the foundation for the next summit that was held at Kyoto. The Kyoto Protocol,named after the Japanese city where it was concluded in 1997, to the United Nations Framework Convention on Climate Change (UNFCCC) is an amendment to the international treaty on climate change, assigning mandatory targets for the reduction of greenhouse gas emissions to signatory nations. Countries under this protocol commit to reduce their emissions of carbon dioxide and five other greenhouse gases, or engage in emissions trading if they maintain or increase emissions of these gases. Kyoto protocol is an international treaty between more than 160 countries globally (not including the United States and Australia) including European union, Japan, Canada for reducing GHG emission by 5.2% below 1991 levels by 2012 and over 55% of global greenhouse gas (GHG) emissions. Of these, 35 countries and the EEC are required to reduce greenhouse gas emissions below levels specified for each of them in the treaty. The individual targets for Annex I Parties are listed in the Kyoto Protocol's Annex B. These add up to a total cut in greenhouse-gas emissions of at least 5% from 1990 levels in the commitment period 2008-2012. The Protocol, in force as of 16 February 2005 following its ratification in late 2004 by Russia, provides the means to monetise the environmental benefits of reducing GHGs.

It is designed to cut greenhouse gas emissions by making the polluter start paying for climate change. The pollutants in question are carbon dioxide (CO₂), methane, nitrous oxide from vehicle exhausts, and some types of man-made gas used in industry. The polluters are the countries, which emit them into the atmosphere.

Under this Governments are separated into two general categories: developed countries, referred to as Annex 1 countries (who have accepted GHG emission reduction obligations); and developing countries, referred to as Non-Annex 1 countries (who have no GHG emission reduction obligations).

Any country struggling to fulfill its obligations may have to buy credits from another that is on track to meet its target. USA accounts for one-third of total GHG emission and it is yet to sign the treaty. Preliminary phase of the protocol is to start in 2007 and second phase to start in 2008. Penalty for non-compliance in 1st phase is E 40/tonne of CO₂ equivalent and in second phase is E 100/tonne of CO₂ equivalent.

All the Annex 1 economies have established Designated National Authorities to manage their GHG portfolios under Kyoto. Countries including Japan, Canada, Italy, the Netherlands, Germany, France, Spain and many more, are actively promoting government carbon funds and supporting multilateral carbon funds intent on purchasing

Carbon Credits from Non-Annex 1 countries. These government organizations are working closely with their major utility, energy, oil & gas and chemicals conglomerates to try to acquire as many GHG Certificates as cheaply as possible.

Virtually all of the Non-Annex 1 countries have also set up their own Designated National Authorities to manage the Kyoto process (and specifically the “**CDM process**” whereby these host government entities decide which GHG Projects they do or do not wish to support for accreditation by the CDM Executive Board). The **Clean Development Mechanism (CDM)** enables developing country parties who carry out projects that reduce GHG emissions to receive credits for these reductions. These credits can be sold to developed country parties, which use them to offset their own emission reduction requirements. For the developed country party this is often a more cost-effective option than reducing reductions from their own domestic operations.

Under the Kyoto Protocol, developed countries are required to limit their greenhouse gas emissions according to the following formula:

actual emissions must be less than or equal to the assigned amount +/- carbon sinks and Kyoto emissions.

It means a country can emit more than its assigned amount if it can simultaneously sequester the equivalent amount in sinks. Under the Kyoto Protocol, allowable carbon sinks include afforestation and reforestation activities undertaken.

European Union’s position:-

The European Union (EU), having ratified the Kyoto Protocol (Kyoto), has voluntarily imposed stricter commitments than those under Kyoto, and has committed to reduce its GHG emissions to 92 percent of 1990 levels by 2012. As a result, it has implemented a trading system for GHG emission reductions known as the EU ETS, which came into effect on 1 January 2005 and is the first regulatory enforced commercial market for certified emission reductions (CERs).

Under the EU ETS, as under Kyoto, GHG emissions are quantified according to tonnes of carbon dioxide equivalent (CO₂e). One tonne of CO₂e is known as a European Union Allowance (EUA). In order to reduce GHG emissions, the EU ETS will impose caps on the amount of EUAs permissible in any EU member state. In turn, each EU member state must draft a National Allocation Plan (NAP), which must be approved by the European Commission, setting out how the maximum annual volume of EUAs in that EU member state is to be divided between the various sectors of GHG emitters, and setting limits on

individual emitters. These caps will be deliberately challenging, so as to encourage GHG emission reduction and the development of a trading market in emission reduction credits.

To reduce their emissions in order to comply with the caps, emitters can either invest in technologies that will result in reducing emissions, purchase reductions from emitters who have emitted less GHG than they were allowed and thus have a surplus to sell into the market, or purchase GHG emission reductions to 'offset' against their GHG emissions. The technology option for most big emitters has proven to be cost prohibitive. In addition, most emitters affected by the GHG reduction commitments are not expected to be in a surplus situation. The emitter's most cost effective solution is to purchase GHG emission reductions, hence accomplishing two key goals: 1) allowing the emitter to meet its GHG reduction commitment and, in the case of CERs, 2) contributing to the social and economic benefit of developing countries or countries in transition.

The EU ETS will be implemented in two stages:

Phase 1 (2005-2007): During phase 1, any emitter exceeding its GHG emission cap under the NAP in any given year (after taking into account any emission reduction credits they have purchased to offset their emissions) will be subject to a fine of €40 per tonne of GHG emitted in excess of that cap, will have to purchase corresponding EUAs to correct the excess in the following year, and will be publicly named on the European Commission's web site. During phase 2, the fine will be increased to €100 per tonne in excess of the cap. There is therefore a strong incentive for emitters to purchase emissions reduction credits to offset their emissions and avoid these harsh penalties.

As mentioned above, the NAPs for each EU member state impose annual caps on emissions. Any installation with a surplus number of EUAs for any year may carry that surplus over into the next year. The surplus may be used to offset GHG emissions in that year, or may be sold to other emitters. Such banking of allowances is permitted during phase 1 of the EU ETS only — any surplus at the end of phase 1 will be lost. The only emission reduction credits that may be used to offset emissions or banked throughout phase 1 and phase 2 of the EU ETS are CERs arising from CDM projects.

Phase II EU ETS (2008 – 2012): This corresponds with the first commitment period of Kyoto.

2008 will see further development of the global GHG emission reductions market. The EU ETS will enter phase 2, with tougher fines and no option of banking EUA allowances from phase to phase. Also, the first commitment period of the Kyoto Protocol will commence, with all ratifying industrialised nations being subject to GHG emission reduction targets. As a result, the market for GHG emission reduction credits is expected to grow due to the forecasted increase in demand from capped emitters. ERUs from JI projects will be available for trading in this period as well.

India's Position :- At the G-8 meeting in June 2005, Indian Prime Minister Manmohan Singh pointed out that the per-capita emission rates of the developing countries are a tiny fraction of those in the developed world. Following the principle of common but differentiated responsibility, India maintains that the major responsibility of curbing emission rests with the developed countries, which have accumulated emissions over a long period of time.

India will benefit from transfer of technology and additional foreign investments when the Kyoto Protocol comes into force. Additional investments will come into renewable energy, energy generation and efficiency promotion and afforestation projects. India has all along maintained that developed and developing countries have differentiated responsibility towards stabilizing emission of GHG. Besides upholding this position, the Kyoto Protocol enables India to take up clean technology projects with external assistance in accordance with national sustainable development priorities.

India's Initiatives :- India is a Party to the United Nations Framework Convention on Climate Change (UNFCCC) and the objective of the Convention is to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

To strengthen the developed country commitments under the Convention, the Parties adopted Kyoto Protocol in 1997, which commits developed country Parties to return their emissions of greenhouse gases to an average of approximately 5.2% below 1990 levels over the period 2008-12.

The Kyoto Protocol provides for quantified emission limitations and reduction commitments for the developed countries and mechanisms to facilitate compliance with these targets, reporting and review and it lists six greenhouse gases - Carbon dioxide (CO₂), Methane (CH₄), Nitrous Oxide (N₂O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs) and Sulphur hexafluoride (SF₆).

India acceded to the Kyoto Protocol in August 2002 and one of the objectives of acceding was to fulfill prerequisites for implementation of Clean Development Mechanism (hereinafter referred to as CDM) projects, in accordance with national sustainable priorities, where-under, a developed country would take up greenhouse gas reduction project activities in developing countries where the costs of greenhouse gas reduction project activities are usually much lower with the purpose to assist developing country parties in achieving Sustainable Development and in contributing to the ultimate objective of the Convention and to assist developed country Parties in achieving compliance with their quantified emission limitation and reduction commitments. India has initiated various measures that are contributing to the objectives of the United Nations Framework Convention on Climate Change (UNFCCC).

India's development plans balance economic development and environmental concerns. The planning process is guided by the principles of sustainable development. Economic growth have been accelerated by undertaking reforms in the energy and power sector and enhanced the efficiency of energy use as well. Initiatives taken by the private sector are worth noting.

In the last few years several measures relating to environmental issues have been undertaken. Their target has been increasing significantly, the capacity of renewable energy installations; improving the air quality in major cities (the world's largest fleet of vehicles fuelled by compressed natural gas has been introduced in New Delhi); and enhancing afforestation. Committing additional resources and realigning new investments, thus putting economic development on a climate-friendly path, have implemented other similar measures.

National Authority for the CDM

The Seventh Conference of Parties (COP-7) to the UNFCCC decided that Parties participating in CDM should designate a National Authority for the CDM and as per the CDM project cycle, a project proposal should include written approval of voluntary participation from the Designated National Authority of each country and confirmation that the project activity assists the host country in achieving sustainable development.

Accordingly the Central Government constituted the National Clean Development Mechanism (CDM) Authority for the purpose of protecting and improving the quality of environment in terms of the Kyoto Protocol;

The National Clean Development Mechanism (CDM) Authority receives projects for evaluation and approval as per the guidelines and general criteria laid down in the

relevant rules and modalities pertaining to CDM in addition to the guidelines issued by the Clean Development Mechanism Executive Board and Conference of Parties serving as Meeting of Parties to the United Nations Framework Convention on Climate Change.

The evaluation process of CDM projects includes an assessment of the probability of eventual successful implementation of CDM projects and evaluation of extent to which projects meet the sustainable development objectives, as it would seek to prioritize projects in accordance with national priorities.

The National Clean Development Mechanism (CDM) Authority can recommend certain additional requirements to ensure that the project proposals meet the national sustainable development priorities and comply with the legal framework so as to ensure that the projects are compatible with the local priorities and stakeholders have been duly consulted.

The Authority ensures that in the event of project proposals competing for same source of investment, projects with higher sustainable development benefits and which are likely to succeed are accorded higher priority.

The Authority also carries out the financial review of project proposals to ensure that the project proposals do not involve diversion of official development assistance in accordance with modalities and procedures for Clean Development Mechanism and also ensure that the market environment of the CDM project is not conducive to undervaluation of Certified Emission Reduction (CERs) particularly for externally aided projects.

The Authority carries out activities to ensure that the project developers have reliable information relating to all aspects of Clean Development Mechanism which include creating databases on organizations designated for carrying out activities like validation of CDM project proposals and monitoring and verification of project activities, and to collect, compile and publish technical and statistical data relating to CDM initiatives in India.

The Member-Secretary of the National Clean Development Mechanism (CDM) Authority is responsible for day-to-day activities of the Authority including constituting committees or sub-groups to coordinate and examine the proposals or to get detailed examination of the project proposals.

The National Clean Development Mechanism (CDM) Authority has the powers: (a) to invite officials and experts from Government, financial institutions, consultancy organizations, non-governmental organizations, civil society, legal profession, industry and commerce, as it may deem necessary for technical and professional inputs and may co-opt other members depending upon need.

(b) to interact with concerned authorities, institutions, individual stakeholders for matters relating to CDM.

(c) to take up any environmental issues pertaining to CDM or Sustainable Development projects as may be referred to it by the Central Government, and

(d) to recommend guidelines to the Central Government for consideration of projects and principles to be followed for according host country approval.

Status of the agreement



Participation in the Kyoto Protocol, where dark green indicates countries that have signed and ratified the treaty and yellow indicates states that have signed and hope to ratify the treaty. Notably, Australia and the United States have signed but, currently, refuse to ratify it.

The treaty was negotiated in Kyoto, Japan in December 1997, opened for signature on March 16, 1998, and closed on March 15, 1999. The agreement came into force on February 16, 2005 following ratification by Russia on November 18, 2004. As of October 2006, 166 countries and other governmental entities have ratified the agreement (representing over 61.6% of emissions from Annex I countries), except United States and Australia. Other countries, like India and China, which have ratified the protocol, are not

required to reduce carbon emissions under the present agreement inspite of their large populations.

According to article 25 of the protocol, it enters into force "on the ninetieth day after the date on which not less than 55 Parties to the Convention, incorporating Parties included in Annex I which accounted in total for at least 55% of the total carbon dioxide emissions for 1990 of the Parties included in Annex I, have deposited their instruments of ratification, acceptance, approval or accession." Of the two conditions, the "55 parties" clause was reached on May 23, 2002 when Iceland ratified. The ratification by Russia on 18 November 2004 satisfied the "55%" clause and brought the treaty into force, effective February 16, 2005.

Enforcement

If the Enforcement Branch determines that an Annexe 1 country is not in compliance with its emissions targets, then that country is required to make up the difference plus an additional 30 percent. That country will also be suspended from making transfers under an emissions trading program.

Kyoto's Mechanism

The Kyoto Protocol has defined three "flexibility mechanisms" to lower the overall costs of achieving its emissions targets.

The three Kyoto mechanisms are:

- **Clean development mechanism (CDM)**

It is defined in Article 12 which provides for Annex I Parties to implement projects that reduce emissions in non-Annex I Parties, or absorb carbon through afforestation or reforestation activities. In return they get certified emission reductions (CERs, tCERs and ICERs) and assist the host Parties in achieving sustainable development and contributing to the ultimate objective of the Convention. It is supervised by the CDM Executive Board.

- **Joint Implementation (JI)**

The basic principles of the mechanism are defined in Article 6 of the Kyoto Protocol. Under JI, an Annex I Party (with a commitment inscribed in Annex B of the Kyoto Protocol) may implement an emission-reducing project or a project that enhances

removals by sinks in the territory of another Annex I Party (with a commitment inscribed in Annex B of the Kyoto Protocol) and count the resulting emission reduction units (ERUs) towards meeting its own Kyoto target.

- **Emissions trading**

Provisions relating to Emissions Trading are there in Article 17 which provides for Annex I Parties to acquire units from other Annex I Parties. These units may be in the form of AAUs, removal units (RMUs), ERUs, CERs, tCERs and ICERs.

The AAUs, RMUs, ERUs, CERs, tCERs and ICERs are the accounting units of the “assigned amount” of each Annex I Party referred to in the provisions of Article 3 of the Protocol. Each unit is equal to one metric tonne of emissions (in CO₂-equivalent terms). AAUs are issued on the basis of the assigned amount pursuant to Article 3.7 and 3.8 while RMUs are issued on the basis of land use, land-use change and forestry (LULUCF) activities (often referred to as “sinks”) under Articles 3.3 and 3.4. In accordance with Article 3.10 and 3.11, the issuance of ERUs results in the cancellation of either AAUs or RMUs, in order that no overall impact on a Party’s assigned amount is felt. Finally, CERs are the additions to assigned amount referred to in Article 3.12. More information may be found on the assigned amount accounting page.

The Kyoto Protocol has not bestowed on Annex I Parties any “right, title or entitlement” to emit and call on Annex I Parties to take domestic actions to reduce emissions in a manner conducive to narrowing per capita differences between developed and developing countries while working toward achievement of the ultimate objective of the Convention. The negotiators of the Protocol therefore sought to design a system that fulfilled the cost-effectiveness promise of the mechanisms, while addressing concerns about environmental integrity and equity. The Marrakesh Accords requires that to meet its target under the Kyoto Protocol each Annex I Party’s domestic actions (as opposed to use of the mechanisms) should constitute a “significant element” of the efforts made by it. While they do not set a quantified proportion that is to be met through domestic action, the decisions relating to Articles 5, 7 and 8 of the Protocol require that Annex I Parties provide information in their national communications under the Protocol to demonstrate that their use of the mechanisms is “supplemental to domestic action” to achieve their targets. This information is to be assessed by the Facilitative Branch of the Compliance Committee

The Marrakesh Accords sets out detailed rules for the implementation of the Kyoto Protocol. It made considerable progress regarding the implementation of the Convention.

These mechanisms are based on the Protocol's system for the accounting of targets. Under this system, the amount to which an Annex I Party (with a commitment inscribed in Annex B of the Kyoto Protocol) must reduce its emissions over the five year commitment period (known as its "assigned amount") is divided into units each equal to one tonne of carbon dioxide equivalent. These assigned amount units (AAUs), and other units defined by the Protocol, contribute the basis for the Kyoto mechanisms by providing for a Party to gain credit from action taken in other Parties that may be counted towards its own emissions target.

Eligibility Requirements

To participate in the mechanisms, Annex I Parties must meet, among others, the following eligibility requirements:

- They must have ratified the Kyoto Protocol.
- They must have calculated their assigned amount, as referred to in Articles 3.7 and 3.8 and Annex B of the Protocol 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.

By submitting a report on the above information to the secretariat the eligibility of each Annex I Party is initially to be determined, at the latest by 1 January 2007 (or a year after becoming a Party to the Protocol, whichever is later). This report will be reviewed, and any questions arising will be dealt with by the Enforcement Branch of the Compliance Committee within 16 months of submission through a set of expedited procedures. In case a Party is subsequently found not meeting the eligibility requirements, it may seek reinstatement of eligibility through a further expedited procedure. For further information, see the pages on Articles 5, 7 and 8, assigned amount accounting, and the Compliance Committee.

The Marrakesh Accords provide for businesses, non-governmental organizations and

other entities to participate in the three mechanisms, under the authority and responsibility of governments.

Detailed participation requirements can be found under the respective decisions agreed by the COP/MOP, as follows:

- CDM participation requirements are reflected in section F in the modalities and procedures ([decision 3/CMP.1](#));
- JI participation requirements are reflected in section D in the Guidelines for implementation of Article 6 of the Kyoto Protocol ([decision 9/CMP.1](#));
- ET participation requirements are reflected in the Modalities, rules and guidelines for emissions trading under Article 17 of the Kyoto Protocol ([decision 11/CMP.1](#));

Registry Systems Under The Kyoto Protocol

Finally, after the commitment period is over, in order to ensure that Annex I Parties are in compliance with their emissions targets, each Party's emissions during the commitment period will be compared with their holdings of ERUs, CERs, AAUs and RMUs. These holdings, as well as transfers and acquisitions, will be tracked and recorded through a computerized system of registries:

- A national registry is to be established and maintained by each Annex I Party. This will contain accounts for the holdings of ERUs, CERs, AAUs and RMUs by the Party, as well as by any entities authorized by the Party to hold them. It will also contain accounts for setting units aside for compliance purposes (retirement) and removing units from the system (cancellation). Transfers and acquisitions between account holders or between Parties will take place through these national registries.
- Under the authority of the [CDM Executive Board](#) a CDM registry will be established and maintained by the secretariat. Upon instruction by the Board, this CDM registry is to conduct the issuance and distribution of CDM credits, and is to contain accounts for project participants.
- An international transaction log (ITL) will be established and maintained by the secretariat. This will verify transactions of AAUs, RMUs, ERUs, CERs, tCERs and ICERs as they are proposed, including their issuance, transfer and acquisition between registries, cancellation, retirement and carry-over to any

subsequent commitment period. The registry is required to stop the transaction if any such verification finds any proposed transaction not to be in order.

Clean Development Mechanism

The Clean Development Mechanism (CDM), provided for under Article 12 of the Kyoto Protocol, enables developing countries to participate in joint greenhouse gas (GHG) mitigation projects. Under this Protocol, Annex I countries (developed countries and economies in transition) are required to reduce GHG emissions to below their 1990 levels. It allows public or private sector entities in Annex I countries to invest in GHG mitigation projects in developing countries. In return the investing parties receive credits or certified emission reductions (CERs), which they can use to meet their targets under the Kyoto Protocol.

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 CDM will be supervised by an executive board, and a share of the proceeds from project activities will be used to assist developing countries in meeting the costs of adaptation to climate change.

Joint implementation (JI)

Joint implementation is one of the mechanisms of the Kyoto Protocol allowing industrialised countries with a greenhouse gas reduction commitment (so-called Annex 1 countries) to invest in emission reducing projects in another industrialised country as an alternative to emission reductions in their own countries. As costs of emission reductions are significantly lower in some countries, countries with relatively high costs for emission reductions can reduce costs of complying with their Kyoto targets by using credits from JI projects. A JI project might involve, for example, replacing a coal-fired power plant with a more efficient combined heat and power plant. Most JI projects are expected to take place in the Annex I Parties with economies in transition in Eastern Europe and the former Soviet Union, where the costs of reducing emissions are considered lower.

The JI has caused less concern of spurious emission reductions, as the JI, unlike the CDM, takes place in countries which have an emission reduction requirement. Emission reductions achieved with JI projects are awarded credits called emission reduction units (ERUs), where one ERU signifies an emission reduction of one tonne of CO₂ equivalent.

Emissions Trading

Emissions trading, as set out in Article 17 of the Kyoto Protocol, provides for Annex I Parties to acquire units from other Annex I Parties and use them towards meeting their emissions targets under the Kyoto Protocol. This enables Parties to make use of lower cost opportunities to reduce emissions, irrespective of the Party in which Party those opportunities exist, in order to lower the overall cost of reducing emissions.

Only Annex I Parties to the Kyoto Protocol with emission limitation and reduction commitments inscribed in Annex B to the Protocol may participate in such trading. Such Parties may therefore be prepared to transfer units when they do not require them for compliance with their own emission targets.

The units which may be transferred under Article 17 emissions trading, each equal to one metric tonne of emissions (in CO₂-equivalent terms), may be in the form of an

assigned amount unit (AAU), a removal unit (RMU), an emission reduction unit (ERU), a certified emission reduction (CER).

Transfers and acquisitions of these units are to be tracked and recorded through the registry systems under the Kyoto Protocol. Parties may also authorize legal entities (e.g. businesses, non-governmental organizations and other entities) to participate, under their responsibility, in Article 17 emissions trading. Accounts may be created in national registries to provide for such participation by legal entities.

The commitment period reserve

Each Party is required to hold a minimum level of ERUs, CERs, AAUs and RMUs in its national registry in order to address the concern that Annex I Parties could “oversell” units and subsequently be unable to meet their own emissions targets. This is known as the “commitment period reserve”. This reserve is calculated as the lower of the following:

- 90% of the Party’s assigned amount, as defined in Articles 3.7 and 3.8 of the Protocol. This calculation is likely to be relevant to Annex I Parties which prove, at the end of the commitment period, to be “net buyers” of units under the mechanisms.
- The level of national emissions indicated in the Party’s most recent emissions inventory (multiplied by five, for the five years of the commitment period). This calculation is likely to be relevant to Annex I Parties which prove, at the end of the commitment period, to be “net sellers” of units under the mechanisms.

Relationship to domestic and regional emissions trading schemes

Emissions trading schemes may be established as climate policy instruments at the national level (e.g. in the United Kingdom) and the regional level (e.g. in the European Union). Under such schemes, governments set emissions obligations to be fulfilled by the participating entities. These obligations may be fulfilled through holding either the ERUs, CERs, AAUs and RMUs established under the Kyoto Protocol or other units established specifically for those trading schemes, depending on the rules of the scheme.

Article 17 of the Protocol provides a framework for transfer of ERUs, CERs, AAUs and RMUs between Annex I Parties. Where transfers are made from one Annex I Party to another, either under linked domestic trading schemes or under a regional trading scheme, these transfers need to be reflected under the assigned amount accounting rules of the Kyoto Protocol through transfers of ERUs, CERs, AAUs or RMUs. This also applies where the trading schemes make use of “non-Kyoto” units established specifically for those schemes. In this manner, all international transfers under the realm of domestic or regional trading schemes fit under the umbrella formed by the emissions trading set out in Article 17 of the Protocol.

Trading in Carbon Credits

Trading in Carbon credits rewards countries which meet their target and provide financial assistance to others to do so as soon as possible. Surplus credits can be sold in the market. One credit is equivalent to one tonne of CO₂ emissions reduced. Foreign countries that cannot fulfill the protocol norms can buy the surplus credits from companies in other countries through trading.

Through this carbon trading system, big polluters in developed countries can pay companies in developing nations to cut emissions in their stead. Since many factories in developing countries use dirty, inefficient processes, it's often cheaper to clean them up than to replace the more modern equipment used in wealthy nations.

The catch however is the cost; developed countries have to spend nearly \$300-500 for every tonne reduction in CO₂, as against \$10-25 to be spent by developing countries. The stage is thus set for trade to flourish. Trading carbon credits is hence seen as a less expensive option. Clean Development Mechanism (CDM) has been put in place to facilitate the trade of carbon credits between the developing and developed nations by United Nations Framework Convention on Climate Change. Till date CDM held little significance, as there was no accrediting body recognized by the United Nations. Not any more.

Monetary gain is, of course, first and foremost thing, which attract such trade. Every tonne of CO₂ not emitted is considered as one credit and every carbon credit fetches the company \$3-6. The remuneration continues year after year.

The carbon market grew in value to an estimated US\$21.5 billion in the first three quarters of the year, more than doubling in value over the previous year. The market was dominated by the European Union Emissions Trading Scheme (EU ETS), which

shrugged off signs of weakness following the sharp declines that accompanied the release of verified emissions data in May 2006. The project-based market also grew in value to US\$2.41 billion in just the first nine months of the year.

The volume of European Union Allowances (EUAs) transacted on major exchanges and over-the counter rose to 764 million tonnes of carbon dioxide equivalent (tCO₂e) by the end of September 2006 compared to approximately 324 million tCO₂e in 2005. EUAs traded at a market value of US\$18.9 billion so far in 2006, more than twice the previous year's US\$8.2 billion. The Chicago Climate Exchange (CCX), the New South Wales Greenhouse Gas Abatement Scheme (NSW) and the United Kingdom Emissions Trading Scheme (UK ETS) all grew sharply, as did the trendy but non-standardized retail carbon market.

Developing countries supplied 214 million tCO₂e of primary project-based credits or 21% of total volumes traded for a total market value of US\$2.3 billion. China continued to have a dominant market-share of the Clean Development Mechanism (CDM) with 60% and exerted its market power to try and influence prices of Certified Emission Reductions (CERs), while Ukraine supplied one third of Joint Implementation (JI) volumes. CERs and Emission Reduction Units (ERUs) transacted at average prices of US\$ 10.50 and about US\$ 8 respectively across a range of prices varying with the terms of the contracts entered into. Buyers found it easier to close transactions than six months ago, while sellers managed carbon price risk by favoring fixed price forward contracts. Hydro fluorocarbon (HFC-23) reduction projects accounted for half of the market volumes, while renewable energy (especially wind) and energy efficiency projects together accounted for nearly 27% of the project-based market.

10. Trade of Carbon Credits in India

The unfolding opportunity of Carbon Credits in India has caught the eye of Indian Entrepreneurs. The no. of Indian Projects in various fields such as biomass, hydropower, wind power, cogeneration for getting carbon credits now stands at 227 with the potential of 225 million CERs. If there is no uncertainty as to what would happen beyond 2012, the no. could easily cross 2000 mark, according to Mr. S.K. Joshi, Joint Secretary in the

Union Ministry of Environment and Forests. It is estimated that opportunity in Carbon Credits in India is likely to the tune of Rs.15000 crores.

Due to the growing industrialization in India and particularly in Gujarat, there are tremendous opportunities in Carbon Credit business. Corporates in the region could use these opportunities to generate good amount of revenues.

India will “move quickly” in the future to capture a large part of the carbon credit market, according to a top official of the Chicago Climate Exchange (CCX). Trading experience at platform such as CCX and first mover advantage will be attractive to many Indian corporates,” said Richard L Sandor, chairman and CEO, CCX. In order to tap the Indian Market CCX is in talks with certain corporates and not-for-profit organizations to identify projects, also in the rural sector, which can produce carbon credits tradable on CCX.

According to Sandor, volumes of carbon credits traded on CCX will increase substantially once corporates from India participate actively. The total volume of carbon credits traded on CCX in '05 was 1.45 mt, which grew to 7 mt in the first six months of this year itself. Mr. Sandor expects significant amount of CDM can be produced in India. Some of the credits can be hedged in European market and sold when the prices are good. Indian corporate can join as liquidity provider on CCX and have option to buy credits in the US, Brazil and China. Companies with subsidiaries in these countries can buy or sell credits on the respective exchanges.

Over 227 projects have received the host country approval in India alone and almost 90 of them have been registered with UNFCCC. Out of these 10% projects are from Gujarat alone.

At Teri, director Preety Bhandari said that Teri would generate 1.5 mt carbon credits in the next 18 months. “All these projects will be generated at rural level. At an average cost of \$4.5 per carbon credit, we hope to generate about Rs 31 crore by selling these credits on CCX,” Ms Bhandari said.

Asia leads other regions in the supply of CDM credits with 84% of market volumes so far this year 2006. China, with 60% market share (down from 73% in 2005 and 56% historically), and India with 15% (up from 3% in 2005 and historically 13%), continue to dominate the market. A notable variation is India, with 13% cumulative market share versus a 20% share for projects at validation and beyond. The India gap was due to the high number of unilateral projects and by the fact that sellers delayed finalizing contracts as they awaited for higher prices last year. A strong pipeline and a growing willingness to strike fair deals may suggest a higher market share for India in the future. The growth prospectus and the potential of market leadership status can be achieved by India as the biggest Chinese assets have either been sold or are very close to finalization, suggesting that China's potential to bring large HFC-23 volumes to the market may peak this year with subsequent decline in coming months.

10. Cost-Benefit Analysis of Kyoto Protocol

Economists have been trying to estimate the net benefit of Kyoto Protocol through cost benefit analysis. As in the case of climatology, there is disagreement due to large uncertainties in economic variables. Still the estimate generally indicate that either observing this protocol will be more expensive than not observing or it will have marginal net benefit which will exceed the cost of adjusting to global warming. A study in Nature found that accounting only for local external costs, together with production costs, to identify energy strategies, compliance with the Kyoto Protocol would imply lower, not higher, overall costs.

One problem in trying to measure the "absolute" costs and benefits of different policies to global warming is choosing a proper discount rate. This is because even small changes in the discount rate create very large discrepancies between net benefits in various studies. There is an argument that a much lower discount rate should be utilized; that high rates are biased toward the current generation. This may appear to be a philosophical value judgement, outside the realm of economics, but it could be equally argued that the study of the allocation of resources does include how those resources are allocated over time.

A great deal of analytical work is still required to fully define how the markets will work, the transaction costs, and the discounts due to factors such as uncertainty and non-permanence. Currently the scientific understanding of Carbon sequestration is ahead of the economic analyses, and it remains an international challenge to combine science with good economic analysis to determine policies which will work for the environment and people here.

11. Important Web-sites

1. CDM India-Designated National Authority - <http://cdmindia.nic.in/>
2. Ministry of Environment & Forests (MoEF)- <http://www.envfor.nic.in/>
3. Ministry of Power- <http://www.powermin.nic.in/>

4. Ministry of New and Renewable Energy-<http://mnes.nic.in/>
5. Ministry of Commerce & Industry- <http://commin.nic.in/>
6. Central Electricity Authority- <http://www.cea.nic.in/>
7. Bureau of Energy Efficiency- <http://www.bee-india.nic.in/>
8. Central Electricity Regulatory Commission- <http://cercind.gov.in/>
9. State Electricity Regulatory Commission's-
<http://www.cercind.org/serckeystaff.htm>
10. United Nations Framework Convention on Climate Change-<http://cdm.unfccc.int/>
11. AGERT- <http://www.agcert.com/about.html>
12. Carbon Planet -<http://www.carbonplanet.com/home/about.php>
13. International Emissions Trading Association(IETA)-
 - a. <http://www.ieta.org/ieta/www/pages/search.php>

12. Text of the Agreement

KYOTO PROTOCOL TO THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

The Parties to this Protocol,

Being Parties to the United Nations Framework Convention on Climate Change,
hereinafter referred to as "the Convention",

In pursuit of the ultimate objective of the Convention as stated in its Article 2,

Recalling the provisions of the Convention,

Being guided by Article 3 of the Convention,

Pursuant to the Berlin Mandate adopted by decision 1/CP.1 of the

Conference of the Parties to the Convention at its first session,

Have agreed as follows:

Article 1

For the purposes of this Protocol, the definitions contained in Article 1 of the Convention shall apply. In addition:

1. "Conference of the Parties" means the Conference of the Parties to the Convention.
2. "Convention" means the United Nations Framework Convention on Climate Change, adopted in New York on 9 May 1992.
3. "Intergovernmental Panel on Climate Change" means the Intergovernmental Panel on Climate Change established in 1988 jointly by the World Meteorological Organization and the United Nations Environment Programme.
4. "Montreal Protocol" means the Montreal Protocol on Substances that Deplete the Ozone Layer, adopted in Montreal on 16 September 1987 and as subsequently adjusted and amended.
5. "Parties present and voting" means Parties present and casting an affirmative or negative vote.
6. "Party" means, unless the context otherwise indicates, a Party to this Protocol.
7. "Party included in Annex I" means a Party included in Annex I to the Convention, as may be amended, or a Party which has made a notification under Article 4, paragraph 2(g), of the Convention.

Article 2

1. Each Party included in Annex I, in achieving its quantified emission limitation and reduction commitments under Article 3, in order to promote sustainable development, shall:

(a) Implement and/or further elaborate policies and measures in accordance with its national circumstances, such as:

(i) Enhancement of energy efficiency in relevant sectors of the national economy;

(ii) Protection and enhancement of sinks and reservoirs of greenhouse gases not controlled by the Montreal Protocol, taking into account its commitments under relevant international environmental agreements; promotion of sustainable forest management practices, afforestation and reforestation;

(iii) Promotion of sustainable forms of agriculture in light of climate change considerations;

(iv) Research on, and promotion, development and increased use of, new and renewable forms of energy, of carbon dioxide sequestration technologies and of advanced and innovative environmentally sound technologies;

(v) Progressive reduction or phasing out of market imperfections, fiscal incentives, tax and duty exemptions and subsidies in all greenhouse gas emitting sectors that run counter to the objective of the Convention and application of market instruments;

(vi) Encouragement of appropriate reforms in relevant sectors aimed at promoting policies and measures which limit or reduce emissions of greenhouse gases not controlled by the Montreal Protocol;

(vii) Measures to limit and/or reduce emissions of greenhouse gases not controlled by the Montreal Protocol in the transport sector;

(viii) Limitation and/or reduction of methane emissions through recovery and use in waste management, as well as in the production, transport and distribution of energy;

(b) Cooperate with other such Parties to enhance the individual and combined effectiveness of their policies and measures adopted under this Article, pursuant to Article 4, paragraph 2(e)(i), of the Convention. To this end, these Parties shall take steps to share their experience and exchange information on such policies and measures, including developing ways of improving their comparability, transparency and effectiveness. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, at its first session or as soon as practicable thereafter, consider ways to facilitate such cooperation, taking into account all relevant information.

2. The Parties included in Annex I shall pursue limitation or reduction of emissions of greenhouse gases not controlled by the Montreal Protocol from aviation and marine bunker fuels, working through the International Civil Aviation Organization and the International Maritime Organization, respectively.

3. The Parties included in Annex I shall strive to implement policies and measures under this Article in such a way as to minimize adverse effects, including the adverse effects of climate change, effects on international trade, and social, environmental and economic impacts on other Parties, especially developing country Parties and in particular those identified in Article 4, paragraphs 8 and 9, of the Convention, taking into account Article 3 of the Convention. The Conference of the Parties serving as the meeting of the Parties to this Protocol may take further action, as appropriate, to promote the implementation of the provisions of this paragraph.

4. The Conference of the Parties serving as the meeting of the Parties to this Protocol, if it decides that it would be beneficial to coordinate any of the policies and measures in paragraph 1(a) above, taking into account different national circumstances and potential effects, shall consider ways and means to elaborate the coordination of such policies and measures.

Article 3

1. The Parties included in Annex I shall, individually or jointly, ensure that their aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases listed in Annex A do not exceed their assigned amounts, calculated pursuant to their quantified emission limitation and reduction commitments inscribed in Annex B 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.

2. Each Party included in Annex I shall, by 2005, have made demonstrable progress in achieving its commitments under this Protocol.

3. The net changes in greenhouse gas emissions by sources and removals by sinks resulting from direct human-induced land-use change and forestry activities, limited to afforestation, reforestation and deforestation since 1990, measured as verifiable changes in carbon stocks in each commitment period, shall be used to meet the commitments under this Article of each Party included in Annex I. The greenhouse gas emissions by sources and removals by sinks associated with those activities shall be reported in a transparent and verifiable manner and reviewed in accordance with Articles 7 and 8.

4. Prior to the first session of the Conference of the Parties serving as the meeting of the Parties to this Protocol, each Party included in Annex I shall provide, for consideration by the Subsidiary Body for Scientific and Technological Advice, data to establish its level of carbon stocks in 1990 and to enable an estimate to be made of its changes in carbon

stocks in subsequent years. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, at its first session or as soon as practicable thereafter, decide upon modalities, rules and guidelines as to how, and which, additional human-induced activities related to changes in greenhouse gas emissions by sources and removals by sinks in the agricultural soils and the land-use change and forestry categories shall be added to, or subtracted from, the assigned amounts for Parties included in Annex I, taking into account uncertainties, transparency in reporting, verifiability, the methodological work of the Intergovernmental Panel on Climate Change, the advice provided by the Subsidiary Body for Scientific and Technological Advice in accordance with Article 5 and the decisions of the Conference of the Parties. Such a decision shall apply in the second and subsequent commitment periods. A Party may choose to apply such a decision on these additional human-induced activities for its first commitment period, provided that these activities have taken place since 1990.

5. The Parties included in Annex I undergoing the process of transition to a market economy whose base year or period was established pursuant to decision 9/CP.2 of the Conference of the Parties at its second session shall use that base year or period for the implementation of their commitments under this Article. Any other Party included in Annex I undergoing the process of transition to a market economy which has not yet submitted its first national communication under Article 12 of the Convention may also notify the Conference of the Parties serving as the meeting of the Parties to this Protocol that it intends to use an historical base year or period other than 1990 for the implementation of its commitments under this Article. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall decide on the acceptance of such notification.

6. Taking into account Article 4, paragraph 6, of the Convention, in the implementation of their commitments under this Protocol other than those under this Article, a certain degree of flexibility shall be allowed by the Conference of the Parties serving as the meeting of the Parties to this Protocol to the Parties included in Annex I undergoing the process of transition to a market economy.

7. In the first quantified emission limitation and reduction commitment period, from 2008 to 2012, the assigned amount for each Party included in Annex I shall be equal to the percentage inscribed for it in Annex B of its aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases listed in Annex A in 1990, or the base year or period determined in accordance with paragraph 5 above, multiplied by five. Those Parties included in Annex I for whom land-use change and forestry constituted a net source of greenhouse gas emissions in 1990 shall include in their 1990 emissions base

year or period the aggregate anthropogenic carbon dioxide equivalent emissions by sources minus removals by sinks in 1990 from land-use change for the purposes of calculating their assigned amount.

8. Any Party included in Annex I may use 1995 as its base year for hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride, for the purposes of the calculation referred to in paragraph 7 above.

9. Commitments for subsequent periods for Parties included in Annex I shall be established in amendments to Annex B to this Protocol, which shall be adopted in accordance with the provisions of Article 21, paragraph 7. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall initiate the consideration of such commitments at least seven years before the end of the first commitment period referred to in paragraph 1 above.

10. Any emission reduction units, or any part of an assigned amount, which a Party acquires from another Party in accordance with the provisions of Article 6 or of Article 17 shall be added to the assigned amount for the acquiring Party.

11. Any emission reduction units, or any part of an assigned amount, which a Party transfers to another Party in accordance with the provisions of Article 6 or of Article 17 shall be subtracted from the assigned amount for the transferring Party.

12. Any certified emission reductions which a Party acquires from another Party in accordance with the provisions of Article 12 shall be added to the assigned amount for the acquiring Party.

13. If the emissions of a Party included in Annex I in a commitment period are less than its assigned amount under this Article, this difference shall, on request of that Party, be added to the assigned amount for that Party for subsequent commitment periods.

14. Each Party included in Annex I shall strive to implement the commitments mentioned in paragraph 1 above in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention. In line with relevant decisions of the Conference of the Parties on the implementation of those paragraphs, the Conference of the Parties serving as the meeting of the Parties to this Protocol shall, at its first session, consider what actions are necessary to minimize the adverse effects of climate change and/or the impacts of response measures on Parties referred to in those paragraphs.

Among the issues to be considered shall be the establishment of funding, insurance and transfer of technology.

Article 4

1. Any Parties included in Annex I that have reached an agreement to fulfil their commitments under Article 3 jointly, shall be deemed to have met those commitments provided that their total combined aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases listed in Annex A do not exceed their assigned amounts calculated pursuant to their quantified emission limitation and reduction commitments inscribed in Annex B and in accordance with the provisions of Article 3. The respective emission level allocated to each of the Parties to the agreement shall be set out in that agreement.
2. The Parties to any such agreement shall notify the secretariat of the terms of the agreement on the date of deposit of their instruments of ratification, acceptance or approval of this Protocol, or accession thereto. The secretariat shall in turn inform the Parties and signatories to the Convention of the terms of the agreement.
3. Any such agreement shall remain in operation for the duration of the commitment period specified in Article 3, paragraph 7.
4. If Parties acting jointly do so in the framework of, and together with, a regional economic integration organization, any alteration in the composition of the organization after adoption of this Protocol shall not affect existing commitments under this Protocol. Any alteration in the composition of the organization shall only apply for the purposes of those commitments under Article 3 that are adopted subsequent to that alteration.
5. In the event of failure by the Parties to such an agreement to achieve their total combined level of emission reductions, each Party to that agreement shall be responsible for its own level of emissions set out in the agreement.
6. If Parties acting jointly do so in the framework of, and together with, a regional economic integration organization which is itself a Party to this Protocol, each member State of that regional economic integration organization individually, and together with the regional economic integration organization acting in accordance with Article 24, shall, in the event of failure to achieve the total combined level of emission reductions, be responsible for its level of emissions as notified in accordance with this Article.

Article 5

1. Each Party included in Annex I shall have in place, no later than one year prior to the start of the first commitment period, a national system for the estimation of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol. Guidelines for such national systems, which shall incorporate the methodologies specified in paragraph 2 below, shall be decided upon by the Conference of the Parties serving as the meeting of the Parties to this Protocol at its first session.

2. Methodologies for estimating anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol shall be those accepted by the Intergovernmental Panel on Climate Change and agreed upon by the Conference of the Parties at its third session. Where such methodologies are not used, appropriate adjustments shall be applied according to methodologies agreed upon by the Conference of the Parties serving as the meeting of the Parties to this Protocol at its first session. Based on the work of, inter alia, the Intergovernmental Panel on Climate Change and advice provided by the Subsidiary Body for Scientific and Technological Advice, the Conference of the Parties serving as the meeting of the Parties to this Protocol shall regularly review and, as appropriate, revise such methodologies and adjustments, taking fully into account any relevant decisions by the Conference of the Parties. Any revision to methodologies or adjustments shall be used only for the purposes of ascertaining compliance with commitments under Article 3 in respect of any commitment period adopted subsequent to that revision.

3. The global warming potentials used to calculate the carbon dioxide equivalence of anthropogenic emissions by sources and removals by sinks of greenhouse gases listed in Annex A shall be those accepted by the Intergovernmental Panel on Climate Change and agreed upon by the Conference of the Parties at its third session. Based on the work of, inter alia, the Intergovernmental Panel on Climate Change and advice provided by the Subsidiary Body for Scientific and Technological Advice, the Conference of the Parties serving as the meeting of the Parties to this Protocol shall regularly review and, as appropriate, revise the global warming potential of each such greenhouse gas, taking fully into account any relevant decisions by the Conference of the Parties. Any revision to a global warming potential shall apply only to commitments under Article 3 in respect of any commitment period adopted subsequent to that revision.

Article 6

1. For the purpose of meeting its commitments under Article 3, 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, provided that:

(a) Any such project has the approval of the Parties involved;

(b) Any such project provides a reduction in emissions by sources, or an enhancement of removals by sinks, that is additional to any that would otherwise occur;

(c) It does not acquire any emission reduction units if it is not in compliance with its obligations under Articles 5 and 7; and

(d) The acquisition of emission reduction units shall be supplemental to domestic actions for the purposes of meeting commitments under Article 3.

2. The Conference of the Parties serving as the meeting of the Parties to this Protocol may, at its first session or as soon as practicable thereafter, further elaborate guidelines for the implementation of this Article, including for verification and reporting.

3. A Party included in Annex I may authorize legal entities to participate, under its responsibility, in actions leading to the generation, transfer or acquisition under this Article of emission reduction units.

4. If a question of implementation by a Party included in Annex I of the requirements referred to in this Article is identified in accordance with the relevant provisions of Article 8, transfers and acquisitions of emission reduction units may continue to be made after the question has been identified, provided that any such units may not be used by a Party to meet its commitments under Article 3 until any issue of compliance is resolved.

Article 7

1. Each Party included in Annex I shall incorporate in its annual inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases not controlled by the Montreal Protocol, submitted in accordance with the relevant decisions of the Conference of the Parties, the necessary supplementary information for the purposes of ensuring compliance with Article 3, to be determined in accordance with paragraph 4 below.

2. Each Party included in Annex I shall incorporate in its national communication, submitted under Article 12 of the Convention, the supplementary information necessary to demonstrate compliance with its commitments under this Protocol, to be determined in accordance with paragraph 4 below.

3. Each Party included in Annex I shall submit the information required under paragraph 1 above annually, beginning with the first inventory due under the Convention for the first year of the commitment period after this Protocol has entered into force for that Party. Each such Party shall submit the information required under paragraph 2 above as part of the first national communication due under the Convention after this Protocol has entered into force for it and after the adoption of guidelines as provided for in paragraph 4 below. The frequency of subsequent submission of information required under this Article shall be determined by the Conference of the Parties serving as the meeting of the Parties to this Protocol, taking into account any timetable for the submission of national communications decided upon by the Conference of the Parties.

4. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall adopt at its first session, and review periodically thereafter, guidelines for the preparation of the information required under this Article, taking into account guidelines for the preparation of national communications by Parties included in Annex I adopted by the Conference of the Parties. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall also, prior to the first commitment period, decide upon modalities for the accounting of assigned amounts.

Article 8

1. The information submitted under Article 7 by each Party included in Annex I shall be reviewed by expert review teams pursuant to the relevant decisions of the Conference of the Parties and in accordance with guidelines adopted for this purpose by the Conference of the Parties serving as the meeting of the Parties to this Protocol under paragraph 4 below. The information submitted under Article 7, paragraph 1, by each Party included in Annex I shall be reviewed as part of the annual compilation and accounting of emissions inventories and assigned amounts. Additionally, the information submitted under Article 7, paragraph 2, by each Party included in Annex I shall be reviewed as part of the review of communications.

2. Expert review teams shall be coordinated by the secretariat and shall be composed of experts selected from those nominated by Parties to the Convention and, as appropriate, by intergovernmental organizations, in accordance with guidance provided for this purpose by the Conference of the Parties.

3. The review process shall provide a thorough and comprehensive technical assessment of all aspects of the implementation by a Party of this Protocol. The expert review teams shall prepare a report to the Conference of the Parties serving as the meeting of the Parties to this Protocol, assessing the implementation of the commitments of the Party and identifying any potential problems in, and factors influencing, the fulfilment of commitments. Such reports shall be circulated by the secretariat to all Parties to the Convention. The secretariat shall list those questions of implementation indicated in such reports for further consideration by the Conference of the Parties serving as the meeting of the Parties to this Protocol.

4. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall adopt at its first session, and review periodically thereafter, guidelines for the review of implementation of this Protocol by expert review teams taking into account the relevant decisions of the Conference of the Parties.

5. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, with the assistance of the Subsidiary Body for Implementation and, as appropriate, the Subsidiary Body for Scientific and Technological Advice, consider:

(a) The information submitted by Parties under Article 7 and the reports of the expert reviews thereon conducted under this Article; and

(b) Those questions of implementation listed by the secretariat under paragraph 3 above, as well as any questions raised by Parties.

6. Pursuant to its consideration of the information referred to in paragraph 5 above, the Conference of the Parties serving as the meeting of the Parties to this Protocol shall take decisions on any matter required for the implementation of this Protocol.

Article 9

1. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall periodically review this Protocol in the light of the best available scientific information and assessments on climate change and its impacts, as well as relevant technical, social and economic information. Such reviews shall be coordinated with pertinent reviews under the Convention, in particular those required by Article 4, paragraph 2(d), and Article 7, paragraph 2(a), of the Convention. Based on these reviews, the Conference of the Parties serving as the meeting of the Parties to this Protocol shall take appropriate action.

2. The first review shall take place at the second session of the Conference of the Parties serving as the meeting of the Parties to this Protocol. Further reviews shall take place at regular intervals and in a timely manner.

Article 10

All Parties, taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances, without introducing any new commitments for Parties not included in Annex I, but reaffirming existing commitments under Article 4, paragraph 1, of the Convention, and continuing to advance the implementation of these commitments in order to achieve sustainable development, taking into account Article 4, paragraphs 3, 5 and 7, of the Convention, shall:

(a) Formulate, where relevant and to the extent possible, cost-effective national and, where appropriate, regional programmes to improve the quality of local emission factors, activity data and/or models which reflect the socio-economic conditions of each Party for the preparation and periodic updating of national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, using comparable methodologies to be agreed upon by the Conference of the Parties, and consistent with the guidelines for the preparation of national communications adopted by the Conference of the Parties;

(b) Formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to mitigate climate change and measures to facilitate adequate adaptation to climate change:

(i) Such programmes would, inter alia, concern the energy, transport and industry sectors as well as agriculture, forestry and waste management. Furthermore, adaptation technologies and methods for improving spatial planning would improve adaptation to climate change; and

(ii) Parties included in Annex I shall submit information on action under this Protocol, including national programmes, in accordance with Article 7; and other Parties shall seek to include in their national communications, as appropriate, information on programmes which contain measures that the Party believes contribute to addressing climate change and its adverse impacts, including the abatement of increases in greenhouse gas emissions, and enhancement of and removals by sinks, capacity building and adaptation measures;

(c) Cooperate in the promotion of effective modalities for the development, application and diffusion of, and take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies, know-how, practices and processes pertinent to climate change, in particular to developing countries, including the formulation of policies and programmes for the effective transfer of environmentally sound technologies that are publicly owned or in the public domain and the creation of an enabling environment for the private sector, to promote and enhance the transfer of, and access to, environmentally sound technologies;

(d) Cooperate in scientific and technical research and promote the maintenance and the development of systematic observation systems and development of data archives to reduce uncertainties related to the climate system, the adverse impacts of climate change and the economic and social consequences of various response strategies, and promote the development and strengthening of endogenous capacities and capabilities to participate in international and intergovernmental efforts, programmes and networks on research and systematic observation, taking into account Article 5 of the Convention;

(e) Cooperate in and promote at the international level, and, where appropriate, using existing bodies, the development and implementation of education and training programmes, including the strengthening of national capacity building, in particular human and institutional capacities and the exchange or secondment of personnel to train experts in this field, in particular for developing countries, and facilitate at the national level public awareness of, and public access to information on, climate change. Suitable modalities should be developed to implement these activities through the relevant bodies of the Convention, taking into account Article 6 of the Convention;

(f) Include in their national communications information on programmes and activities undertaken pursuant to this Article in accordance with relevant decisions of the Conference of the Parties; and

(g) Give full consideration, in implementing the commitments under this Article, to Article 4, paragraph 8, of the Convention.

Article 11

1. In the implementation of Article 10, Parties shall take into account the provisions of Article 4, paragraphs 4, 5, 7, 8 and 9, of the Convention.

2. In the context of the implementation of Article 4, paragraph 1, of the Convention, in accordance with the provisions of Article 4, paragraph 3, and Article 11 of the

Convention, and through the entity or entities entrusted with the operation of the financial mechanism of the Convention, the developed country Parties and other developed Parties included in Annex II to the Convention shall:

(a) Provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties in advancing the implementation of existing commitments under Article 4, paragraph 1(a), of the Convention that are covered in Article 10, subparagraph (a); and

(b) Also provide such financial resources, including for the transfer of technology, needed by the developing country Parties to meet the agreed full incremental costs of advancing the implementation of existing commitments under Article 4, paragraph 1, of the Convention that are covered by Article 10 and that are agreed between a developing country Party and the international entity or entities referred to in Article 11 of the Convention, in accordance with that Article.

The implementation of these existing commitments shall take into account the need for adequacy and predictability in the flow of funds and the importance of appropriate burden sharing among developed country Parties. The guidance to the entity or entities entrusted with the operation of the financial mechanism of the Convention in relevant decisions of the Conference of the Parties, including those agreed before the adoption of this Protocol, shall apply *mutatis mutandis* to the provisions of this paragraph.

3. The developed country Parties and other developed Parties in Annex II to the Convention may also provide, and developing country Parties avail themselves of, financial resources for the implementation of Article 10, through bilateral, regional and other multilateral channels.

Article 12

1. A clean development mechanism is hereby defined.

2. The purpose of the clean development mechanism shall be to assist Parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the Convention, and to assist Parties included in Annex I in achieving compliance with their quantified emission limitation and reduction commitments under Article 3.

3. Under the clean development mechanism:

(a) Parties not included in Annex I will benefit from project activities resulting in certified emission reductions; and

(b) Parties included in Annex I may use the certified emission reductions accruing from such project activities to contribute to compliance with part of their quantified emission limitation and reduction commitments under Article 3, as determined by the Conference of the Parties serving as the meeting of the Parties to this Protocol.

4. The clean development mechanism shall be subject to the authority and guidance of the Conference of the Parties serving as the meeting of the Parties to this Protocol and be supervised by an executive board of the clean development mechanism.

5. Emission reductions resulting from each project activity shall be certified by operational entities to be designated by the Conference of the Parties serving as the meeting of the Parties to this Protocol, on the basis of:

(a) Voluntary participation approved by each Party involved;

(b) Real, measurable, and long-term benefits related to the mitigation of climate change; and

(c) Reductions in emissions that are additional to any that would occur in the absence of the certified project activity.

6. The clean development mechanism shall assist in arranging funding of certified project activities as necessary.

7. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, at its first session, elaborate modalities and procedures with the objective of ensuring transparency, efficiency and accountability through independent auditing and verification of project activities.

8. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall ensure that a share of the proceeds from certified project activities is used to cover administrative expenses as well as to assist developing country Parties that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation.

9. Participation under the clean development mechanism, including in activities mentioned in paragraph 3(a) above and in the acquisition of certified emission reductions,

may involve private and/or public entities, and is to be subject to whatever guidance may be provided by the executive board of the clean development mechanism.

10. Certified emission reductions obtained during the period from the year 2000 up to the beginning of the first commitment period can be used to assist in achieving compliance in the first commitment period.

Article 13

1. The Conference of the Parties, the supreme body of the Convention, shall serve as the meeting of the Parties to this Protocol.

2. Parties to the Convention that are not Parties to this Protocol may participate as observers in the proceedings of any session of the Conference of the Parties serving as the meeting of the Parties to this Protocol. When the Conference of the Parties serves as the meeting of the Parties to this Protocol, decisions under this Protocol shall be taken only by those that are Parties to this Protocol.

3. When the Conference of the Parties serves as the meeting of the Parties to this Protocol, any member of the Bureau of the Conference of the Parties representing a Party to the Convention but, at that time, not a Party to this Protocol, shall be replaced by an additional member to be elected by and from amongst the Parties to this Protocol.

4. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall keep under regular review the implementation of this Protocol and shall make, within its mandate, the decisions necessary to promote its effective implementation. It shall perform the functions assigned to it by this Protocol and shall:

(a) Assess, on the basis of all information made available to it in accordance with the provisions of this Protocol, the implementation of this Protocol by the Parties, the overall effects of the measures taken pursuant to this Protocol, in particular environmental, economic and social effects as well as their cumulative impacts and the extent to which progress towards the objective of the Convention is being achieved;

(b) Periodically examine the obligations of the Parties under this Protocol, giving due consideration to any reviews required by Article 4, paragraph 2(d), and Article 7, paragraph 2, of the Convention, in the light of the objective of the Convention, the experience gained in its implementation and the evolution of scientific and technological knowledge, and in this respect consider and adopt regular reports on the implementation of this Protocol;

(c) Promote and facilitate the exchange of information on measures adopted by the Parties to address climate change and its effects, taking into account the differing circumstances, responsibilities and capabilities of the Parties and their respective commitments under this Protocol;

(d) Facilitate, at the request of two or more Parties, the coordination of measures adopted by them to address climate change and its effects, taking into account the differing circumstances, responsibilities and capabilities of the Parties and their respective commitments under this Protocol;

(e) Promote and guide, in accordance with the objective of the Convention and the provisions of this Protocol, and taking fully into account the relevant decisions by the Conference of the Parties, the development and periodic refinement of comparable methodologies for the effective implementation of this Protocol, to be agreed on by the Conference of the Parties serving as the meeting of the Parties to this Protocol;

(f) Make recommendations on any matters necessary for the implementation of this Protocol;

(g) Seek to mobilize additional financial resources in accordance with

Article 11, paragraph 2;

(h) Establish such subsidiary bodies as are deemed necessary for the implementation of this Protocol;

(i) Seek and utilize, where appropriate, the services and cooperation of, and information provided by, competent international organizations and intergovernmental and non-governmental bodies; and

(j) Exercise such other functions as may be required for the implementation of this Protocol, and consider any assignment resulting from a decision by the Conference of the Parties.

5. The rules of procedure of the Conference of the Parties and financial procedures applied under the Convention shall be applied *mutatis mutandis* under this Protocol, except as may be otherwise decided by consensus by the Conference of the Parties serving as the meeting of the Parties to this Protocol.

6. The first session of the Conference of the Parties serving as the meeting of the Parties to this Protocol shall be convened by the secretariat in conjunction with the first session of the Conference of the Parties that is scheduled after the date of the entry into force of this Protocol. Subsequent ordinary sessions of the Conference of the Parties serving as the meeting of the Parties to this Protocol shall be held every year and in conjunction with ordinary sessions of the Conference of the Parties, unless otherwise decided by the Conference of the Parties serving as the meeting of the Parties to this Protocol.

7. Extraordinary sessions of the Conference of the Parties serving as the meeting of the Parties to this Protocol shall be held at such other times as may be deemed necessary by the Conference of the Parties serving as the meeting of the Parties to this Protocol, or at the written request of any Party, provided that, within six months of the request being communicated to the Parties by the secretariat, it is supported by at least one third of the Parties.

8. The United Nations, its specialized agencies and the International Atomic Energy

Agency, as well as any State member thereof or observers thereto not party to the Convention, may be represented at sessions of the Conference of the Parties serving as the meeting of the Parties to this Protocol as observers. Any body or agency, whether national or international, governmental or non-governmental, which is qualified in matters covered by this Protocol and which has informed the secretariat of its wish to be represented at a session of the Conference of the Parties serving as the meeting of the Parties to this Protocol as an observer, may be so admitted unless at least one third of the Parties present object. The admission and participation of observers shall be subject to the rules of procedure, as referred to in paragraph 5 above.

Article 14

1. The secretariat established by Article 8 of the Convention shall serve as the secretariat of this Protocol.

2. Article 8, paragraph 2, of the Convention on the functions of the secretariat, and

Article 8, paragraph 3, of the Convention on arrangements made for the functioning of the secretariat, shall apply *mutatis mutandis* to this Protocol. The secretariat shall, in addition, exercise the functions assigned to it under this Protocol.

Article 15

1. The Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body for Implementation established by Articles 9 and 10 of the Convention shall serve as, respectively, the Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body for Implementation of this Protocol. The provisions relating to the functioning of these two bodies under the Convention shall apply *mutatis mutandis* to this Protocol. Sessions of the meetings of the Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body for Implementation of this Protocol shall be held in conjunction with the meetings of, respectively, the Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body for Implementation of the Convention.

2. Parties to the Convention that are not Parties to this Protocol may participate as observers in the proceedings of any session of the subsidiary bodies. When the subsidiary bodies serve as the subsidiary bodies of this Protocol, decisions under this Protocol shall be taken only by those that are Parties to this Protocol.

3. When the subsidiary bodies established by Articles 9 and 10 of the Convention exercise their functions with regard to matters concerning this Protocol, any member of the Bureaux of those subsidiary bodies representing a Party to the Convention but, at that time, not a party to this Protocol, shall be replaced by an additional member to be elected by and from amongst the Parties to this Protocol.

Article 16

The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, as soon as practicable, consider the application to this Protocol of, and modify as appropriate, the multilateral consultative process referred to in Article 13 of the Convention, in the light of any relevant decisions that may be taken by the Conference of the Parties. Any multilateral consultative process that may be applied to this Protocol shall operate without prejudice to the procedures and mechanisms established in accordance with Article 18.

Article 17

The Conference of the Parties shall define the relevant principles, modalities, rules and guidelines, in particular for verification, reporting and accountability for emissions

trading. The Parties included in Annex B may participate in emissions trading for the purposes of fulfilling their commitments under Article 3. Any such trading shall be supplemental to domestic actions for the purpose of meeting quantified emission limitation and reduction commitments under that Article.

Article 18

The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, at its first session, approve appropriate and effective procedures and mechanisms to determine and to address cases of non-compliance with the provisions of this Protocol, including through the development of an indicative list of consequences, taking into account the cause, type, degree and frequency of non-compliance. Any procedures and mechanisms under this Article entailing binding consequences shall be adopted by means of an amendment to this Protocol.

Article 19

The provisions of Article 14 of the Convention on settlement of disputes shall apply *mutatis mutandis* to this Protocol.

Article 20

1. Any Party may propose amendments to this Protocol.
2. Amendments to this Protocol shall be adopted at an ordinary session of the Conference of the Parties serving as the meeting of the Parties to this Protocol. The text of any proposed amendment to this Protocol shall be communicated to the Parties by the secretariat at least six months before the meeting at which it is proposed for adoption. The secretariat shall also communicate the text of any proposed amendments to the Parties and signatories to the Convention and, for information, to the Depositary.
3. The Parties shall make every effort to reach agreement on any proposed amendment to this Protocol by consensus. If all efforts at consensus have been exhausted, and no agreement reached, the amendment shall as a last resort be adopted by a three-fourths majority vote of the Parties present and voting at the meeting. The adopted amendment

shall be communicated by the secretariat to the Depositary, who shall circulate it to all Parties for their acceptance.

4. Instruments of acceptance in respect of an amendment shall be deposited with the Depositary. An amendment adopted in accordance with paragraph 3 above shall enter into force for those Parties having accepted it on the ninetieth day after the date of receipt by the Depositary of an instrument of acceptance by at least three fourths of the Parties to this Protocol.

5. The amendment shall enter into force for any other Party on the ninetieth day after the date on which that Party deposits with the Depositary its instrument of acceptance of the said amendment.

Article 21

1. Annexes to this Protocol shall form an integral part thereof and, unless otherwise expressly provided, a reference to this Protocol constitutes at the same time a reference to any annexes thereto. Any annexes adopted after the entry into force of this Protocol shall be restricted to lists, forms and any other material of a descriptive nature that is of a scientific, technical, procedural or administrative character.

2. Any Party may make proposals for an annex to this Protocol and may propose amendments to annexes to this Protocol.

3. Annexes to this Protocol and amendments to annexes to this Protocol shall be adopted at an ordinary session of the Conference of the Parties serving as the meeting of the Parties to this Protocol. The text of any proposed annex or amendment to an annex shall be communicated to the Parties by the secretariat at least six months before the meeting at which it is proposed for adoption. The secretariat shall also communicate the text of any proposed annex or amendment to an annex to the Parties and signatories to the Convention and, for information, to the Depositary.

4. The Parties shall make every effort to reach agreement on any proposed annex or amendment to an annex by consensus. If all efforts at consensus have been exhausted, and no agreement reached, the annex or amendment to an annex shall as a last resort be adopted by a three-fourths majority vote of the Parties present and voting at the meeting. The adopted annex or amendment to an annex shall be communicated by the secretariat to the Depositary, who shall circulate it to all Parties for their acceptance.

5. An annex, or amendment to an annex other than Annex A or B, that has been adopted in accordance with paragraphs 3 and 4 above shall enter into force for all Parties to this Protocol six months after the date of the communication by the Depositary to such Parties of the adoption of the annex or adoption of the amendment to the annex, except for those Parties that have notified the Depositary, in writing, within that period of their non-acceptance of the annex or amendment to the annex. The annex or amendment to an annex shall enter into force for Parties which withdraw their notification of non-acceptance on the ninetieth day after the date on which withdrawal of such notification has been received by the Depositary.

6. If the adoption of an annex or an amendment to an annex involves an amendment to this Protocol, that annex or amendment to an annex shall not enter into force until such time as the amendment to this Protocol enters into force.

7. Amendments to Annexes A and B to this Protocol shall be adopted and enter into force in accordance with the procedure set out in Article 20, provided that any amendment to Annex B shall be adopted only with the written consent of the Party concerned.

Article 22

1. Each Party shall have one vote, except as provided for in paragraph 2 below.
2. Regional economic integration organizations, in matters within their competence, shall exercise their right to vote with a number of votes equal to the number of their member States that are Parties to this Protocol. Such an organization shall not exercise its right to vote if any of its member States exercises its right, and vice versa.

Article 23

The Secretary-General of the United Nations shall be the Depositary of this Protocol.

Article 24

1. This Protocol shall be open for signature and subject to ratification, acceptance or approval by States and regional economic integration organizations which are Parties to the Convention. It shall be open for signature at United Nations Headquarters in New York from

16 March 1998 to 15 March 1999. This Protocol shall be open for accession from the day after the date on which it is closed for signature. Instruments of ratification, acceptance, approval or accession shall be deposited with the Depositary.

2. Any regional economic integration organization which becomes a Party to this Protocol without any of its member States being a Party shall be bound by all the obligations under this Protocol. In the case of such organizations, one or more of whose member States is a Party to this Protocol, the organization and its member States shall decide on their respective responsibilities for the performance of their obligations under this Protocol. In such cases, the organization and the member States shall not be entitled to exercise rights under this Protocol concurrently.

3. In their instruments of ratification, acceptance, approval or accession, regional economic integration organizations shall declare the extent of their competence with respect to the matters governed by this Protocol. These organizations shall also inform the Depositary, who shall in turn inform the Parties, of any substantial modification in the extent of their competence.

Article 25

1. This Protocol shall enter into force on the ninetieth day after the date on which not less than 55 Parties to the Convention, incorporating Parties included in Annex I which accounted in total for at least 55 per cent of the total carbon dioxide emissions for 1990 of the Parties included in Annex I, have deposited their instruments of ratification, acceptance, approval or accession.

2. For the purposes of this Article, "the total carbon dioxide emissions for 1990 of the Parties included in Annex I" means the amount communicated on or before the date of adoption of this Protocol by the Parties included in Annex I in their first national communications submitted in accordance with Article 12 of the Convention.

3. For each State or regional economic integration organization that ratifies, accepts or approves this Protocol or accedes thereto after the conditions set out in paragraph 1 above for entry into force have been fulfilled, this Protocol shall enter into force on the ninetieth day following the date of deposit of its instrument of ratification, acceptance, approval or accession.

4. For the purposes of this Article, any instrument deposited by a regional economic integration organization shall not be counted as additional to those deposited by States members of the organization.

Article 26

No reservations may be made to this Protocol.

Article 27

1. At any time after three years from the date on which this Protocol has entered into force for a Party, that Party may withdraw from this Protocol by giving written notification to the Depositary.

2. Any such withdrawal shall take effect upon expiry of one year from the date of receipt by the Depositary of the notification of withdrawal, or on such later date as may be specified in the notification of withdrawal.

3. Any Party that withdraws from the Convention shall be considered as also having withdrawn from this Protocol.

Article 28

The original of this Protocol, of which the Arabic, Chinese, English, French, Russian and Spanish texts are equally authentic, shall be deposited with the Secretary-General of the United Nations.

DONE at Kyoto this eleventh day of December one thousand nine hundred and ninety-seven.

IN WITNESS WHEREOF the undersigned, being duly authorized to that effect, have affixed their signatures to this Protocol on the dates indicated.

Annex A

Greenhouse gases

Carbon dioxide (CO₂)

Methane (CH₄)

Nitrous oxide (N₂O)

Hydrofluorocarbons (HFCs)

Perfluorocarbons (PFCs)

Sulphur hexafluoride (SF₆)

Sectors/source categories

Energy

Fuel combustion

Energy industries

Manufacturing industries and construction

Transport

Other sectors

Other

Fugitive emissions from fuels

Solid fuels

Oil and natural gas

Other

Industrial processes

Mineral products

Chemical industry

Metal production

Other production

Production of halocarbons and sulphur hexafluoride

Consumption of halocarbons and sulphur hexafluoride

Other

Solvent and other product use

Agriculture

Enteric fermentation

Manure management

Rice cultivation

Agricultural soils

Prescribed burning of savannas

Field burning of agricultural residues

Other

Waste

Solid waste disposal on land

Wastewater handling

Waste incineration

Other

Annex B

Party Quantified emission limitation or

reduction commitment

(percentage of base year or period)

Australia 108

Austria 92

Belgium 92

Bulgaria* 92

Canada 94

Croatia* 95

Czech Republic* 92

Denmark 92

Estonia* 92

European Community 92

Finland 92

France 92

Germany 92

Greece 92

Hungary* 94

Iceland 110

Ireland 92

Italy 92

Japan 94

Latvia* 92

Liechtenstein 92

Lithuania* 92

Luxembourg 92

Monaco 92

Netherlands 92

New Zealand 100

Norway 101

Poland* 94

Portugal 92

Romania* 92

Russian Federation* 100

Slovakia* 92

Slovenia* 92

Spain 92

Sweden 92

Switzerland 92

Ukraine* 100

United Kingdom of Great Britain and Northern Ireland 92

United States of America 93

* Countries that are undergoing the process of transition to a market economy.

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About the book

Carbon Credits: International Demand and Economic Possibilities for the Indian Industry provides an insight into the host of opportunities Kyoto Protocol has opened a for the developing nations of the world. It has also given them an opportunity to make their contribution to the sustainable development in the world. Multifarious opportunities that have been created by the Kyoto Protocol and its ratification by various countries of the world pose challenges for the Government, the industry, the entrepreneurs and individuals to work towards meeting the time bound commitments and to explore ways and means to get the most of the international agreements.

This book serves as an insight into the possibilities that have emerged from the coming into effect of the protocol. This book also brings out the importance and significance of Carbon Emission control and the ways and means of financial exploitation of the resultant benefits. The protocol has ushered the formation of a new form of asset in the form of 'CER-Carbon Emissions Rights/Carbon Rights'. This asset has the capacity of International Trading and the trading has a ready International market in the form of large EU, Japanese and American Firm ready to trade on these assets.

This book is a must for entrepreneurs, regulators chartered accountant and consultants.