

## Paper on Study on Clean Development Mechanism and Carbon Trading and possible audit scope in India

### 1. Introduction

**1.1** An assessment report by Inter Government Panel on Climate Change (IPCC) set up by World Meteorological Organization (WMO) and United Nations Environment Programme (UNEP) stated that there was discernible human influence on global climate change and was indeed a threat to environment and human health. In most tropical and subtropical regions, yields of cereal crops are projected to decrease for most of the increases in temperature. Water scarcity in many dry areas would be further exacerbated. Population in low lying coastal areas and small islands would be at particular risk. Ecological productivity and bio-diversity would be affected by climate change with increased risk of extinction of some species. Increasing concentration of Green House Gases was also projected to result in changes in frequency, duration and intensity of extreme weather events such as heat waves and heavy precipitation. Climate change would also increase the threats to human health due to increase in vector borne diseases. The impacts of climate change would fall disproportionately upon developing countries and would further increase inequities in health status, access to food, clean water and other resources.

**1.2** India is a party to the United Nations Framework Convention on Climate Change (UNFCCC), which was adopted in May 1992 and came into force on 21 March 1994. The objective of the Convention is to achieve stabilization of Green House Gas concentrations in the atmosphere at a level that would prevent dangerous interference with the climate system. In 1997, Parties to the UNFCCC adopted the Kyoto Protocol in recognition of necessity for strengthening developed country commitments under the Convention. **The Kyoto Protocol commits the developed country parties to return their emissions of Green House Gases to an average of approximately 5.2 per cent below 1990 levels over the period 2008-2012.** Green House Gases (GHGs) constitute six gases namely, carbon-di-oxide(CO<sub>2</sub>), methane(CH<sub>4</sub>), nitrous oxide(N<sub>2</sub>O), hydrofluorocarbons (HFC), perfluorocarbons (PFC) and sulphur hexafluoride (SF<sub>6</sub>). The protocol stipulated 39 country parties for emission limitation and reduction commitments. India was not given any targets for reduction of emission. India acceded to the Kyoto Protocol in August 2002. India was also elected to represent Asia in December 2004 in the CDM Executive Board, the highest decision making body as far as CDM is concerned. For Kyoto Protocol to enter into force, it was to be ratified/acceded by at least 55 parties and amounting to 55 per cent emissions. **In view of the ratification by the Russian Federation, the Kyoto Protocol came into force on 16 February 2005.**

**1.3** The Kyoto Protocol provides for three mechanisms that enable the developed countries with quantified emission limitation and reduction commitments to acquire

Green House Gas reduction credits from activities outside their own boundaries at relatively lesser costs. These mechanisms are:

**1.3.1 Joint Implementation (JI):** Under the Joint Implementation, a developed country with relatively higher costs of domestic green house gas reduction activities would take up these activities in another developed country, which may offer opportunities for reduction at lower costs.

**1.3.2 Clean Development Mechanism (CDM):** Under the Clean Development Mechanism, a developed country would take up green house gas reduction project activities in a developing country where the costs of implementing these projects are much lower.

**1.3.3 Emission Trading (ET):** Under Emission Trading, developed countries with quantified emission limitation and reduction commitments under the Kyoto Protocol may acquire credits from other such parties that do not need them for compliance with their own targets due to their actual emissions remaining lower than the upper limit provided for in the Protocol during the commitment period of 2008-12 and who, therefore, have a surplus of credits.

**1.4** The purpose of CDM shall be 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. The CDM, in particular, aims to assist developing countries by promoting environment friendly investment from industrialized country government and business. India has the potential to offer many projects in the field of energy efficiency, municipal and industrial wastes, biomass based cogeneration, besides renewable energy sources such as wind, small hydro etc. The resulting certified emission reductions could be used by developed country parties to help meet their emission reduction targets. These reductions are termed as Certified Emission Reductions (CERs) and one CER is equal to one tonne of carbon-di-oxide equivalent. The objective of India's acceding to the Kyoto Protocol was to fulfill prerequisites for implementation of CDM projects in accordance with national sustainable development priorities.

## **2. Setting up of National Clean Development Mechanism Authority**

**2.1** The Seventh Conference of Parties (COP-7) to the UNFCCC decided that parties participating in CDM should design an Authority for the CDM and as per the CDM project cycle, a project proposal should include written approval of participation from the Designated National Authority of each country and confirmation that the project activity assisted the country in achieving sustainable development. Accordingly, the Cabinet approved the setting up of National Clean Development Mechanism Authority (NCDMA) in December 2003 and Government of India Ministry of Environment and Forests notified the same on 16 April 2004 so that entities whether private, public or non-governmental could participate in the CDM process.

**2.2** The main functions of the NCDMA are receiving projects for evaluation and approval as per the guidelines and general criteria laid down in relevant rules and modalities pertaining to CDM, to recommend certain additional requirements to ensure that the project proposals meet the national sustainable priorities and to maintain a registry of CDM projects approved and their certified emission reduction potential. The NCDMA is headed by Secretary (E&F) with members drawn from various Ministries such as Ministry of Power (MOP), Ministry of Finance (MOF), Ministry of Non-conventional Energy Sources (MNES), Ministry of External Affairs (MEA), Department of Industrial Policy Promotion (DIPP) and Planning Commission. The Authority has also the powers to co-opt other experts and other members depending upon need. **This is a single window clearance.**

### **3. Steps involved in getting the project registered with UNFCCC**

**3.1** The scope and functions of the NCDMA have been listed out in the Government of India Notification dated 16 April 2004. The various steps involved in the registration of projects under this scheme are given below.

**Stage 1: Host Country Approval:** The project proponent has to submit a Project Concept Note (PCN) and a Project Design Document (PDD) to the NCDMA for getting Host Country Approval (HCA). Director (Climate Change), who is also Member Secretary of NCDMA would conduct preliminary examination of the project and would get detailed examination of the project proposal conducted through experts/consulting organizations for consideration by CDMA in accordance with guidelines established for the purpose. The NCDMA would evaluate the CDM projects along with an assessment of the probability of eventual successful completion of the projects and evaluation of extent to which the project meets the sustainable development objectives.

**Stage 2 : Validation and Registration:** After the approval of the host country the project proponent submits the Project Design Document to the Designated Operational Entity accredited by the UNFCCC for complete due diligence of the project activity. Submission of the documents to the NCDMA and DOE can be a parallel activity also. DOE independently evaluates the project activity as per the CDM requirements as set out in various decisions of Conference of Parties (COP) and the Executive Board (EB). Once DOE validate the project, it submits the documents to the EB of the CDM in Bonn for registration of the project.

**Stage 3: Implementation and monitoring:** After registration of the project, the project is implemented and emission reductions are to be monitored by collection and archiving of all relevant data necessary for estimating the anthropogenic emissions by sources of Green House Gases occurring within the project boundary during the crediting period.

**Stage 4: Verification and certification:** Verification is the periodic independent review by a DOE of the monitored reductions that have occurred as a result of the registered CDM project activity during the crediting period. DOE certification is the written assurance that the project activity achieved the reduction targets of emissions during the specified time period.

**Stage 5: Issuance of Certified Emissions Reductions (CERs):** The certification report is sent by DOE to EB for issuing CERs.

#### **4. Steps taken by MOEF for popularization of carbon trading**

**4.1** With a view to raising awareness levels of the beneficiaries and the supporting agencies ( the NGOs, banks, financial institutions, insurance agencies, and civil society) about the mechanism to be followed for project identification, baseline definition, etc., on the CDM project, a four page article titled “The Great Indian Success Story” covering vast concept of carbon trading process was published in Hindi, English and regional versions of India Today (a weekly popular magazine) dated 29 August 2005.

**4.2** The Prime Minister’s Office (PMO) held a meeting on 19 December 2005 to discuss CDM opportunities for the Public Sector. The meeting was attended by the Secretaries of all the stakeholder Central Ministries and Departments. Ministry of Power, Ministry of Petroleum and Natural Gas and Ministry of Steel committed that the PSUs under their administrative control would develop CDM projects. The PMO directed the Ministry of Urban Development to assist municipal bodies for CDM projects on solid waste management. The PMO further asked the MoEF to develop afforestation projects under CDM process. The MoEF organised a workshop at New Delhi on 16 January 2006 in order to facilitate the Central PSUs in conceptualizing, formulating and proposing CDM projects. The workshop was attended by about 150 heads of Central/State Public Sector Undertakings and stakeholder Ministries/Departments.

**4.3** With the assistance of UNDP, capacity of following State level organizations was being built for developing Project Design Documents:

1. The Environmental Training Research Institute, Hyderabad
2. The Environmental Management, Planning & Research Institute, Bangalore
3. Maharashtra Energy Development Agency, Pune
4. Punjab Energy Development Agency, Chandigarh
5. Rajasthan Renewable Energy Development Agency, Jaipur

#### **5. CDM Projects approved by NCDMA and involvement of PSUs/Government set ups**

**5.1 Host Country Approval:** NCDMA has accorded Host Country Approval to 447 CDM projects of which 416 projects pertained to Private Industry and 31 projects pertained to Central/State Public Sector Undertakings. Of 31 CDM projects, 19 projects pertain to Central PSUs and remaining 12 relate to State PSUs. The earning potential of these 447 CDM projects in India is 324,525,770 Certified Emission Reductions (CERs); and at the average rate of US\$ 10 per CER, the earning potential notionally works out to Rs.14,603 crore for these 447 projects over the span of the projects till 2012 if all the projects are approved by the UNFCCC.

**5.2 Validation and Registration by UNFCCC:** Of the 447 CDM projects approved by NCDMA, 121 CDM projects had been registered by UNFCCC till 2006. The earning

potential of these 121 CDM projects in India is 11,879,757 Certified Emission Reductions (CERs). At the average rate of US\$ 10 per CER, earning potential of 1,18,79,757 CERs notionally works out to Rs.534 crore for these 121 projects over the span of the projects till 2012. Details of the approvals accorded stage wise are given below:

No	Stage	Private industry		Public Sector Industry		Total	
		No	CER	No	CER	No	CER
1.	Host Country approval by NCDMA	416	307540846	31	16984924	447	324525770
		93%	95%	7%	5%		
Amount of CER notional potential in Rs. (1 CER = 10 US\$= Indian Rs.450)							<b>Rs.14,603 crore</b>
2.	Validation and Registration by UNFCCC	121	11879757	0	0	121	11879757
		100%	100%	0%	0%		
Amount of notional CER potential in Rs. (1 CER = 10 US\$= Indian Rs.450)							<b>Rs.534 crore</b>

### 5.3 Comments

The private sector has taken a major initiative in CDM projects which is evident from the fact that out of 447 projects approved by the host country, 416 projects pertained to private sector. All the CDM projects registered with the UNFCCC up to 2006 pertained to private sector.

## 6. Scope of Audit Examination at this stage and in the future

### 6.1 Current Scope

- Check whether the entire potential for earning CERs have been assessed by the NCDMA or not? Even though this is not function of the NCDMA as per the Cabinet Note which lists out their functions and powers, this can be a line for audit enquiry.
- Review the progress of according host country approval by the NCDMA. The pendency at the level of UNFCCC can also be reviewed. Steps taken by the host country to get these approvals expedited can also be reviewed.
- Check whether the entire potential for earning CERs have been exploited by the industry in India or not? This can be checked at the level of the NCDMA for the industry as a whole (Private Sector and Public Sector) but it appears that NCDMA have not attempted such an exercise. As regards the role of PSUs in CER earning capacity, it can be checked at the level of the State and Central PSUs. The reasons for the delay in responding to CDM projects can be commented upon by

respective Commercial Auditors of State and Central PSUs in their respective reports.

- Comment on the role of NCDMA in popularizing Carbon Trading in India. Here again keeping in view the success India has had in the international arena, we may not have any strong comment to make.

## 6.2 Future Scope

- Once the CDM projects are implemented, then the role of the NCDMA can be reviewed with regard to the actual generation vis a vis approved capacity of CERs in each project.
- The reasons for the failure in the CDM projects, if any, can also reviewed in Audit.
- Once CERs are available, then the role of NCDMA in the entire mechanism for trading can be looked into.

## 6.3 Case study

A Case Study of implementation of a CDM project by the Bakra Beas Management Board is enclosed as Annexure A. Understanding the procedures adopted would also help in identifying audit areas in the future.

## 7. Conclusion

The Koyoto protocol came into force only in February 2005. It commits the developed country parties to return their emission of green house gases over the period 2008-12. Only 121 CDM projects have been registered with UNFCCC till 2006. However, after holding of meeting of PMO with the Secretaries of stakeholder Ministries in December 2005 and organizing a workshop by MoEF for Central Public Sector Undertakings, in January 2006, there is a trend of increase in the participation of Central/State Public Sector Undertakings as 31 CDM projects of these entities have already been approved by the host country, which are likely to be registered with UNFCCC. The scope of audit at present may be limited to delay in approval of projects by NCDMA and lack of MOEF to involve Government companies/departments in the CDM process. At this stage the State AG could be directed to look into the involvement of State/Central Public Sector Undertakings in the development of CDM projects. The actual earning of CERs by entities would commence only after satisfactory implementation of projects and emission trading would start only from the year 2008.

**Considering the scale of earning potential which the Indian Industry has (Rs.14,603 crore even at the current level of 447 Host Country Approvals), this subject promises to gain prominence over the next 3 years and needs to be monitored carefully with an Audit point of view.**

## Annexure A

### **Case Study of implementation of a CDM project undertaken by the Bakra Beas Management Board -- a hydel power generating parastatal**

1. BBMB is a pioneering parastatal organization in the power sector in India to participate in the Clean Development Mechanism (CDM) as enunciated in the Kyoto Protocol. The CDM project is based on the Renovation, Modernization and Upration (R, M&U) of the BBMB Power Stations viz: five units of Bhakra river (left bank) and one unit each of Kotla and Ganguwal Power Stations respectively. The R,M&U activities at BBMB would not only lead to much needed augmentation of capacity (94.43 MW) in the Northern Grid (which always remains deficit) but would also lead to reduction of carbon dioxide (a Green House Gas) emissions. The emission reductions can be traded under the Clean Development Mechanism of the Kyoto Protocol in the international markets as Certified Emission Reductions (CERs). One CER is equivalent to 1 tonne of carbon dioxide emission reduction.
2. World Bank (as a trustee of many International Carbon Funds) has signed a Letter of Intent (LOI) with BBMB for purchase of first 1 million CERs at a fixed price of at least US\$8 (eight US dollars) per CER up to 31<sup>st</sup> December, 2016 (though the official cut off date of implementation of the ‘First Period’ of the Kyoto Protocol is only up to 31<sup>st</sup> December, 2012) and have expressed their interest to extend the contract up to 2020 during recent discussions. After obtaining approval of the host country (from Ministry of Environment & Forests, Government of India), the CDM project will then be registered with the Executive Board of CDM.
3. The main criteria which need to be satisfied for an activity to qualify as a CDM Project is the criteria of “Additionality”. Additionality requires demonstrating that without the CDM revenue, the project would not have occurred. This requires an assessment of the project’s financial and technological structuring, and of the electrical system (in the context of a power project) and regulatory framework. The United Nations Framework Convention for Climate Change (UNFCCC) has issued a tool (EB 29) for demonstration and assessment of Additionality. While there are different criteria listed out for establishing Additionality, in the case of R,M&U activity of BBMB, the Investment Analysis is used as the underpinning factor to show that the project is otherwise financially unattractive and thus does not fall in the “Business as usual” category. This also involves carrying out an ‘Alternative Analysis’, wherein capacity addition from other sources (thermal or others based on fossil fuels) is compared.
4. For the project activity of BBMB, the levelized tariff both with and without CDM benefit for 35 years as per CERC norms is as follows:

Project	Levelized Tariff (Rs/ kWh)	
	With CDM benefit	Without CDM benefit

Ganguwal , Kotla & Bhakra Left Bank Power Stations	3.64	3.96
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5. As against the above tariffs, Punjab State Electricity Board (one of the partner States of BBMB) has finalized long term Power Purchase Agreements (PPA's) with the new hydro projects at the following levelized tariff (35 years- as per CERC Norms);

- a. 200 MW from 1000 MW Karcham Wangatoo project in Himachal Pradesh at a uniform tariff of Rs. 2.25 paise/unit ( for 35 years);
- b. 22.5 MW from Bhilangana Hydro Project in Uttarakhand at a uniform tariff of Rs. 2.25 paise/unit (for 35 years);
- c. 100 MW from Malana-II Hydro Project in Himachal Pradesh at a uniform tariff of Rs. 2.31 paise/unit ( for 40 years);

thus proving that the project activity at BBMB is an expensive option.

6. The other benchmark used to undertake the comparison is the cost of capacity additions per megawatt in the regional grid. The present project activity will lead to capacity augmentation of 94.44 MW resulting in increasing the much needed peaking power in the Northern Grid. The uprated capacity through R,M&U can be equated to a new capacity addition of around 248.93 MUs (Million Units) at grid level. The estimated cost for the BBMB's R,M&U projects will be around Rs. 590.53 crore. In other words, the cost of augmenting power (94.44 MW) through R,M&U in BBMB will be around Rs. 6.25 crore per MW. This is extremely high as compared to normative figure of Rs. 60 to 80 lakh per MW for new capacity augmentation at the grid level.

7. In addition to the above, it is stated that the BBMB power stations covered under the project activity have a 'Residual Life' that can last beyond the crediting period (say 2020). This can be proved through Residual Life Analysis (RLA), but it is generally seen that RLAs are generic in nature, inaccurate and often misleading. Therefore, in case of BBMB, for more reliable and authentic approach, the argument on 'Residual Life' of BBMB Power Stations is settled by the facts and figures on the annual availability and forced outage data of the machines of unit 1 each at Ganguwal and Kotla power stations and all the five units at Bhakra Left Bank power station. The reason for excellent health of machines and low forced outage is that the replacement of turbine significantly depends upon the quality of water that passes through it for generation of electricity and the operation & maintenance practices adopted by the management.

8. The Bhakra Power Stations have a huge water reservoir with storage capacity of 9621 Million Cubic meters. The silt gets settled down by gravity and the silt free water is

available to turbines for generation of power. The trap efficiency of Bhakra Dam is over 99.5% (the trap efficiency is an indication of the percentage of silt settling in the reservoir). The Ganguwal and Kotla power stations are on the canal system down stream of Bhakra Dam, thus also receiving silt free water from Bhakra. Therefore, the erosion of underwater parts of the turbines at Bhakra, Ganguwal and Kotla is negligible. The generators and generator transformers are also performing well and do not require immediate replacements. Moreover, a meticulous maintenance programme followed by BBMB has helped in maintaining the high availability of power generating equipment at all times. Therefore, the present performance, efficiency and condition of turbines at Ganguwal, Kotla and Bhakra power stations do not warrant their replacement immediately and can still be used for at least another two decades at the current level of power generation.

9. Having established Additionality, the next step as per the prescribed procedure is to apply a baseline methodology to determine the emissions that would occur if it were a “business as usual” project. In the instant case, it will be the emissions/kwh from all the electricity that is generated at the grid during the same time. The methodology to be adopted has been prescribed by the CDM Executive Board in its document ACM0002, “Consolidated baseline methodology for grid-connected electricity generation from renewable sources’. This methodology is applicable to reservoir based hydro power plants whose reservoirs have a power density of more than four. In the case of Bhakra, the power density of the upstream reservoir is greater than four and is hence covered. For baseline determination, CO<sub>2</sub> emissions from fossil fuel fired power that is displaced by the project activity is used as the baseline. The spatial extent of the project includes the project site and all power plants connected to the electricity system (grid in the Indian context) that the CDM power plant is connected to. Using a rough indicator (due diligence on the application of this methodology is yet to be done), an overview of CERs expected to be generated from the R,M&U project of BBMB is as shown below:

S.No	During the year ending (1 <sup>st</sup> Jan to 31 <sup>st</sup> Dec)	Expected capacity to be added through R,M&U	Cumulative capacity (MW)	Energy generated (MWhr)	CERs generated CO <sub>2</sub>
1	2006	4.44	4.44	8527.00	7504
2	2007	0.00	4.44	36230.00	31822
3	2008	0.00	4.44	36230.00	31822
4	2009	36.00	40.44	55870.00	49166
5	2010	36.00	76.44	75510.00	66449
6	2011	18.00	94.44	129520.00	113978
7	2012	0.00	94.44	134430.00	118298
<b>Grand Total</b>				<b>476317.00</b>	<b>419159</b>

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