

Yuvaraj Dinesh Babu, N.; Michaelowa, Axel

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Removing barriers for renewable energy CDM projects in India and building capacity at the state level

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REPORT

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N Yuvaraj Dinesh Babu

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Removing Barriers for Renewable Energy CDM Projects in India and Building Capacity at the State Level

**State in Focus:
Maharashtra**

N Yuvaraj Dinesh Babu

Axel Michaelowa

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Introduction

As an effective greenhouse gas (GHG) mitigating mechanism, the Clean Development Mechanism (CDM) is widely expected to stimulate co-operation between developed and developing nations, thereby encouraging the transfer of climate-friendly technologies to developing countries. In this context, renewable energy technologies (RETs) can provide ample opportunities for successful implementation of CDM projects. Renewable energy not only can mitigate GHG emissions but provides developing countries with multiple benefits such as enhanced energy security and overall energy availability, an augmented level of technology, greater investment, and development that is more sustainable.

Though at current market prices additional revenue from sale of certified emission reductions (CERs) is relatively small with varying increase of internal rate of return based on type of RET project (e.g. in the order of one to 5 percentage points), it can outweigh some risks that may otherwise prevent RET projects. Among developing countries, India assumes a lead role in RET development.

The current policy environment in India has been instrumental in creating one of the largest and most diverse renewable energy programmes in the world. However, there are several barriers preventing rapid penetration and commercialization of RETs in India to achieve this potential.

CDM can only address these barriers effectively if India creates a regulatory environment that promotes low-risk carbon emissions reduction opportunities, while optimizing transaction costs. Creation of such an environment requires an understanding of the concerns and apprehensions that various stakeholders have with regards to baseline assessment, to high transaction costs, uncertainty associated concerning the actual price of CERs and the selection of national sustainable development criteria. Many project developers fear that in a federal state like India, many layers of bureaucracy will be involved, siphoning off the CER revenue. Indeed some state electricity boards want to use CER revenues to lower electricity prices, not leaving any incentive to private project developers. Such an attitude ignores that private partners play a decisive role in the successful implementation of CDM projects in developing countries if they are driven by the desire to monetize CERs while the nation will equally gain from improved social economy and environment.

Therefore, there is an urgent need to build up effective institutions at the central as well as the state level. Moreover, the “real” potential of the CDM to promote RET projects and how it can be harnessed needs to be communicated to the RET project developers in India.

In India on-going and planned capacity-building programmes from various donors do not take great account of these needs. They usually only focus on awareness-raising of government officials and the private sector on the CDM opportunities in general. A sustainable in-depth knowledge of the Indian CDM stakeholders’ of the relevant CDM issues outlined above is rarely achieved.

This report aims at the following. First, to identify crucial CDM capacity-building needs in India. Second, to review current and planned capacity-building activities in the light of these needs. Third, to propose a CDM capacity-building strategy in the private sector as well as among government officials at the central and state-level in India that ensures an in-depth and sustained understanding of the most relevant CDM issues.

To this end the report is structured around 7 chapters.

Chapter 1 briefly outlines the relevance for CDM in renewable energy development in India.

Chapters 2 and 3 give an overview on the renewable energy potential and related CDM potential in India respectively.

Chapter 4 provides an overview on activities of the central as well as the state governments to promote renewable energy and CDM development in India. Moreover, it highlights opportunities for further integration of CDM in central and state government energy policies.

In terms of advancement in both general energy policy reforms and renewable energy as well as CDM promotion the state of Maharashtra has been among the most active states in India. Therefore, chapter 5 gives an account of the barriers and opportunities for CDM project development in renewable projects in Maharashtra. Finally, it gives concrete policy recommendations on how the barriers can be overcome.

Chapter 6 provides an overview of the current capacity building programmes under CDM in India. It critically assesses the possibility of building the capacity of the stakeholders under CDM to an extent to achieve rapid implementation of renewable energy projects to meet the objectives of CDM. This assessment covers both the federal government and state government levels. At the state level, the assessment is focused on the state of Maharashtra.

Chapter 7 summarises the main findings of this report and concludes with concrete policy recommendations for the central and state level.

1. The Relevance of CDM for Renewable Energies in India

1.1 The Clean Development Mechanism

The UN Framework Convention on Climate Change was agreed upon at the United Nations Conference on Environment and Development (UNCED) in Rio, 1992. To put the convention into operation, a protocol was outlined in Kyoto in 1997. The most important aspect of the Kyoto Protocol is its legally binding commitments for 39 developed countries to reduce their greenhouse gas (GHG) emissions by an average of 5.2% relative to 1990 levels. These emission reductions must be achieved by 2008-2012: the so called 'first commitment period'. Developed countries with emission reduction targets are called Annex B countries, whereas those without targets are referred to as Non-Annex I countries. The Kyoto Protocol allows developed countries to achieve their targets through the following 'flexibility mechanisms':

Emissions Trading: Trading of "Assigned Amount Units" between developed nations.

Clean Development Mechanism (CDM): The CDM allows countries with emission targets to buy emission credits from projects in countries without targets. It also has the goal to further sustainable development in the latter countries and already formally started in 2000. Due to the fact that CDM emission credits are added to the overall emissions budget of Annex B countries, their quality has to be guaranteed. Therefore, they only accrue after independent verification through so-called "Operational Entities", which are mainly commercial certification companies, and thus are called Certified Emission Reductions (CERs). The Marrakech Accords defined an elaborate project cycle that is overseen by the CDM Executive Board (EB), whose 10 members are elected by the Conference of the Parties. It has to check whether projects conform to the rules and formally register them. Each country participating in the CDM has to have ratified the Kyoto Protocol and set up a "Designated National Authority" (DNA) for approval of the CDM projects it is involved in.

Joint Implementation: The term "Joint Implementation" only applies to projects that take place in Annex B countries. Emission credits ("Emission Reduction Units", ERUs) can only accrue from 2008. JI has two distinct "tracks". The first track is very liberal and leaves choice of baselines and project lifetimes to the participating countries. This is due to the fact that ERUs are deducted from the emissions budget of the host country and thus there is no incentive for baseline manipulation. The second track is similar to the CDM and applies if the host country does not fulfil the reporting requirements for Annex B countries; of course it can also be chosen voluntarily. It is overseen by a "Supervisory Committee" and the ERUs have to be certified by "Independent Entities". It is likely that the rules developed by the CDM Executive Board will be used under the second track. To garner the potential for emission reductions before 2008, some countries already now invite investments into "early JI" emission reduction projects and grant post-2008 emission rights from their budgets for the pre-2008 reductions.

1.2 Renewable Energy in India

Renewable energy deserves global attention and accelerated promotion due to its triple benefits of enhancing sustainable development, augmenting energy security and abating GHG emissions.

There are various reasons for India to push renewable energy such as.:

- The inability of conventional systems to meet growing energy demand in an equitable and sustainable manner.
- The large scale negative impact of conventional energy production and consumption on the physical and human environment.
- The need for meeting energy needs of an unserved population in rural and remote areas as well as those residing on islands.
- The need for maintaining a properly diversified energy mix. Such a diversified portfolio would also help in minimizing the socio-economic impact if the supply of a particular fuel were to break down. However, maintaining a back-up infrastructure for periods when renewable energy

supply is scarce (e.g. no wind is blowing) can be very costly. This becomes the more important, the higher the renewables penetration.

Due to these benefits, Indian policymakers have decided to allocate different kinds of subsidies¹ to the RE sector. Over the past decade, the country has witnessed a rapid growth in this sector and several RE technologies have attained technological maturity. They are biomass power, solar energy (photovoltaic and thermal), small hydro and wind energy with a cumulative installed capacity of around 4000 MW (MNES 2003). India is the only country in the world which has a dedicated ministry for promoting RE viz., Ministry of Non-conventional Energy Sources (MNES) and an exclusive public sector financial institution, viz., Indian Renewable Energy Development Agency (IREDA).

2. Indian Renewable Energy Scenario

2.1 Potential Vs Achievements

Two major issues, namely, the ever widening gap between energy demand and supply, and associated greenhouse gas emissions, place the renewable energy resources in the right perspective.

Technologies based on renewable energy sources (RETs) have developed rapidly in India due to a strong political support. The contribution of renewable energy technologies in India's economy and impact on overall development can be classified into two categories: off-grid and grid-connected applications. Table 1 shows the prevalent RE technologies in the country. The cumulative subsidies spent on RET since 1980 is to the tune of 1040 Million €²

Table 1: Potential³ and Achievements for Renewable Energy Technologies

Source/Systems	Potential according to past studies	Cumulative physical achievements (31st March 2003)
Biogas plants (nos.)	12 million	3.5 million
Improved cook stoves (numbers)	120 million	35.2 million
Biomass power / Co-generation	19500 MW	484 MW
Biomass gasifiers		53.40 MW
Solar photovoltaic systems	20 MW/sq.km	121 MWp
Solar water heating (collector area)	140 million sq. m.	0.70 million sq. m
Wind energy	45000 MW	1870 MW
Small hydro power	15000 MW	1509 MW
Waste-to-energy	1700 MWe	25.80

Source : <http://mnes.nic.in/frame.htm?majorprog.htm>
various SPV systems viz., Lanterns, Home & Street lighting systems & SPV power plant

* MWe - Megawatt electricity equivalent, MWp –Megawatt Peak

¹ While fiscal benefits remain the same for entire RE spectrum the capital subsidies vary across the spectrum based on sectors' potential, technology level and access etc.

² Cumulative actual expenditure by MNES as on February 2003 since 1980 (Lok Sabha 2003, Ministry of Finance 2000, Planning Commission 1996). Exchange rate used: Rs 50 per €. The expenditure excludes receipts of external budgetary resources by IREDA but includes budgetary support by MNES to IREDA.

³ The estimated potential may not be necessarily realistic and influenced by interest groups. For an external observer, the wind power potential looks strongly overestimated. In fact, the regions with an average windspeed of more than 6 m/s are few; many other countries such as Morocco, Argentina, Costa Rica and China have higher average windspeeds on a larger share of their area. On the other hand, the small hydro potential seems to be substantially underestimated given the mountainous nature and high rainfall regime of important parts of India. China has shown that more than 20 GW of small hydro power can be installed if there is a coordinated policy.

After making bad experiences with public programmes that led to a rush in building of RET plants that were quickly abandoned afterwards, the MNES now places greater reliance on developing market linkages and promoting commercialisation by involving private sector, rather than public investment, and providing more fiscal and tax incentives. However, also many of these incentives such as one-off depreciation were not conducive to long-term maintenance of plants. Only slowly policymakers have realised that incentives for long-term operation of the RETs such as low interest loans, interest subsidies, financing packages for consumers, fiscal benefits, preferential tariffs for imports and viable power-purchase prices are needed.

The successful penetration of renewable energy into conventional markets depends on several factors that in turn are driven by the institutional and policy environment.

2.2 Enabling Environment

2.2.1 Central Policy for Renewable Energy Development

Prime Minister Vajpayee announced at the Chief Minister's Conference on power sector reforms on March 3, 2001, a goal of increasing the share of renewables to 10% of the additional planned capacity in the next 10 years (by 2012) that is 10 GW. This goal is indicative and not binding.

MNES has prepared a draft Renewable Energy Policy Statement which has been submitted for further approval. The policy statement seeks to set out the major application areas and near term targets for the period up to the end of the Eleventh Five Year Plan, in the year 2012.

The Electricity Bill, which was recently enacted also contains several provisions to promote accelerated development of power generation from non-conventional sources.

Major policy initiatives taken to encourage private/foreign direct investment for RETs include provision of fiscal and financial incentives under a wide range of programmes being implemented by the Ministry and simplification of procedures for private investment in renewable energy projects.

A multi-pronged strategy is being pursued by MNES for promotion of RETs through private sector involvement. These include:

- providing budgetary resources by government for demonstration projects. In fiscal 2002 and 2003, the budgets allocated were 95 million €⁴ and 126 million € respectively
- extending institutional finance from the Indian Renewable Energy Development Agency (IREDA) and other financial institutions for commercially viable projects, with private sector participation; and external assistance from international and bilateral agencies. IREDA's loan availability during fiscal 2002 stood at 100 million €, the interest rate reduction averaged 6 basis points⁵ only for fiscal 2002 and is expected to be 67 basis points for the fiscal 2003 (Lok Sabha 2003)
- promoting private investment through fiscal incentives, tax holidays, depreciation allowance. For a wind power project of 100 MW, this amounts to tax reductions of 118 million €⁶
- Providing guidelines to the state utilities for favourable purchase of power from RE based power producers. The suggested rate amounts to 4.5 ct/kWh with fiscal 94 as base year and 5 % annual escalation. (7 ct/kWh for fiscal 2003)
- promote rapid indigenisation of RETs by providing financial support for R&D projects involving equal contribution from private/industrial sector

⁴ Budget also includes capital support to IREDA

⁵ Too low since the average cost of borrowing was 9.6 % against the average lending rate of 12%, giving a margin of 2.4 % for the year 2002-03.

⁶ Assumptions : 1 Mn €/ MW, 80% acceleration depreciation on 90% of capital cost availed in first year and Income tax benefits computed for first 10 years.

3. Indian CDM Scenario

3.1 Ratification of Kyoto Protocol

The Kyoto Protocol was ratified by the Government of India during August 2002. So India can participate in the CDM once a Designated National Authority (DNA) has been specified.

3.2 National CDM Potential

Following is the outcome of the national GHG inventory prepared as part of the ALGAS (Asia Least-cost Greenhouse Gas Abatement Strategy) project for India (ADB, 1998).

3.2.1 ALGAS Outcome

In India, total CO₂-equivalent emissions in 1990 were 1.001 billion t, which was approximately 3% of global emissions (ADB et al. 1998)⁷. The energy sector was the largest emitter of CO₂, contributing 55% of national emissions. These also included emissions from road transport, coal mining, and fugitive emissions from oil and natural gas. Agriculture was the second largest source of GHGs in India; methane emissions from enteric fermentation in domestic animals, manure management, rice cultivation, and burning of agricultural residues constituted 34% of national GHGs. The net uptake and emissions from the land use change and forestry sector were almost equal, resulting in negligible emissions from this sector (ADB et al 1998). This study also identified GHG abatement options for India, focusing on CO₂ reduction in the energy sectors and methane emissions reduction in the agriculture sector.

Typical project types in the energy sector include :

- Renewable energy
- Fuel switching (in industry, transport, residential sector, etc)
- Advanced coal-based power generation technologies
- Renovation and modernization
- Demand side management
- Industrial energy efficiency improvement

Two types of GHG abatement options were highlighted for the energy sector:

1. Improvement in energy efficiency through the refurbishment of currently employed technologies.
2. Introduction of advanced technologies that are more efficient or are based on renewable energy sources.

The ALGAS study made projections for sectoral GHG emissions from India for the period 1990-2020 in order to identify the key areas for developing an abatement strategy for the country. The energy sector projections for India are summarized in Table 2. The baseline scenario represents the most likely situation. Rather than projecting past trends, it includes some carbon abatement technologies and energy efficiency improvements that are likely to occur in the future, irrespective of concerns for carbon dioxide emission reduction.

⁷ There is no updated comprehensive data available since then. The India NATCOM project is currently developing the GHG inventory but again with 1994 as the base year for the emissions. However, the total CO₂e emissions has been estimated as 1.254 billion t by "A study of 466 district level GHG inventory data" for the year 1995 (Shukla 2000).

Table 2: CO₂ Emissions in the Baseline Scenario (mill. t CO₂)

	1990	2010	2020
Baseline	532	1555	2308
Coal	327	895	1336
Oil	178	553	777
Gas	27	107	198

Source : ALGAS report

ALGAS developed an abatement cost curve leading to the prioritisation of technologies shown in Table 3.

Table 3: Summary of Priority GHGs Abatement Projects

Sector	Technologies
Power	Solar photovoltaics Bagasse co-generation, biomass based power generation and biomass gasification
Transport	Fuel cells
Commercial	Compact fluorescent lamps
Transport	Compressed natural gas operated cars
Power	Small hydro power Wind power
Coal	Coal washing
Power	Large hydro Renovation & modernisation of old thermal power plants Biomass gasifiers steam injected gas turbine cogeneration for sugar industry Integrated gasification combined cycle based power generation using Indian coal
Power, Industrial & Transport	Fuel switching
Transport, Residential and Agriculture	End use energy efficiency improvements

3.2.2 Other Projections

With respect to CDM, it is essential that GHG abatement projects be in consonance with the host country's sustainable development priorities. The Government of India's Ninth Five-Year Plan envisaged adequate and reliable power for all, with coal being the main source of energy in future. The Ministry of Power has stressed clean coal technologies for addressing various environmental issues, and has identified priority areas for developing CDM projects in the power sector, including new power generation technologies, renovation and modernization of power plants, transmission and distribution loss reduction, agricultural demand side management, and load management.

MNES has ambitious plans of adding 10% of the additional capacity installed in the power sector from renewables by 2012. MNES has indicated that CDM options can be explored in the areas of wind energy, solar energy, small hydro, biomass and waste to energy.

Based on the AHP (Analytical Hierarchical Process) model, TERI (2002) carried out an exercise for prioritisation of projects in the energy, agriculture, and forestry sectors, by policymakers on the basis of cost of mitigation, GHG mitigation potential, feasibility of implementation, and sustainable development benefits. Table 4 presents the overall ranking of options for a selected set of projects in the renewable energy sector. This ranking is not consistent with the ALGAS results presented above due to the existence

of non-cost related preferences in the AHP procedure. Such preferences influence policy decisions and thus have to be taken into account.

Table 4: AHP Results for Energy Sector GHG Mitigation Options for India

	AHP
Renewables for power generation	
Biomass power including bagasse-based cogeneration	1
Small hydro	2
Wind farm	3
Photovoltaic	4
Renewables for agriculture	
Wood-waste-based gasifiers	1
Agro-waste-based gasifiers	2
Photovoltaic pump	3
Wind deep well	4
Wind shallow well	5

TERI (2002) identified potential CDM projects for India that would be technically feasible, consistent with the country's priorities, and yield high sustainable development benefits. A preliminary analysis was carried out for representative options in conventional power generation, renewable energy, and industrial efficiency (Table 5).

Table 5 Potential CDM Projects for India

GHG mitigation option	Abatement cost range ^a	National mitigation potential (million tonnes of CO ₂ p.a.)
Power generation		
Pulverized fluidized bed combustion	Low	8.2
Renovation and modernization	High	8.6
Integrated gasification combined cycle	High	14.6
Renewable energy		
Wind power (grid-connected)	High	0.5
Solar thermal power (grid-connected)	High	0.3
Industrial efficiency		
Iron and steel – dry coke quenching	Low	1.0
Pulp and paper – continuous digester	Medium	0.9
Replacement of industrial motors	Medium	<0.1

a Low: up to 10 €/tonne of CO₂; Medium: 10-20 €/tonne of CO₂, High: Above 20 €/tonne of CO₂

There are varying estimates of the total potential opportunities under CDM. Earlier studies expected annual flows of as much as 1 billion € into India based on expected CER prices of 10-20 €/t CO₂. However, the United States refusal to ratify the Kyoto Protocol has reduced the demand for CDM considerably and grey market prices for CERs have settled around 3.5 €/t.

Given current market prices of 3-5 €/t, only the low cost options will become attractive under the CDM, unless subsidies are used to bring their abatement costs down to the level where the cost gap is below 5 €. Shukla et al (2002) estimated the CDM potential for renewable energy technologies in the power sector under different global mitigation scenarios. The net contribution of renewables varied from 11 million t CO₂ reduction and 14 million € revenue earning under a low mitigation scenario to 58 million tonnes

carbon reduction and 434 million € revenue earning under a high global mitigation scenario. The mitigation potential of some interventions in the power and industry sectors has also been assessed by the Confederation of Indian Industry.

If India can capture a 10% share of the global CDM market, annual CER revenues to the country could range from 10 million to 300 million € (assuming that CDM is used to meet 10-50% of the global demand for GHG emission reduction of roughly 1 billion tonnes CO₂, and prices range from 1-6 €/per tonne of CO₂)⁸. The central scenario of a model of the global greenhouse gas market with realistic transaction cost estimates for CDM generates a market price of 3.8 €/t and gross revenues of 100 million €/per year (Jotzo and Michaelowa 2002). As the deadline for meeting the Protocol targets draws nearer, prices can be expected to rise, as countries/companies save carbon credits to meet stricter targets in the future.

3.3 Enabling Environment

The Government of India has been very active in the climate change negotiations since the inception of the Convention. Although it does not have GHG reduction targets, it has actively taken steps to address the climate change issue. The policy on climate change in India is based on three principles:

- The primary responsibility of reducing GHG emissions is that of developed countries
- The development needs of developing countries are of prime importance
- The developed world should transfer resources and technologies at favourable terms to the developing world, thereby facilitating developing countries to move towards sustainable development

CDM represents a step forward from the AIJ (Activities Implemented Jointly) scheme. Initially there was resistance towards CDM because the guidelines for the provision were unclear and India thought it could use its opposition as a bargaining chip. In 1999, a strong capacity building effort by the US was able to convince India about the benefits of CDM, especially due to the expectation of a multi-billion € inflow of fresh capital. A little of this enthusiasm faded after the United States refusal to accede to the Kyoto Protocol. However, when it became clear that the CDM would go ahead at COP 7, the Indian government did not want to be left behind. A fairly complex and overlapping structure of activities resulted that is summarised in Figure 1.

The Ministry of Environment and Forest (MoEF) is the nodal ministry for climate change and is actively working with various stakeholders. MoEF has constituted a 'Working Group on the FCCC' to deliberate upon measures and positions that should be taken regarding the various issues emerging out of the climate change negotiations. A separate group on the Kyoto Mechanisms has also been constituted. MoEF is responsible for developing the institutional framework (Designated National Authority) for developing CDM projects in the country.

With a view to obtaining expert inputs on the climate change issues, on the concerns relating to renewable energy in the changing climate change scenario and on the recommendations made at various sessions of the Commission on Sustainable Development (CSD), MNES has constituted a Climate Change Advisory Group. The Group recommended creating an enabling environment for undertaking CDM projects in renewable energy area, especially the mature technologies like wind energy, solar energy, small hydro, biomass and waste-to-energy.

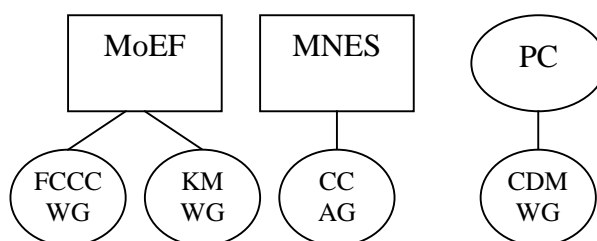
In addition, MNES also commissioned studies on different aspects of CDM to facilitate development of CDM projects in India (MNES 2003) viz., "Baselines for Renewable Energy Projects under CDM", "Sustainable Development Concerns In Renewable Energy CDM Projects", "Reducing Transaction Costs in Small Scale CDM projects" and "Feasibility of Retrofitting of On-going Renewable Energy Programme as Unilateral CDM Projects - Issues and Possibilities"⁹. However, these studies so far are not publicly available.

⁸ Assumptions made by TERI

⁹ The Baseline study was carried out by TERI, Development Alternatives carried out the study on Transaction Costs and Sustainable Development and Winrock International carried out the study on Retrofitting of RE projects under unilateral CDM. The studies have been completed and MNES is in the process of finalizing these reports.

In addition to the above groups on KP and Climate Change constituted by MoEF and MNES, a third working group (WG) on “Action plan for capacity building in operationalisation of CDM in India” was constituted by Planning Commission, Government of India on the advise of Prime Minister’s Office (PMO). This WG deliberates on the steps to be followed for the preparation and necessary clearance of CDM proposals from various sectors of the economy and a dynamic action plan to expedite the process and create awareness amongst the beneficiaries.

Figure 1: Different CDM Working Groups in Central Government



3.4 National Policy on CDM

Despite the proliferation of working groups on CDM issues, a comprehensive National CDM Policy and an institutional framework for the country is still missing.

The Prime Minister’s Office has stated the need to establish a regulatory mechanism (responsibility of MoEF) and a capacity building mechanism (responsibility of Planning Commission) for spearheading the development of different sectoral projects under CDM in India.

The present system of endorsement of CDM projects in India is through an ad hoc committee, which was formed for approving Activities Implemented Jointly (AIJ) projects. The ad hoc committee is an inter-ministerial group of which all the important ministries are members. The project developers need to submit fifteen copies of their CDM project to MoEF for further circulation to the committee members for their comments and inputs. However the final decision of endorsement is taken by MoEF.

The ad hoc procedure of host country endorsement is expected to be regularised by formation of Designated National Authority (DNA). Currently, MoEF is in the process of establishing a DNA for endorsing CDM projects. However as an interim measure to guide the stakeholders in developing CDM projects, MoEF has established an interim CDM project approval criteria. (Annex 1, MoEF 2003b).

The major features of this interim approval criteria are as follows:

1. Eligibility : Environmental, financial and technological additionality
2. Sustainable development:
 - Social well-being: Generating employment, removing social disparities, improvement in quality or life
 - Economic well-being: CDM project activity should bring in additional investment consistent with the needs of the people.
 - Environmental well-being: Environmental Impact Assessment
 - Technological well-being: Transfer of technology
3. Transparent baselines
4. Financial indicators
5. Technological feasibility
6. Risk analysis and credential of the project developer/ CER seller

This set of criteria is far-reaching as criteria 3 and 4 will be screened by the independent validator in the international CDM project cycle.

3.5 Response by Private Sector

The MoEF made public the interim criteria for CDM projects during early 2002 when the first call of CERUPT (Certified Emissions Reduction Procurement Tender) by the Dutch Government was announced. MoEF endorsed 12 projects under CERUPT out of which 6 projects were shortlisted for approval by CERUPT authorities. Finally 5 projects were approved for signing the contract. The projects are given below.

- 7.5 MW biomass power plant in Maharashtra
- 7.5 MW biomass power projects in Rajasthan
- 14.45 MW wind project in Tamil Nadu
- 15 MW wind project in Tamil Nadu
- 15 MW wind power project in Karnataka

CDM projects were also submitted in response to the call for tenders by Government of Sweden (Swedish Climate Investment Program) and Finland Government. Projects have also been submitted to the World Bank's three carbon facilities.¹⁰

Two more carbon facilities are operating in India with the support of Indian financing institutions namely the Rabo India Bank and Infrastructure Development Finance Corporation (IDFC). While the former has a tie up with the Government of Netherlands, the latter has an exclusive contract with PCF.

The positive outcome of the CERUPT call has kickstarted the CDM process in India encouraging the private sector to embark on CDM project development in the country.

3.6 Role of Renewables as Pillar of Indian CDM Strategy

Having already discussed the importance of renewable energy under CDM, it is needless to re-emphasize the necessity to integrate RETs and CDM. With relentless efforts, MNES has for the past nearly two decades promoted the RET movement and has been well received and complemented by the private sector. With the major stake in the RET held by private sector, CDM can further propel the private sector's participation leading to multiple benefits. CDM being a market based mechanism can undoubtedly contribute to enhanced implementation of RET in the country.

The global experience so far in the CDM displays the above mentioned fact that RE has been the second most preferred sector behind methane reduction from landfills. All projects shortlisted by various tenders from India belong to the RE sector. Out of the 27 projects submitted to CDM Executive Board for approval of methodologies until September 2003, the number of projects in the RET sector is 13, including four from India.

The major attributing and prevalent barriers inhibiting the rapid commercialization and implementation of RETs in India can be summarized as limited access to power market, stiff competition from subsidized conventional energy, risks involved in the transformation of technologies from novelty to mainstream, high capital investment and marginal commercial viability, lack of adequate capital at affordable cost, limited access to financial resources and high cost of finance.

Though the CDM will not be a panacea to overcome all the abovementioned barriers in the RE sector, it can effectively address some of those related to finance. Especially, CDM can be used as a financial tool to promote technologies that are just about to become viable what applies to RETs in favourable locations without any subsidies or in locations where existing subsidies are just insufficient to make projects happen.

¹⁰ Prototype Carbon Fund, Community Development Carbon Fund and Biocarbon Fund

This of course needs fine-tuning to avoid that project proposals are labelled as not being additional. The recently enacted Electricity Act 2003, which directs the SERCs¹¹ to specify a minimum percentage of purchase¹² of RE based electricity by the state utilities (see box 1) could be interpreted in a way that only projects that increase RETs beyond the minimum threshold are seen as additional (Ministry of Power 2003).

Box 1: Renewable Energy, Electricity Act 2003 and Additionality : The Vicious Circle

The efforts of MNES in convincing the state utilities and the government to announce uniform and favourable policies for procuring RE based power is a well known process in India. Despite many hurdles, MNES was successful in convincing around 15 states in announcing their RE power purchase policies, though at varying degrees as compared to those advised by MNES. MNES was also having continuous discussions with all the state electricity regulatory commissions (SERCs) for evolving RE tariff policies for which some SERCs have responded positively. MERC tariff orders for bagasse co-generation and wind power are the positive outcome of such efforts. It has always been highlighted by various experts in the RE and power sector that the quantity of RE power procurement is minuscule compared to the purchase of conventional power by the state utilities and hence total RE power procuring expenditure by providing a higher, preferential tariff is negligible from the point of view of resultant burden on consumer for this preferential tariff. From the RE power sector forum it is always argued that cost of RE power generation cannot compete with that produced by old thermal and large hydro plants, including from expanding units in old thermal power plants. The strong incentives viz., hidden subsidies, infrastructure facilities, strong market access etc., available for conventional power sector has been continuously denied to RE sector besides the famous cost of *externalities*. Hence it was the common voice of both RE stakeholders and the MNES to provide a level playing field for RE power in the power market. Though the much talked about and awaited RE legislation is yet to come through, MNES efforts to prioritise RE in the Electricity Act 2003 has finally paid off. The Electricity Act 2003 has several provisions favourable for RE power including rural electrification. Under the proposed open access scheme expected to be in place by mid of 2004, the Independent Power Producers (IPP) can setup RE power plants for captive use, third party sale, power trading companies and for own transmission and distribution both in rural and urban areas. The act also directs the Central Government to prepare a national electricity and tariff policies including RE based power and currently MNES is in the process of developing the same for RE. The most important feature and the highlight of the act is that it empowers the SERCs to promote RE and specify for purchase of electricity from RE sources, a percentage of the total consumption of electricity in the area of a distribution licence. This is considered as a major boost for promotion of the RE sector in India. In other words, once it is enacted, the utilities in the state will be having a target of procuring RE based power based up to a certain percentage as specified by the SERC. Given this situation we now discuss a couple of scenarios with and without CDM.

Scenario 1 More RE IPPs without CDM : This is a win win situation for RE IPPs. Presently in most of the states, the utilities belong to the state electricity board (SEB) who frame the power purchase terms and provision of infrastructure for implementing power projects. Under the EA 2003 enacted scenario, these SEBs are meant to be unbundled into generation, transmission and distribution companies. Further, due to the open access, more IPPs in the RE sector are expected to enter the power sector with third party sale option. Hence based on the SERC's Renewable Energy Portfolio Standards (RPS), the unbundled state utility needs to procure a certain of percentage of power from RE besides its current RE power procurement (as against the already signed Power Purchase Agreements (PPAs)). Hence a situation may arise that it has to outreach to these new IPPs and procure power from them ! Now it will be RE IPPs turn that they may refuse sale of power to state own utilities! In addition the state utilities may also approach power trading companies to provide RE based power available from states with RE power surplus. However it is understood that SERCs will not allow this situation to happen and hence would analyse the RE power generation status and plans in the state before allocating the RPS.

Scenario 2 More RE IPPs with CDM : Currently, the RE power projects implemented under CDM are going through a tough process of proving additionality and rigorous baseline estimations. The CDM EB has stated in their guidelines for the approval of methodologies that the barriers need to be proved for the additionality and several baseline scenarios need to be developed and discussed for justifying the selected scenario. One of the barrier is that the projects are not implemented under the regulatory provisions and legally mandated. But once the RPS is enforced by the SERC, the IPPs need to take a decision whether to go for the RPS or participate in the CDM. It is

¹¹ State Electricity Regulatory Commissions

¹² Electricity Act 2003 : Page 46 Point 36. 1.(e) under the heading of Functions of State Commission

assumed that the choice of participation would be available for the RE IPPs. Then it is a task for the RE IPPs to evaluate the benefits offered by these mechanism (RPS and CDM) and then decide the attractive option. If the project is implemented as a CDM project, then the power produced cannot be procured by a utility mandated by RPS and in the reverse situation a RPS based project cannot claim the benefits of CDM viz., sell CERs ! However it remains to be clarified that whether the RPS based RE projects can prove other barriers as stipulated by CDM EB and qualify under CDM which is less likely to happen. Again SERCs may need to seriously analyse this issue, weigh the benefits accrued by CDM and may decide to set a pretty low RPS to promote CDM in the state. This low RPS may of course be reviewed appropriately (e.g. annually) by SERC based on the performance of the CDM projects.

In both the scenarios it is seen that SERCs play a vital and pivotal role in propagating RE sector in the states. There is strong need to sensitize and build the capacity of the SERCs and state utilities interms of the RE and as well as CDM procedures and benefits. Though the current level of understanding and appreciation on RE issues is fair among several SERCs and state utilities , the understanding on CDM has been observed to be poor. This is stated on the fact that the Karnataka State Power Utility has decided to claim all the revenues from CDM, (incorporated as one of the clause in their future PPA) in case the RE IPP implements a CDM project! MERC on the other hand suggests in their recently announced wind power tariff policy that a suitable formula needs to be worked out for sharing the benefits of the RE IPPs with the state utility including CDM! With the revenue from CDM already seem to be low, these kinds of “eating away layers” of even those low benefits would make the RE IPPs shun the CDM process, eventually extinguishing the CDM efforts in the country. Besides this anomaly of sharing the CDM benefits with the state utilities, there is already few proposed bureaucratic layers at the central level to tax the CDM revenues, claim a share towards host country approval costs etc.,

The bureaucratic stakeholder both at the central and state levels need to be provided with a thorough analysis of the current CDM market scenario for their better awareness and appreciation of the low revenues expected to be generated from CDM amidst the most complicated circumstances. They play a crucial role in the success of building the capacity of private sector and rest of the community as any bureaucratic barrier will render the CDM capacity building programme futile, quickly. Hence it is very important to sensitise them and involve them in the fore front of stakeholders CDM capacity building programme.

Having understood the link of CDM with RE, some states in India have shown a keen interest in participating in CDM. While the state of Madhya Pradesh has an exclusive CDM cell located within the State Pollution Control Board, Andhra Pradesh has acknowledged EPTRI¹³ for CDM activities in the state. In other states, SEDAs are taking active role in propagating CDM in the private sector. We now discuss what capacity building activities are needed on the state level.

4. Role of Federal and State Governments in Energy Policy

Since its inception, the renewable energy programme in India has been driven by policies framed by the MNES and subsequently adopted by the respective state governments. On both the fronts, the major objective was to attract private investment and rapid penetration of RET market. While these policies did contribute in achieving milestones in terms of RET capacity addition in certain states, the reason for such impressive state-wise capacity additions cannot be attributed only to the favourable policies.

The present RE energy programme in India is well defined and structured both at the central (federal) and state levels. Beside the five year plan allocation for renewables, the central government (MNES) allocates sectorwise annual targets for the installed capacity and also allocates budget for promotion, demonstration, development and R&D for each sector.

At the state level, the state energy development agencies (SEDA) also develop similar annual targets and receive annual budget allocations from the state government. The SEDA also receives financial support from MNES for their promotional activities, annually.

On the policy level MNES has issued the following policies, guidelines for furthering RE in the country.

¹³ Environment Protection, Training and Research Institute www.eptri.com/special.htm

- Fiscal and financial incentives
- Guidelines for the state electricity utilities and 15 states have announced their power purchase policy from renewable energy (see Table 6).
- Industrial Policy
- Foreign investment policy
- Concessional customs duties for imported RE equipments
- Soft (loans) and long term debt facility
- Major clearances required for implementing RE projects

Similarly, the state governments have the policies and guidelines issued for the RE sector. Recently the SERCs are engaged in developing tariff policy for grid connected RE power projects, sectorwise. This effort has already enhanced the confidence of the project promoters. Additionally, the Electricity Act 2003 proposes open access and hence third party sale will become a reality soon for improving the viability of such projects.

The above shows that the Central and State Government are equally geared up for mainstreaming RE in improving the overall national energy security.

MNES has taken commendable steps to promote effective implementation of its programme and policy guidelines. However its effort in bringing about uniform policy among all the states for grid-connected RE power did not materialise as expected. MNES had prepared during 1993 and 1996, a set of guidelines for "Promotional and Fiscal Incentives by State Governments for Power Generation from Non-Conventional Energy Sources". These guidelines were designed to bring about a level playing field for power generation from non-conventional energy sources. Salient features included a preferential tariff of 4.5 ct /kWh with a 5% annual escalation, allow third party sale and captive use, timely payment, long term PPA, provide grid connectivity, create the infrastructure for power evacuation, streamline procedures for various statutory clearances, sales tax and electricity duty exemptions etc. MNES even suggested implementation of Empowered Institutional Mechanism (EIM) with sufficient funding be created to deal with all aspects of non-conventional energy power projects at the state level. MNES also recommended an interim separate and distinct *cell* for non-conventional energy power projects within the state electricity board (SEB). However, states responded somewhat erratically and implemented few guidelines in an uneven manner. Since then States have been continuously advised by MNES to lay in place conducive policies for commercial development in this sector with moderate success. The underlying principle being that Central Government can mainly act as a catalyst and facilitator, with implementation being carried out by the States or by the private sector. MNES was able to persuade the SEBs to incorporate renewable energy based electricity into their systems. However it lacked uniformity in providing concessional tariffs, wheeling, banking, third party sale and power evacuation facilities as many states saw RETs as an unaffordable luxury in a situation of bankrupt SEBs. The current restructuring of the electricity sector is leading to the creation of independent regulatory commissions and the unbundling of the SEBs, meaning that RET once again would not be the focus of state policy. Nevertheless, 15 of 26 states have so far announced policies for grid connectivity of renewable energy projects. The details and the variation of these policies with reference to MNES guidelines is provided in the Table 6. The Ministry is currently interacting with the regulatory commissions in various states to help in bringing about a rational pricing framework that takes into account the environmental costs and other externalities of conventional energy, as well as the benefits of non-conventional energy options, with a view to providing a level playing field in the energy sector. In the new Electricity Bill which is being finalised, several enabling provisions have been proposed for incorporation in the Bill with a view to promote accelerated development of non-conventional energy based power generation. After consistent efforts by MNES, Gujarat declared a Policy after a gap of four years. Karnataka has agreed to follow MNES guidelines up to March 2005 for the projects already sanctioned by them. Kerala Government has also come up with a policy for private sector projects. The Regulatory Commission in Maharashtra has come out with conducive tariff policies for bagasse co-generation and wind power sectors and is presently working on the biomass power sector. Tamil Nadu is

also deliberating on tariff for wind power projects in its state. Ultimately it is clear that in order to accelerate progress and attract investments, policy support and creation of a conducive regulatory and legislative framework are critical.

Some states, Tamil Nadu, Andhra Pradesh, Karnataka, Maharashtra, Gujarat and Rajasthan are more proactive in propagating RE in their respective states.

However for this discussion paper, the state of Maharashtra has been chosen for applying the framework for building the capacity under CDM, for the following reasons :

- The state has one of the largest installed power capacity and highest per capita consumption. Between April-August 2003 the state had a peak demand¹⁴ of about 13.1 GW and only 10.8 GW was met resulting in a deficit of around 17.6 %¹⁵.
- The state nodal agency namely, Maharashtra Energy Development Agency Ltd., (MEDA) is the designated agency for promotion of RET in the state and has been on the lead in promoting rapid implementation of RET projects in the state . MEDA while utilises the MNES support effectively, is also continuously engaged in developing promoter friendly incentive schemes and promotional schemes for RE in the state.
- MERC has announced attractive feed-in-tariff policy for bagasse based co-generation and wind power sectors (7 ct/kWh) and is currently in the process of developing tariff policies for biomass power sector.
- Recently the state has given promoters from Andhra Pradesh licenses for implementing biomass power projects in the state.
- Several leading RET providers/manufacturers have their base in the state.
- Reently MEDA drew a comprehensive energy plan (up to year 2012) for the state based including propagation of RETs. The blueprint for this plan was based on the latest technological developments as well as prevailing ground realities. This exercise was carried out by TERI which also included a review of MEDA's own capabilities and detailed planning for strengthening them so that MEDA would be well prepared to face long term challenges in the field of RET and Energy Efficiency (EE).
- Also UCCEE (2001) has analysed possible measures for overcoming barriers for two sectors namely solar and wind.

¹⁴ The peak demand is lesser than the installed capacity in the state because the available capacity is less than the installed due to old plants, low share from central sector, reactive power etc.

¹⁵ http://www.cea.nic.in/data/opt2_peakdemand.htm.

Table 6: Non-Conventional Energy Power Policies in Indian States

State	Programme	Wheeling	Banking	Third Party Sale	Buy-Back (Rs./ kWh)	Annual Tariff Escalation
		2 %	12 months	Recommended	Rs. 2.25	5 % (1994-95 as base year)
Andhra Pradesh	Wind	a	a	X	a	a 1994-95
	Cogen/ Biomass	2% for old projects	2%	X	a	a 1994-95
		28.4%+Re 0.5/ unit for new projects				
	Small Hydro	a	2%, 8-12 M	anot< HTT	a	a 1997-98
	Waste	a	2%, 8-12 M	anot< HTT	a	a 1997-98
Bihar	all	To be decided by State Electricity Regulatory Commission				
Chattisgarh	Wind	a	a	a	a	X
	Biomass	X	X	a	a	X
	Waste	a	a	a	a	X
Gujarat	Wind	4%	6 months	X	2.60	5 paise 2002-03
	Biomass	4%	a	a	a	1994-95
	Waste	4%	a	a	a	1994-95
Haryana	Wind	a	a	a	a	1994-95
	Cogen/ Biomass	a	a	a	a	1994-95
	Small Hydro	a	a	a	a	1994-95
	Waste	a	a	a	a	1994-95
Himachal Pradesh	Small Hydro	a	a	X	2.50	X
		with addl. charge				
Karnataka	Wind	6-12%	a 2% on monthly basis	a	3.10 for new projects	2% on base tariff
	Biomass	6-12%	a on monthly basis	X	2.80	2% on base tariff
	Small Hydro	2-5%	a	a	2.60	1994-95
Kerala	Wind	5%	June-Feb	X	2.80	2000-01 for five years
	Small Hydro	a	X	X	2.50	Not allowed
	Biomass	5%	4 months	X	2.80	2000-01 for five years
	Waste	5%	June-Feb	X	2.80	2000-01 for five years
Madhya Pradesh	Wind	a	X	a	a	X
	Cogen/ Biomass	a	X	a	a	X
	Small Hydro	a	X	a	a	X
	Waste	a	X	a	a	X
Maharashtra	Wind	a	a	a	3.50	@ 15 paise per year from the year of commissioning for 13 years
	Cogen	7%	a	a	3.05	@ 2% from the year of commissioning

1 Rupee (Rs) = 100 paise = 2 ct

a : Available X : Not Available

Cogen: Bagasse Cogeneration

Source : mnes.nic.in/guide.htm

Table 6 (Continuation): Non-Conventional Energy Power Policies in Indian States

State	Programme	Wheeling	Banking	Third Party Sale	Buy-Back (Rs./ kWh)	Annual Tariff Escalation
Recommended level by MNES		2 %	12 months	Recommended	2.25	5 % (1994-95 as base year)
	Small Hydro	a	a	a	a	1999-00
	Waste	2-6%	a	a	a	1994-95
Orissa	Small Hydro	2-3%	a	a	At mutually agreed rate	X
Punjab	Cogen/ Biomass	a	a	a	3.01	3% 2001-02
	Small Hydro	a	a	a	2.73	1998-99
	Waste	a	a	a	3.01	3% from 2000-01
Rajasthan	Small Hydro	a10%	a (Calendar year basis)	a	3.32 in 2003-4	2% from 2003-04 Rs. 3.92 fixed from 2013-14 for 10 years
	Wind	a	a	a	3.32 in 2003-4	
		10%	(Calendar year basis)			
	Cogen/ Biomass	a	a	a	a	1994-95
	Waste	a	a	a	3.03	2000-01
Tamil Nadu	Wind	5%	5%	X	2.70	No escalation
	Cogen/ Biomass	2-10%	a 2%	X	2.73	2000-01
	Small Hydro	5%	X	X	Mutually agreed rate	1995-96
	Waste	X	a	X	2.70	2000-01
Uttaranchal	Small Hydro	a	a	a	Mutually agreed rate	
Uttar Pradesh	Wind	12%	a	0.5%	a	1995-96
	Cogen	X	a 24 months	X	a	1999-00
	Small Hydro	a	a	a	a	1995-96
	Waste	a	a	a	a	1995-96
West Bengal	Wind	a	a 6 months	X	X	X
	Cogen	--	--	--	--	--
	Small Hydro	a	a 6 months	X	X	X

1 Rupee (Rs) = 100 paise = 2 ct

a : Available X : Not Available

Cogen: Bagasse Cogeneration

Source : mnes.nic.in/guide.htm

5. Renewable Energy and CDM in Maharashtra

Some states, Tamil Nadu, Andhra Pradesh, Karnataka, Maharashtra, Gujarat and Rajasthan are more proactive in propagating RE in their respective states.

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- The state has one of the largest installed power capacity and highest per capita consumption
Between April-August 2003 the state had a peak demand¹⁶ of about 13.1 GW and only 10.8 GW was met resulting in a deficit of around 17.6 %¹⁷

¹⁶ The peak demand is lesser than the installed capacity in the state because the available capacity is less than the installed due to old plants, low share from central sector, reactive power etc.

¹⁷ http://www.cea.nic.in/data/opt2_peakdemand.htm.

- The state nodal agency namely, Maharashtra Energy Development Agency Ltd., (MEDA) is the designated agency for promotion of RET in the state and has been on the lead in promoting rapid implementation of RET projects in the state. MEDA utilises the MNES support effectively and is also continuously engaged in developing promoter friendly incentive schemes and promotional schemes for RE in the state
- MERC has announced an attractive feed-in-tariff policy for bagasse based co-generation and wind power sectors (7 ct/kWh) and is currently in the process of developing tariff policies for the biomass power sector
- Recently the state has given promoters from Andhra Pradesh licenses for implementing biomass power projects in the state
- Several leading RET providers/manufacturers have their base in the state
- Recently MEDA drew a comprehensive energy plan (up to year 2012) for the state based including propagation of RETs. The blueprint for this plan was based on the latest technological developments as well as prevailing ground realities. This exercise was carried out by TERI which also included a review of MEDA's own capabilities and detailed planning for strengthening them so that MEDA would be well prepared to face long term challenges in the field of RET and Energy Efficiency (EE)
- Also UCCEE (2001) has analysed possible measures for overcoming barriers for two sectors namely solar and wind.

5.1 Maharashtra's Energy Scenario

Maharashtra accounts for nearly one-fourth of the gross value of the output of India's registered industrial sector. It is one of the few states in the country to achieve 100% electrification of its towns and villages. The annual average consumption of electricity per person in the state is considerably higher than the national average, and is growing constantly.

As of August 2003, the total installed power capacity in Maharashtra was 13,733 MW. The Maharashtra State Electricity Board (MSEB), a statutory body constituted under the Electricity (Supply) Act, 1948 is responsible for generation, transmission and distribution of power in the state. Besides MSEB, there are some licensees like Tata Power, BSES and BEST, which distribute the power in individual franchise areas. The MSEB is further supported by captive generation from some of the industrial units within the state.

Of the total installed capacity, thermal capacity accounts for 72 %, large hydro 21 %, nuclear 2 % and renewables based power 5%.

The T&D losses in the state are expected to be around 16.5% by 2004-05. The energy demand requirement (at the bus bar) in the state is expected to be around 107 TWh, and 143 TWh by 2007 and 2012 respectively. The growth in peak load at power stations bus bars has been projected at 6% by the end of the 10th and 11th plan periods respectively.

5.2 Power Sector Reforms in Maharashtra

Maharashtra has initiated electricity reforms by formulation of Electricity Regulatory Commission and rationalisation of tariff. The initiation of reforms has led to the emergence of merit order dispatch of electricity to the MSEB, related to the least cost options. Based on the recently enacted Electricity Act 2003, unbundling of the MSEB is scheduled by the year 2004. Maharashtra Electricity Regulatory Commission (MERC) was constituted in August 1999 and has been instrumental in bringing about the participatory approach and transparency in the power sector in Maharashtra. The regulatory process has also provided an impetus to an exercise for reducing T & D losses in the state. As per MoUs signed with the Centre, Government of Maharashtra has given an undertaking of (i) having 100 per cent metering of all consumers by September 2002, (ii) computerised billing by March 2003, and (iii) achieving breakeven in distribution by March 31, 2003, and positive returns

thereafter. This aim obviously could not be achieved within stipulated time but 97 % (MSEB 2003) of metering of the 11 kV and above feeders has been completed till June 2003 but T&D loss reduction has not been significant primarily due to unmetering of agricultural load.

5.3 Carbon Emissions in Maharashtra in 1999/00

Table 7 below gives the consumption of coal, kerosene, fuel oil and Low Sulphur Heavy Stock Oil (LSHS), naphtha, light diesel oil, and bio-fuels in the state in different years. Based on these consumption figures for the year 1999-2000, the CO₂ emissions have been calculated after taking into consideration the emission factors as provided by Intergovernmental Panel on Climate Change (IPCC) and Regional Wood Energy Development Programme (RWEDP) in Asia. For Kerosene and Fuel Oil/ LSHS, the figures for the year 1998-99 have been considered.

Further the emission from coal consumed for power generation in the state for the year 1995-96 and that of biofuels for the year 1996-97 have also been calculated and provided.

Table 7: Carbon emissions

Fuel	Consumption '000 tonnes				CO ₂ Emission Factor [#] kg/ kg	Annual CO ₂ Emissions Million t
	95-96	98-99	96-97	99-00		
Kerosene		1584			3.13	4.96
Fuel Oil / LSHS		2124			3.18	6.75
Naphtha				1015	3.18	3.23
Liquified Petroleum Gas				941	3.09	2.90
Light Diesel Oil				336	3.18	1.07
Bio-Fuels*			36990 [^]		1.68,1.3,1 [€]	56.38
Coal (Power generation)	25243				1.39	35.12
Total						110.41

Sources

Intergovernmental Panel on Climate Change & Regional Wood Energy Development Programme

* Biofuels: fuelwood, agricultural residues & dung

[^] "Emissions Inventory for Aerosol Constituents and Sulphur Dioxide, from Biomass Combustion in India", M. Shekar Reddy & Chandra

Venkataraman, Centre for Environmental Science & Engineering, IIT, Mumbai

[€]Carbon emission factors for fuel wood, agricultural residues & dung

5.4 Renewable Energy Scenario

As per the new projects in pipeline, Maharashtra is expected to add about 12 GW of conventional fuel based power plants by the end of 11th five-year plan. The draft renewable energy policy document of the Government of India plans to augment 10% of new capacity addition through renewable energy. Based on this, proposed RET target for the Maharashtra may be taken at 1200 MW by 2012, which could be possible given the RET potential available. The total gross estimated potential for RETs and the achievements are mentioned in Table 8 below.

Table 8: Estimated Potential Vs Achievements

RE source	Potential in MW	Achievements in MW
Wind	3650	401 ¹⁸
Municipal solid waste	100	-
Bagasse cogen	1000	21
Biomass	773	3.5
Small hydro	600	206
Total	6123	632

Source: MEDA

From the above table it is evident that only 10% of the total RE potential has been achieved and the state has a long way to go in realising more.

5.5 Government of Maharashtra's RET Policy

Government of Maharashtra (GoM) announced their policy for promoting renewable energy during January 1996. Since then GoM modified the policies for the renewable energy sector by providing attractive features to certain sectors viz., wind and bagasse based cogeneration.

The GoM announced and implemented fiscal & financial benefits viz, sales tax benefits and capital subsidy in addition to other benefits during the end year 1998 to woo private investment in the wind sector. Similarly GoM announced benefits for bagasse based co-generation projects during October 1997 and December 98.

However during August 2001, MSEB proposed to withdraw the benefits offered in their previous policy and framed a new policy withdrawing most of the benefits announced earlier by the GoM. GoM subsequently withdrew almost all the favourable incentives which were provided to RE project promoters including withdrawal of sales tax benefits. With most of the incentives withdrawn by the GoM, it is unlikely that the many potential projects in the renewable energy would get implemented on fast track basis. It may be noted that most of the pipeline renewable energy projects that have been developed were based on the prevalent favourable incentives. Hence the implementation of such projects remains skeptical.

However, the RET promoters submitted their concerns with the MERC for continuation of the favourable incentives (based on which the projects were envisaged and implemented). MERC has currently reviewed two sectors, namely wind and bagasse co-generation and has publicised the respective tariff policies which have been widely accepted among the RE promoters in the state. Tariffs are set at 7 ct/kWh for wind and 6.1 ct/kWh for bagasse.

5.6 Potential of RE-based CDM Projects

The gross potential of grid connected RE power projects in the state is 6123 MW. By 2012, MEDA has projected a cumulative installed capacity, to the tune of 2450 MW in the RE based grid connected power sector¹⁹. Based on this projection, past growth in the sector and present tariff policy environment prevalent in the state, it can be estimated on a conservative basis, around 25%²⁰ of the gross potential can be achieved by 2007.

¹⁸ As on August 2003 source : <http://cea.nic.in>

¹⁹ http://www.mahaurja.com/BP_Perspective_Plan.html

²⁰ Estimates made by the authors based on available data for the state

In other words, the cumulative installed RE power capacity is estimated at 1482 MW at the end of 2007 with a capacity addition of around 850 MW during the tenth five year plan. This estimation has been made keeping in view of the interest of CER buyers and the start of first commitment period (2008-2012).

Table 9: Assumptions for Estimating CDM Potential in Maharashtra from RETs

Sectors	Installed capacity between 2003-2007 (MW)	Cumulative CER generation (Million CERs)	PLF (%)	Baseline Emission kg/kWh (2003-2007)
Biomass Power	75	2.0	80	0.91 –0.87
Co-generation	125	4.5	80	
Wind	500	3.5	25	
Small Hydro	100	1.0	35	
Waste to Energy	50	5.0	70	
Total	850	16		

Based on certain assumptions (Table 9) as regards the plant load factors, annual generation and baseline emissions, the cumulative CERs generation till the year 2007 for the installed capacity of 850 MW was estimated. It was also assumed that only 40% of the installed capacity may qualify for CDM due to additionality problems between 2003 and 2007. The cumulative CERs generation until 2007 is to the tune of 16 million €, possibly earning a cumulative revenue of around 64 million € when assuming a CER price of 4 €/CER. This estimate excludes the revenue from the currently operating and potential CDM projects (viz., commissioned during the prompt start CDM projects period, between January 2000 and November 2001 and between December 2001 and March 2003). The investment for achieving the installed capacity of around 850 MW during the ninth five year plan, has been estimated to be in the tune of around 788 million €

5.7 Barriers and Constraints Hindering RET Growth in the State

The following section tries to analyze the reasons as to why renewable energy technologies have been unable to realize the vast potential that is available despite the favourable national programme, incentives, policies, technological advances etc., Most of the barriers are quite common for all the states in the country.

The main barriers to greater penetration of RETs as well as their mainstreaming are given below.

- High initial investment and still higher costs of RETs compared to that of conventional energy
- Short term state policies for sector has resulted in a sluggish RE market. The state policies does not adequately build on that of the federal government and keep changing erratically
- The strong marketing network and excellent market-support infrastructure for conventional energy are not yet available for RETs
- At present most of the RET industry is dominated by small scale enterprises who have limited human and technical resources as well as credit standing
- Poor access to adequate financial resources including working capital and lack of innovative financing mechanism including micro and retail financing
- RET market is currently supply driven as user's needs have not been fully addressed by the suppliers. Emphasis is more on technology development rather than product development to effectively meet the users' need

- Access to RE products is currently poor and limited to urban population. Rural reach has not been impressive so far
- Intermittent nature of RET.(common barrier)
- Awareness level of the benefits of RET is low (UCCEE 2001)

5.8 Barriers for Integrating RET under CDM in the State

The current capacity level of CDM in India is discussed in the ensuing chapter. However specific barriers for the state of Maharashtra in implementing CDM is summarized as follows.

- Awareness level among all the stakeholders including the government is poor except the private industry which is fair
- There is no exclusive state policy and capacity building plan by the state for disseminating on CDM
- The state government has not defined any institution in the state to spearhead CDM
- There is no concrete capacity developed in CDM by any of the stakeholders
- The industrial associations are not active in enabling CDM among the private sector
- Media coverage on CDM is poor
- Grass root NGOs representing rural population are not aware of CDM
- Capacity level displayed by state utility namely MSEB and even (MERC) are low
- Most financial institutions have no strategy for funding CDM projects

In its recent tariff order for wind power, MERC has mentioned that the revenues from CDM need to be shared with the MSEB. This shows the outdated understanding that CDM revenues can be “eaten away” at every level of administration.

However there are few consolations in the state on the CDM front which are the following.

- One of the CDM project (grid connected biomass power project) selected under CERUPT tender is from this state
- MEDA is carrying out CDM events on adhoc basis in the field of RE
- Apart from MEDA other conferences on CDM are organised by companies like IT Power, MITCON etc.
- Some consultants are approaching the industries on their own to develop CDM projects
- The major wind mill manufacturers Suzlon and Enercon have their head offices in the state and they are actively involved in CDM
- Rabo India P Ltd., which has a MoU with the government of the Netherlands for developing CDM projects is located in this state and is actively engaged in developing CDM projects in the country
- The Irrigation Department of Maharashtra has recently called for a tender for developing their proposed implementation of small hydro projects (app. 100 MW) under CDM
- Research institutions like IIT²¹, NEERI²² and IGIDR²³ are located in the state and are involved in the CDM process

5.9 Integrated Interventions Addressing the Barriers

In this section, initiatives are discussed collectively for overcoming the barriers both in RET and CDM. These address the Government of Maharashtra (GoM), MSEB, MERC and MEDA.

²¹ Indian Institute of Technology

²² National Environmental Engineering Research Institute

²³ Indira Gandhi Institute of Development Research

- GoM should prepare an exclusive plan for rapid propagation of RE in the state in conjunction with their annual budget and five year plan. In addition, the GoM should prepare *long term* policies favouring and attracting investment in RETs and develop infrastructure facilities for such investors. Given this enabling environment, the investors will confidently participate in the government's endeavor in exploiting RE resources
- GoM should encourage the urban local bodies to implement waste to energy projects
- GoM should develop suitable state level funds for providing financial support for market propagation of RETs and also stipulate state financing institutions and banks to provide exclusive funding portfolio for RE and CDM
- GoM may initiate an exercise to assess the cost of the conventional power to understand the extent of externalities associated with conventional power generation. This would provide a favourable platform for promoting RETs in the state
- GoM should acknowledge MEDA for all facilitation activities for propagating RET- based projects including CDM. MEDA is already designated for executing the energy efficiency programme in the state and hence serve as a single window clearance agency for all energy related projects
- GoM should enhance budgetary support to MEDA for propagating RETs and CDM in the state
- MEDA need to pursue with the donors engaged currently in the Indian CDM capacity building programme to provide part of this budget which should be spent on:
 - Establishment of a CDM support cell/ clearing house with one long-term RET specialist
 - Development of a CDM priority list for Maharashtra
 - Awareness and training campaign for other government departments
 - Training courses for private project developers
- Academic and research institutes (e.g. IIT, IGIDR and NEERI), industries and its associations should assist MEDA in developing the strategy for Maharashtra's effective participation in CDM. For enabling this, MEDA may form a state level CDM committee
- MERC should continue to develop favourable tariff policies for all the renewable energy based power generation sectors which should be carefully tuned to avoid "over-subsidisation" which would in turn endanger project additionality

The specific suggestions and an integrated capacity building module for promoting RET projects under CDM in Maharashtra is discussed in the ensuing chapter.

6. CDM Capacity Building Framework for India

6.1 Definition of Capacity Building in the CDM Context

CDM is a complex undertaking that currently is only understood by a very limited number of individuals from research and consultancy companies, mainly from industrialised countries. The expansion of the pool of individuals understanding CDM is key to a successful implementation of CDM projects. While not every project developer needs to understand the intricacies of baseline development in all sectors of the CDM, he needs to understand what he has to do to get his project registered by the CDM Executive Board.

Here, capacity can be defined as the "*ability of individuals and institutions to make and implement decisions to achieve registration of CDM projects and perform functions related to the CDM project cycle in an effective, efficient and sustainable manner*" (Ecosecurities 2002, p.46). To build capacity, three components are strictly interrelated.

These components correspond to three levels :

1. **Skill/expertise** of the people participating in the CDM. At this level, capacity building refers to the process of changing attitudes and behaviour as well as imparting knowledge and developing skills while maximising the benefits of participation, knowledge exchange and ownership.
2. **Institutions** that mobilise and use the skills of individuals. This level of capacity building focuses on the overall organisational performance and functioning capabilities as well as the ability of an organisation to adapt to new policy agendas. Actions to strengthen institutions, such as the creation of focal points - for example a CDM office - maximise the effectiveness of the skills base; (GEF – UNDP, 2001)
3. **Systemic** refers to the policy and legal regime in which actors and institutions operate.

Many of the principles of the UNFCCC capacity building framework can be used in the context of CDM :

- capacity-building should be country-driven, i.e. here by the government that has to set up the DNA.
- Learning-by-doing through building on existing activities in the RET sector. Support project developers in bringing existing project ideas through the CDM project cycle while being aware of the additionality challenge
- providing an initial list of priorities for CDM project types that would be the focus of training courses
- enlisting the capacity of other developing countries (e.g. through the SouthSouthNorth project) which allows to reduce the costs considerably
- Mobilising funds from Annex II Parties

6.2 Assessment of Current Capacity Levels in India

CDM capacity building in India started in 1999 when the US government parachuted two experts into TERI for one year. They focused on awareness raising of government officials and CEOs of large companies and were extremely successful. However, the declaration of the Bush administration prevented continuation of this effort. Only from 2001 and intensively from 2003 new capacity building programmes have been initiated. Unfortunately, many of these programmes have duplicated work and not managed to develop a long-term strategy. India has witnessed scores of workshops, and conferences on CDM towards raising the awareness level of the stakeholders. The extent of human skills displayed during these events in terms of invited international experts has been exemplary. But as mentioned above, these programmes have been a short term exercise. These programmes can be said to have achieved the initial awareness level among the private sector to a better extent. Besides the missing link of continuity of such exercises, the stakeholders attending such programmes are repeatedly exposed to similar events, thereby limiting the scope to spread the awareness level on a wider dimension. The flurry of workshops could even lead to a “CDM fatigue”, especially if the private sector feels that there is too much talk and too little concrete incentives to embark on CDM project development. On the contrary, sectorally and stakeholder-targeted in-depth training is lacking.

An attempt has been made to assess and summarize the current capacity building levels in the field of renewable energy under CDM and is given in the Table 10 below.

Table 10: Current Capacity Building Levels for Renewable Energy CDM Sector in India

Indicators of capacity	Stakeholders (Levels)					
	Policy makers	Financing Institutions	Private Industry	Consultants	Local community, GNGOs ²⁴	NGOs, RI & AI ²⁵
Skills/expertise/awareness						
Awareness levels	Mixed	Poor	Fair	Good	Unavailable	Good
Technical expertise on PDD development (international rules, baseline methodologies etc.)	Poor	Unavailable	Poor	Mixed	N.A	Mixed
Institutional						
DNA setup	Mixed	N.A	N.A	N.A	N.A	N.A
Small-scale projects (bundling)	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
Technology transfer strategy	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
Innovative financing including insurance aspects	Unavailable	Unavailable	N.A	N.A	N.A	N.A
Policy & Legal Context						
Country climate change strategy	Mixed	N.A	N.A	N.A	N.A	N.A
Legal framework	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
Integration into other policy areas	Mixed	Mixed	Mixed	Mixed	Unavailable	Unavailable
Streamlined CDM approval procedures	Unavailable	N.A	N.A	N.A	N.A	N.A

N.A : Not applicable

6.3 Essentials of CDM Capacity Building

6.3.1 Identification of Key Stakeholders Involved in the Process

Different stakeholders have key roles to play in the CDM project cycle, for instance, central and state government ministries and departments (including state renewable energy development agencies, central and state pollution control boards, etc), industry associations, banks and financial institutions, technical , environmental and financial consultants, research and academic institutions, NGOs, local communities and finally, not excluding the project promoters. **Only a joint effort, involving the government, industry, NGOs, and research institutes, can help maximise CDM benefits for India.**

These stakeholders fall within four levels, viz.

1. Policy and promotional level: central and state government ministries and departments, state level agencies
2. Analysis, participation and propagation level: research and academic institutions, NGOs , local community and mass media
3. Funding and promotional level: public and private sector financial institutions
4. Facilitation and implementation level: public sector undertakings, private industry, and industry associations

All the stakeholders identified in the above levels need to build their capacity from a multi-fold perspective (e.g. institutional, promotional and strategic), so as to facilitate the creation of the right enabling environment for CDM in India.

After identification of stakeholders has been done, we suggest the following capacity building modules (see Table 11).

²⁴ Grass Root NGOs

²⁵ Research Institutions and Academic Institutions

Table 11: Tasks for Capacity Building

Issues	Main Tasks
Legal/Institutional Set-up	<ul style="list-style-type: none"> • Establish the DNA • Promote co-operation across government agencies • Train and prepare for national DOEs²⁶
Project Development Set-up	<ul style="list-style-type: none"> • Enable actors to develop CDM projects • Develop PDDs domestically for registration with the Executive Board
Ensuring long-term sustainability of capacity building	<ul style="list-style-type: none"> • Public/Private Partnerships for data collection & PDD²⁷ experience sharing • Solve financing issues of CDM structures

6.3.2 Establishment of DNA

Essential to setting up a DNA is ensuring **transparent approval procedures, efficient decision structures** and a **financially light-weight** institution with its own budget. In addition, the DNA can be designated to promote CDM projects nationally and internationally and oversee that the pool of skills and knowledge, developed by the support of the GTZ and other international organisations; is continuously kept up to date and expanded. The DNA could also be entrusted with the responsibility of keeping information structures working (e.g. website) and networks in place (e.g. secretariat for sector-wise forums). Capacity building would entail

- Identification and technical training of DNA personnel
- Co-operation with DNA personnel in developing operational and integer sustainability criteria
- Legal framework
- International out-reach: facilitating contacts between project developers and investors;
- National out-reach: facilitating information on the development of CDM rules and decisions, responsible for long-term capacity building
- Physical infrastructure support, including a national CDM website
- Draw up transparent and functional approval procedures which integrate national sustainability criteria
- Assessing and ensuring the long-term financial viability of the DNA, including funding from non-governmental sources

6.3.3 Promote Co-operation Across Government Agencies

Depending on the cultural circumstances, a more or less formal structure should be promoted to facilitate co-operation between government ministries and agencies. In some circumstances, a formal memorandum of understanding or interdepartmental councils can be set up, which can be helpful to ensure co-operation is actually carried out. In other circumstances, meetings between ministries, departments and agencies are

²⁶ Designated Operational Entities

²⁷ Project Design Document

sufficient to create the proper atmosphere and actions to facilitate and integrate CDM into national policies and measures.

Promoting co-operation on a macro-level necessitates awareness raising on what benefits CDM can offer the host country and, more generally, awareness of climate change issues and international legal frameworks in place. In addition, a continuous capacity building of government officials will be necessary in India, due to short term work-rotation policies.

6.3.4 Train and Prepare Selected National Organisations to Designated Operational Entities (DOE) Status

Low transaction costs are pivotal to the success of the CDM. By preparing and training local private stakeholders to perform validation and/or verification and certification, transaction costs are reduced while human resources are enhanced within the host country. In addition, the host country will benefit from the multiplier effect of keeping as many CDM activities as possible within the country as well as seeing a new sector of climate change related service providers develop. Awareness raising, training and incentives should lead to a competitive market of DOEs.

Capacity building should include:

- Identification of potential operational entities, selected on the basis of their technical expertise within the sectors of priority of CDM projects
- Development of a training package, including field trips relevant for the sectors and technology priorities and preparation of the companies for accreditation with the Executive Board (based on experience with former accreditation requirements)
- Create incentives by letting the best organisation/company participate in a real validation by an already accredited organisation

6.3.5 Enabling Actors to Develop CDM Projects

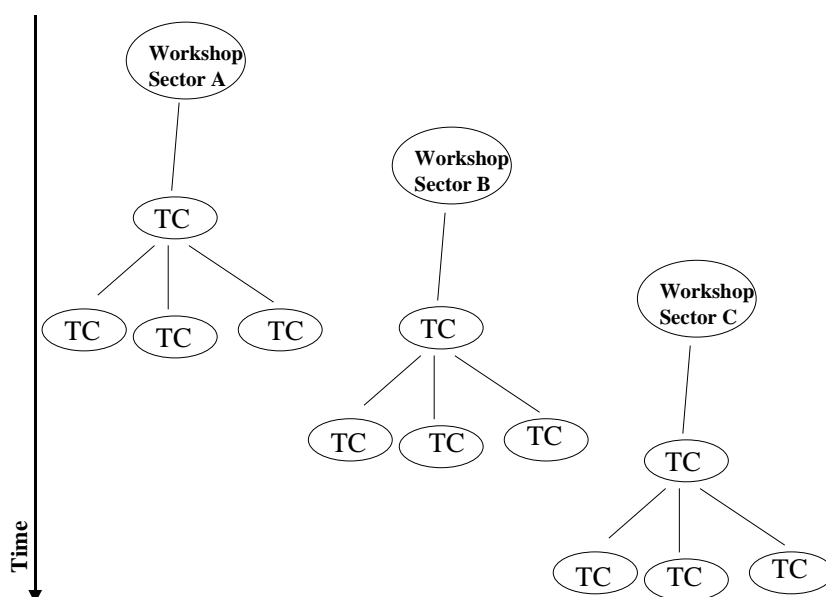
India has at least 10 different training initiatives of foreign companies and organisations running at different levels and sectors. This multitude of capacity building involvement will need to be taken into account when setting up the workshop and training course plan to avoid double efforts and increase synergy between training programmes.

A two-step approach with a sectoral differentiation is recommended: in an **initial phase, workshops** in different sectors are arranged and hosted by government departments and/or central trade organisations. The aim of the workshop is a general dissemination of international climate change policy, CDM in particular and the potential benefits to actors in the specific sectors. The workshop should target senior level management in companies, financial institutions and project development. The targeted sectors should be the ones identified to offer the greatest potential for carbon reduction and sustainable development, for instance as assessed in the initial assessment of CDM potential. In the Indian RET sector, this should no longer be necessary.

In the **second phase**, a series of **training courses** are provided on the **technical level**. The training courses aim at providing practical and detailed knowledge on project development and implementation. The training courses should take a flexible form such that training sessions for sub-groups within one sector can be established, for instance subgroups looking at baseline methodologies by technology, and subgroups looking at project development in terms of financing, due diligence, project management etc.

Workshops and training courses will run **in parallel between sectors**, but not necessarily following the same time schedule (see Figure 2)

Figure 2: Increasingly Specialized, Technology-specific Capacity Building



The training courses will be based on developing real world projects, allowing participants to **learn by doing**. **Incentives** can be offered through a competitive selection of the best project with a free validation as prize. In addition, the DOE undertaking the validation will also provide a “training-on-the-job” of an entity training to become a host country based DOE.

6.3.6 *Sharing the Experience*

The experience gained by participants should be made available to other stakeholders within the same sector and/or to other sectors. Qualifying **champions** for the dissemination of CDM practicalities can have a far greater impact on national stakeholders than external consultants through a greater sense of ownership and control. In addition, it provides an avenue for long-term capacity building within the country, independent of foreign involvement. The potential for involving selected champions directly in the training courses should be explored (e.g. providing premises, organising site-visits etc.). An additional way of capitalising on the efforts made will be the **recycling of baseline methodologies** for similar projects, outside the current programme. The training process will be designed in a **flexible** way that allows for up-to-date course material, for instance rapidly integrating decisions from the EB on new methodologies.

The expected output of the training courses should be a number of PDDs registered with the EB, of which a defined minimum of projects should be developed by participants of the training courses.

6.3.7 *Ensuring Long-term Sustainability of Capacity Building*

In order to ensure the long term sustainability of the host country’s capacity to set up CDM projects, a set of formal infrastructures would be useful. A national **website** hosting information on the national approval procedures, informed links to the executive board and information for investors and project developers alike is almost a prerequisite for disseminating information nationally and internationally on CDM. **Networks** and **forums** within and across sectors and types of organisations will be essential for the continued development of CDM.

The financial aspects of turning capacity building into a long term, and continuous process in the CDM host countries will need to be addressed. Different avenues exist, which may be helpful to consider:

- **Privately driven:** competitiveness between companies in a new sector on CDM service provisions. National companies/individuals offer training courses to interested parties.
- **Governmentally driven:** The DNA is responsible for the national CDM website is kept up to date with appropriate links to the CDM executive Board's website; The DNA could also take initiative to hold regular information forums on the development of rules and methodologies, animated by local service providers and inviting organisations & public entities with experience from neighbouring countries. The DNA could also be responsible for updating and developing training material and holding or commissioning training activities.
- **Public-Private-Partnerships (PPP):** one type of partnership could be established between the host country government providing data for the use in developing baselines, and private entities providing and sharing experience in developing PDDs.

6.4 Current Capacity Building Programme in India under CDM

The following presents the current CDM capacity building programmes in India. The details of each programme are listed in the Annexure 2.

- National Strategy Study (NSS) on CDM, World Bank , TERI, India
- Integrated Capacity Building – CDM: Ministry of Environment, Trade and Investment, Japan
- GTZ – IGEEP CDM Capacity-building Project
- CDM Pool , IT Power-ECN
- CDM and Indian Industry, Ecomsecurities & FCO, U.K
- Asian Development Bank (ADB) Clean Development Mechanism (CDM) Facility
- UNDP Capacity-building Programme for Biomethanation Sector , MOEF, Government of India
- Canada Small-Scale CDM Projects Facility, Pembina Institute of Technology

In addition to the above, two Indian financial institutions, namely Rabobank India and IDFC²⁸ have already begun to explore carbon purchase opportunities from Indian projects and have mutual agreements with the Dutch Government and Prototype Carbon Fund respectively. However, the capacity building components are not always clearcut in such facilities.

6.5 Capacity Building Framework for Renewable Energy Sector under CDM at the State Level

As discussed in the previous chapter, MEDA has taken the lead in the renewable energy sector in the state of Maharashtra besides being designated as the nodal agency for Energy Efficiency (EE). Hence it is strategically placed in the state, having easy access to means, facilitating RETs and EE. This substantiates MEDA to be designated as the state nodal agency for CDM. Hence it is proposed that MEDA should setup a “**CDM Clearing House**” for examination of potential CDM projects and provide project proponents with match making services with buyers.

For enabling MEDA to do this, capacity building is essential in the following areas:

- Understanding CDM project concept, characteristics, project cycle, baselines, crediting period, contractual issues, banking of CERs, Internal CERs registry and associated procedures
- Identification of CDMable project(s) and suitable promoters
- Facilitate appropriate services to CDM project promoters in project identification and formulation of potential CDM projects, baseline development, quantification of emissions reductions, identification of Operational Entities, monitoring project performance (e.g. via forming a consortium with organizations that have expertise in the respective technology)

²⁸ Infrastructure Development Finance Company

- Continuously explore the possibilities to simplify the procedures and optimizing transaction cost associated in developing the projects
- Provide intensive capacity building for the stakeholders (state policy makers, technical staff of concerned government departments and institutions, private sector entities, commercial banks, NGOs, and research/academic institutions) for better level of understanding of CDM and for developing CDM projects.

6.5.1 Suggested Action Plan

The major activities identified to be carried out for building its own capacity and that of the stakeholders are given below :

1. Identify specific stakeholders relevant for CDM at State Government ministries, departments and agencies including the Central Government departments in the state
2. Identify the gaps and training needs for the specific stakeholders group
3. Develop a strategy for building their capacity to facilitate CDM project implementation

This strategy will be aimed at aspects such as

- Disseminating information on CDM criteria and procedures
- Analysis of national/local sustainable development priorities for identifying projects in consonance with such priorities
- Maintaining database of technologies, consultants, operational entities, funding agencies, CER buyers, etc
- Develop state-specific appendices supplementing the DNA CDM manual for guidance on eligibility, baselines, estimates of transactions costs, legal issues (contracts, insurance, taxation of CERs, etc), CERs market, project development etc.
- Analyse the state sectoral potential under CDM
- Develop a portfolio of CDM projects to offer to potential buyers
- To update the stakeholders with on-going changes in the CDM modalities and procedures at the UNFCCC CDM Executive Board, Conference of Parties, and Subsidiary Bodies
- To develop indicators for assessing the success of the capacity-building programme

Based on the above, a tentative but comprehensive framework for implementing a capacity building programmes for stakeholders in the field of RE for CDM for the state of Maharashtra is provided in Annexure 3.

The basic terms for implementation of this framework need to be the following :

- Stakeholders (SH) hold a dialogue position in their organisation who can effectively communicate with their clients
- SH need to display their efforts in disseminating their experience to similar level of stakeholders
- Irrespective of their change in position/ organisation, such champions will be always identified for such dissemination exercises. Towards this a state level “Roster of Experts” who have undergone capacity building will be maintained and disseminated
- Capacity building providers should provide international exposure to SH for better perspective of the CDM market and related issues
- All the SH participating in the one time capacity building events need to be provided continuous updates in the sector, for e.g. to keep track of key developments for increased awareness among SH related to CDM modalities and procedures
- The continuous outreach may be designed through e-magazines, e-forums, newsletters and video conferences.

MEDA should submit a comprehensive proposal to the donors for drawing their support for CDM activities in its state.

6.5.2 Synergizing Efforts Among the Donors in their Capacity Building Programmes in India

In general, by observing the ongoing capacity building programmes in India, one could easily desire to conclude that all necessary capacity building and technical assistance activities are already implemented to the full extent. However the reality is different. Among various reasons attributed for this situation, the major reason is *lack of coordination among donor countries sponsoring capacity building programmes*.

Needless to re-emphasize the importance of coordination and synergy between different organizations, it is noteworthy to mention here that there are still projects implemented by several organizations with same objectives but with different approaches. Such programmes do not reinforce any outcome but dilute the hold on the major issues. In India a programme on developing 8 PDDs for small-scale projects started well but the final outcome of the same has not been tangible enough to mention; whereas there is another recently launched programme looking into bundling of small projects and developing a bundling organisation. Though the lack of additional resources plays an important role in the continuity of such programme, it is reiterated that by improving the coordination of capacity building activities planned by different organizations and focusing on the synergy of their work, such financial problems can be alleviated, greatly.

However it is heartening to note that besides the German Capacity Building Programme which held meetings with the other donor agencies present in New Delhi in December 2002, the recently launched programme on Integrated Capacity Strengthening for the CDM (ICS-CDM) by the Japanese government in India, clearly states that “*multilateral and international organizations such as the WB, ADB, UNEP and various bilateral agencies have also been implementing CDM support programmes in various Asian countries and ICS-CDM will collaborate with such initiatives, wherever possible, to ensure effectiveness of the programme and efficient use of resources*”. This is a good move which would proceed in the right direction of achieving the perceived goals.

Further, developing action plan for enabling to match with prospective donor’s activities is also equally important. For example end of one capacity building activity leading to another can secure funding from donors looking for similar activities. It would always be useful if any CAPACITY BUILDING programme while coming to a logical end could look up to link with the upcoming or other ongoing ones and feed in the results accomplished to them. The efforts required for such *link-ups* require less efforts but are highly rewarding for the quality of any CAPACITY BUILDING programme.

6.6 Utilisation of Development Aid and Government Budget for Capacity Building for CDM

Utilising Overseas Development Assistance (ODA) for CDM has not raised much of a concern so far though it is very clear that such funds can neither be used for implementing CDM projects nor for procuring CERs from any CDM project. However since Kyoto, most of the donors, mainly Japan and some European Union countries have shown their intention on utilising ODA for actually procuring CERs.

Currently, there is no mechanism to trace the diversion of ODA for CDM activities though the Development Assistance Committee of the OECD is currently negotiating guidelines for the treatment of ODA in the context of CDM project finance, which are expected to be finalised by June 2004 (Dutschke and Michaelowa 2003).

The utilisation of ODA for capacity building in CDM is construed to focus only on such countries which are perceived to have high CDM potential thereby shunning LDCs. Yet several CAPACITY BUILDING programme have been witnessed in LDCs, Latin America, South Africa, Central Asia and South East Asia and the concrete results are yet to be seen once the CDM project registration begins.

Besides the above ODA funds ploughed in CDM CAPACITY BUILDING activities, as far as India is concerned, MNES has annual budget allocations for promotional activities under two headings namely “Infrastructure Development & Capacity Building Programme” and “Awareness & Extension Programme”. For information purpose, the plan outlay for the Tenth Five-Year Plan (2002-2007) under these headings for MNES is to the tune of 140 Million € with a special allocation of 80 Million € for the north-eastern states alone (Planning Commission 2001). In a bid to encourage indigenous technology development, a special allocation of 4 million € has been made to the Council for Scientific and Industrial

Research (CSIR) for launching incentive-driven research in the fields of solar energy, wind turbines, and hydrogen fuels as alternatives to fossil fuels (Winrock 2003). The MoEF also has a special allocation of 6 Million € under the Climate Change scheme for the first time under the Tenth Five-Year Plan (MoEF 2003a). The goals set by MOEF for 2002-2007 under climate change were the following:

- Organization of COP 8 projects/ activities relating to adaptation to climate change;
- Capacity building at appropriate levels for taking climate change considerations in social, economic and developmental planning;
- Impact assessment including impacts on food and water resources, eco-system and bio-diversity, human settlements and human health;
- Promotion of scientific and technological research and systematic observation with a view to furthering understanding of climate change;
- Education, training and public awareness;
- Enhancement of international cooperation in pursuance of the objectives of the UNFCCC.

The achievements as on date has been reported by MOEF as follows.

- Hosting of COP 8
- Organization of several workshops
- Launching of Climate Change Web Site (<http://www.envfor.nic.in/cc/cdm/>)
- Publications
- Climate change film
- Consolidation of India's position on climate change

Besides this special allocation, MOEF has other outlay to the tune of 50 million € under the following heads for the Tenth Five-Year Plan.

- Industrial pollution through abatement strategies
- Clean technologies
- Environment Impact Assessment
- Environment education, training and awareness
- Environmental information (ENVIS)
- Research & development
- Centres of excellence

In addition to the above central budgetary allocation for the renewable energy, climate change and environment, there are similar annual budgets for promotion of similar activities at state levels.

If these budgets can be effectively tuned to address CDM issues in their ongoing promotional programmes they can allow to continue donor-based capacity building programmes programmes that will not last forever. Budgetary support may also be made available from other departments such as Ministry of Rural Development, Ministry of Tribal Welfare, Department of Woman and Child Development, MPLAD²⁹ / MLALAD³⁰ fund (as reported to be utilised by MNES for their Village Electrification Programme) and the Ministry of Power.

7. Road Ahead

Despite all the above progressive initiatives and positive developments in the CDM sector, under the current CDM market scenario, purchase of Certified Emission Reductions (CERs) by Annex B parties is currently done at relatively low price. Though from a buyers perspective there should be a large mitigation potential and high possibility of approval by host country, from the host countries perspective the projects should be in line with the nation's sustainability goals and low transaction costs. The CDM project developer or the seller of CERs is exposed to all the major risks involved in the CDM process covering debts, high transaction costs, CER revenue, bank guarantee and insurance against CERs etc.

²⁹ Member of Parliament Local Area Development

³⁰ Member of Legislative Assembly Local Area Development

Though a strong human resource base and service sector makes India an ideal place for CDM projects, carbon prices are too low to change the fortunes of unviable projects. The principles of “investments and technology transfer in developing countries”, which evolved initially around CDM, no longer exist and CDM has been reduced to a mere purchase of a “clean air” commodity. Low carbon prices have resulted in a low level of interest, lack of clear domestic institution and legal framework, and poor investment climate. Almost all sectors (one expects some clarity on forestry and sinks after COP 9) seem to have good potential for CDM but clarity of the additionally issue is essential for estimating the real potential. The level of understanding of the opportunities and capacity to formulate projects is generally low, though renewables have a better understanding than the other sectors. The best understanding is generally amongst the stakeholders in energy and large industry.

The government also feels that the barriers to CDM are the low market prices, the low awareness amongst the private sector, uncertainty about the rules, and a lack of trained experts in the government. The private sector feels that the barrier is low market prices and lack of transparent rules and procedures. The sector perceives that there is a need for more learning-by-doing and interactions with international experts. There is also a need to develop linkages with international financing sources. Central and state levels need to develop an action plan for CDM.

Developing countries wishing to host CDM projects need to put in place the necessary institutional mechanisms for approving CDM projects and ensuring their compatibility with national sustainable development goals and strategies.

The development and dissemination of information, including a guidebook on CDM, is considered essential, and the MoEF is currently exploring such an initiative.

It is upon the national government and state governments to come out with complete information such as priority areas (in terms of preferred technologies and applications), procedures, taxation and legal issues, guidelines for proposing CDM projects, sustainability criteria, maintaining continuity in government offices to retain capacity. This will serve to assist the development of a portfolio of CDM projects in the country and to allow clear options for potential investors.

Different stakeholders have key roles to play in the CDM project cycle: central and state government ministries and departments (including state renewable energy development agencies, central and state pollution control boards, etc), industry associations, banks and financial institutions, environmental and financial consultants, research and academic institutions, NGOs and local communities.

The national policy on CDM will need to be formulated to create the right enabling environment. It will encourage the development and implementation of CDM projects by these public and private sector agencies. This includes identifying preferential sectors/ projects based on national/ local sustainable development priorities, disseminating information on CDM criteria and procedures, maintaining a database of technologies, consultants, operational entities, funding agencies, CER buyers, etc, guidance on baselines, estimates of transactions costs and legal issues (contracts, insurance, taxation of CERs, etc) as well as developing a portfolio of CDM projects on offer to potential buyers.

In developing countries like India launching of CDM would necessarily have to be preceded by intensive capacity building exercises. This would be needed at various levels: for policy makers and technical staff of concerned government departments and institutions, private sector entities, financial institutions, NGOs and research/ academic institutions. This would help the host country attract CDM projects and gain the maximum benefit from them. A joint effort, involving the government, industry, NGOs, and research institutes can help maximise CDM benefits for India.

Overall, India has a huge CDM potential in the field of RETs. It has to be harnessed properly by making policymakers and stakeholders on all levels understand that CDM is not about money falling from the sky but about painstakingly planned projects that have to perform to generate an additional revenue stream. Feelings that each policy level can claim its share in these revenues are misplaced; Indian requirements for project approvals should be limited with regards to the time and money needed.

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Annexure 1

CLEAN DEVELOPMENT MECHANISM- INTERIM APPROVAL CRITERIA

1. Purpose

The purpose of the clean development mechanism (CDM) is defined in Article 12 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change. The CDM has a two-fold purpose: (a) to assist developing country Parties in achieving sustainable development, thereby contributing to the ultimate objective of the Convention, and (b) to assist developed country Parties in achieving compliance with part of their quantified emission limitation and reduction commitments under Article 3. Each CDM project activity should meet the above two-fold purpose.

2. Eligibility:

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

Additionalities:

- Emission Additionality: The project should lead to real, measurable and long term GHG mitigation. The additional GHG reductions are to be calculated with reference to a baseline.
- Financial Additionality: The funding for CDM project activity should not lead to diversion of official development assistance. The project participants may demonstrate how this is being achieved.
- Technological Additionality: The CDM project activities should lead to transfer of environmentally safe and sound technologies and know how.

3. Sustainable Development Indicators:

It is the prerogative of the host Party to confirm whether a clean development mechanism project activity assists it in achieving sustainable development. The CDM should also be oriented towards improving the quality of life of the very poor from the environmental standpoint.

Following aspects should be considered while designing CDM project activity:

1. Social well being: The CDM project activity should lead to alleviation of poverty by generating additional employment, removal of social disparities and contribution to provision of basic amenities to people leading to improvement in quality of life of people.
2. Economic well being: The CDM project activity should bring in additional investment consistent with the needs of the people.
3. Environmental well being: This should include a discussion of impact of the project activity on resource sustainability and resource degradation, if any, due to proposed activity; bio-diversity friendliness; impact on human health; reduction of levels of pollution in general;
4. Technological well being: The CDM project activity should lead to transfer of environmentally safe and sound technologies with a priority to the renewables sector or energy efficiency projects that are comparable to best practices in order to assist in upgradation of technological base.

4. Baselines:

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

- Baselines should be precise, transparent, comparable and workable;
- Should avoid overestimation;
- The methodology for determination of baseline should be homogeneous and reliable;
- Potential errors should be indicated;
- System boundaries of baselines should be established;
- Interval between updates of baselines should be clearly described;
- Role of externalities should be brought out (social, economic and environmental);
- Should include historic emission data-sets wherever available;
- Lifetime of project cycle should be clearly mentioned;

The baseline should be on project by project basis except for those categories that qualify for simplified procedures. The project proposal should indicate the formulae used for calculating GHG offsets in the project and baseline scenario. Leakage, if any, should be described. For the purpose of Project Idea Notes (PIN), default values may be used with justification. Determination of base project which would have come up in absence of proposed project should be clearly described in the project proposal.

5. Financial Indicators:

The project participants should bring out the following aspects:

- Flow of additional investment
- Cost effectiveness of energy saving
- Internal Rate of Return (IRR) without accounting for CERs
- IRR with CERs
- Liquidity, N.P.V., cost/benefit analysis, cash flow etc establishing that the project has good probability of eventually being implemented
- Agreements reached with the Stakeholders, if any, including power purchase agreements, Memorandum of Understanding etc.
- Inclusion of indicative costs related to validation, approval, registration, monitoring and verification, certification, share of proceeds
- Proposal should indicate funding available, financing agency and also describe as to how financial closure is sought to be achieved

6. Technological Feasibility:

- The proposal should include following elements:
- The proposed technology/process
- Product/technology/material supply chain
- Technical complexities, if any
- Preliminary designs, schematics for all major equipment needed, design requirement, manufacturers name and details, capital cost estimate
- Technological reliability
- Organizational and management plan for implementation, including timetable, personnel requirements, staff training, project engineering, CPM/PERT-Chart etc.

7. Risk Analysis

The project proposal should clearly state risks associated with a project including apportionment of risks and liabilities; insurance and guarantees, if any.

8. Credentials: The credentials of the project participants must be clearly described.

Annexure 2

Briefings of Various Capacity Building Programme on CDM Currently in Operation in India

1. National Strategy Study for Implementation of CDM in India (World Bank/Switzerland)
2. Integrated Capacity Strengthening for the Clean Development Mechanism (Japan)
3. Indo-German Capacity Building Project (under GTZ Climate Protection Programme)
4. CDM Pool - Establishing the Institutional Capacity to enable Small-scale CDM projects in India
5. The Clean Development Mechanism & Indian Industry (UK)
6. The Clean Development Mechanism and Biomethanation (Ministry of Environment and Forests, Government of India and UNDP)
7. Canadian Clean Development Mechanism Small Projects Facility (Canada)

1. National Strategy Study for Implementation of CDM in India

A National Strategy Study (NSS) on Clean Development Mechanism (CDM) has been initiated in India to assess the issues and opportunities presented by potential international markets for greenhouse gases (GHG) offset through the CDM, and to evaluate processes and methodologies to facilitate implementation of CDM in India. The study is being conducted by TERI, New Delhi, with Swiss consultants INFRAS AG providing inputs as required.

Participation of India in CDM helps it bringing in clean technologies and financial resources thereby complementing its sustainable development efforts. The extent to which India could participate in the CDM depends largely on the potential of the GHG emission reductions and their costs at the project, sectoral and national level and the international demand for GHG offsets.

Evolution of NSS

The National Strategy Study is a part of the National Joint Implementation/Clean Development Mechanism (JI/CDM) Strategy Studies Program (NSS Program) of the World Bank. The program was launched in 1997 between the Government of Switzerland and the World Bank. The objective of this programme is to build capacity of the JI/CDM host countries regarding the application of the Kyoto Protocol flexibility mechanisms that promote trade of GHGs emission reductions.

With Germany, Australia, Finland, Austria and Canada joining the major Swiss donor support, the NSS Program targets nearly 30 of the Bank's client countries. As the NSS Program aims at building local capacity, the studies are conducted by host country experts, in collaboration with experts from donor countries and the World Bank.

So far, Argentina, Bolivia, Colombia, Czech Republic, Indonesia, Russia, Slovak, South Africa, Uzbekistan, Zimbabwe have completed their NSS and many other countries are in the process of doing so.

Objectives of the Study

Objective of the study is to develop a national strategy for India to participate in the global efforts to reduce GHGs emissions through CDM.

This could be achieved through following steps:

- assess the opportunities presented by the international demand for carbon
- assess CDM potential in different sector in India
- evaluate processes and institutional arrangement in India for CDM implementation
- suggest a framework, including the capacity building requirements to facilitate the development and implementation of CDM projects
- develop a pipeline of CDM projects and test the framework proposed against these projects

Activities and Outcomes

The study will bring out a strategic overview of CDM opportunities for India through an analysis of international demand for GHG offsets and India's supply potential from different sectors.

The study will look into the barriers for CDM implementation in India and identify key institutional, legal, financial and regulatory pre-requisites for CDM project development and implementation. Keeping in view the ongoing developments (government of India procedures, Marrakesh Accords, Executive Board guidelines etc.) a framework to facilitate CDM project development and implementation will be designed. To get stakeholders opinion on this framework a national workshop is also proposed to be conducted.

During the study a national CDM registry system will also be designed. A CDM registry system is a standardised electronic database for recording and tracking the transactions taking place under the CDM. Several Annex I countries have set up such registry and their experience will be taken into account while designing such a registry system for India.

The study not only identifies human and institutional capacity building needs to develop, implement, and process CDM projects in India in order to tap global GHG offset opportunities but also organises several capacity building

and technical assistance workshops for different categories of stakeholders. A calendar of these events will shortly be available on the TERI website.

The study will prioritise key sectors and develop a pipeline of potential CDM projects at sectoral levels thereby bringing out sectoral methodologies and guidelines.

The ultimate outcome of the study is an Action Plan to facilitate the operationalisation of CDM in India.

Project Organization

The overall organization of the NSS consists of a Study Team comprising TERI and INFRAS AG as a Steering Committee, comprising the relevant ministries of government of India, industry associations, research institutions and the representatives of the Swiss Government and the World Bank and a Technical Advisory Group (TAG) comprising several short-term national and international experts.

Project Financing

Major part of the study is financed by the Swiss Government through the World Bank. The World Bank will provide support during the preparation of the study and technical assistance during its performance including monitoring. The Government of India is participating in the financing of the NSS by providing in-kind support.

Time Frame

The duration of the NSS is 12 months from the kick-off. The Study was kicked off on June 18, 2003. The purpose of this meeting was to develop a consensus on project activities and outcomes among different project partners. A formal launch of the study is scheduled during the middle of October 2003.

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2. Integrated Capacity Strengthening for the CDM (ICS-CDM) A Government of Japan Project

On behalf of Ministry of Environment, Japan, the Institute for Global Environmental Strategies (IGES) will implement a capacity building programme for CDM in Asian countries, called “Integrated Capacity Strengthening for Clean Development Mechanism (ICS-CDM)” from October 2003.

Goal, Objective, Principles and Expected Outcomes

1. Goal

To enable developing countries in Asia and investors from Japan fully participate in CDM projects that contribute to sustainable development of host countries

2. Objective

The main objective of ICS-CDM is to strengthen systemic, institutional and human capacity in host countries through activities such as:

- Providing information and raising awareness on CDM
- Implementing actions to support institutional networks for CDM
- Contributing to training and human resource development to operationalize CDM

- Supporting CDM project identification, development and implementation activities

3. Principles

The programme will implement the above activities based on three principles: *Synergy, Simplicity, and Sustainability*

4. Sectors

The project will mainly focus on capacity building activities in the following sectors/project types: (a) waste management, (b) renewable energy (including afforestation/reforestation component) and (c) small-scale integrated projects that will greatly contribute to environmental protection, poverty alleviation, and sustainable development of local communities.

5. Expected Outcomes:

A. Outcomes expected in all host countries:

- Diffusion of knowledge and understanding about opportunities and benefits from CDM to diverse stakeholders (policy makers, industries, financial institutions, non-governmental organizations [NGOs], academia and the general public) thereby leading to creation of a positive attitude to CDM in host countries
- Establishment of a strong partnership between Japan and host countries in relation to CDM and climate protection based on mutual understanding of needs and priorities
- Analysis of the realistic potential for CDM projects in the waste management and renewable energy sectors and of small-scale integrated projects, to serve as a basis for devising an effective national strategy for CDM in these sectors/ project types
- Development of human resources necessary for drafting project design documents (PDDs) and validation of feasible CDM projects

B: Outcomes expected in countries where some capacity for CDM already exists:

- Further enhancement of understanding of CDM among ministries and other governmental institutions thereby leading to creation of a positive attitude to CDM
- Creation of a common basis for understanding on the operational procedures of CDM among project implementing entities, investors, and agencies in-charge-of CDM in host countries and Japan

C: Expected outcomes in countries new to CDM concept and/or in early stages of capacity building for CDM:

- Further progress in systemic and institutional capacity building through support to creation and/or development of an institutional framework for CDM in host countries
- Development of human resources to handle CDM issues across organizations including governments, businesses, financial sector, NGOs, and academic institutions

6. Period, Target Countries and Activities

Period : ICS-CDM activities will formally commence in October 2003 for a period of three years.

Target Countries:

- Emission reduction potential and population increase potential: China and India
- Carbon sequestration potential/medium-size countries: Indonesia, Malaysia, etc.
- Sustainable development in small developing countries: Bhutan, Cambodia, Lao PDR, Mongolia, South Pacific Islands, Sri Lanka, etc.

In FY 2003, one country from each of these groups is selected. Additional 3-4 target countries will be selected in both FY 2004 and FY 2005 depending on the progress of the project and management capacity.

The proposed countries for project implementation in FY 2003 are: India, Indonesia and Cambodia.

Outline of Activities

A. Raising Awareness of CDM and Climate Protection through Training and Human Resource Development

B. Support to Institutional and Systemic Capacity Building

(i) Support to activities for formulating CDM policy and strategy

(ii) Support to activities necessary for identification and/or establishment of Designated National Authority (DNA)

C. CDM Potential Assessment

D. Joint Research Between IGES and Local Research Institutions

Source : IGES, Japan

3. Indo-German Capacity Building Project (under GTZ Climate Protection Programme)

The Indo - German Capacity Building Project is scheduled to run for a minimum of three years commencing October 2003. It has the aim to foster high-quality CDM projects that will successfully complete the project cycle. The project is being executed by the Indo-German Energy Efficiency Project office under the Indo-German Energy Programme and overseen by the Climate Protection Programme of the German Agency for Technical Cooperation (GTZ). These projects shall provide experience through "learning-by-doing" and should be widely replicable. Activities under technical cooperation are:

1. **Contributions to the national deliberations** concerning an efficient institutional set-up for approval of CDM project proposals. Here the experience of other countries in establishing national authorities will be useful.
2. **Human capacity building** to assess and promote CDM project proposals. Thrust of this activity depends on government guidelines for approval of CDM projects. It is very important that rules are made transparent and unambiguous.
3. **Assessment of capacity building needs** and interest at the state level. States play an important role in getting the investment climate right and have an influence on environmental impact assessments. So far, state entities have a low level of knowledge concerning the CDM. This could constitute a relevant obstacle for project developers.
4. **Staging a competition for project proposals** addressing project developers. The best project proposals will receive a prize in the form of a pre-validation.
5. **Technology-specific training courses for project developers.** There had been a wealth of promotional CDM workshops in India with little concern on details how to prepare a CDM project proposal. To be able to submit a project documentation that has a chance to be accepted by the CDM Executive Board, project developers need specific and interdisciplinary knowledge. Moreover, the "case law" nature of the international CDM rules means that competencies have to be regularly updated. Training courses should begin in sectors with officially accepted baseline methodologies and a high potential for CDM projects. Clear candidates are power generation from alternative energy sources, efficiency increases in fossil fuel power generation, transmission and distribution, as well as lowering specific energy consumption in industry and commerce.
6. **Training courses for prospective certifiers.** The bulk of independent certifiers currently come from industrialised countries. Fees for validation and verification services are therefore very high. India has the knowledge to set up a thriving group of certifiers. However, risk considerations due to the need to pay a non-refundable fee for submission of an accreditation request, has contributed to the situation that no Indian company has so far filed an application to become a verifier.

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Source : <http://www.cdmindia.com/igeep.htm>

4.. CDM Pool

Establishing the Institutional Capacity to Enable Small-scale CDM projects in India

The 'bundling' together of appropriate small-scale projects on a regional basis has been proposed as a way in which funding can be leveraged from international sources and transaction costs reduced. IT Power, IT Power India and the Energy Research Centre from the Netherlands (ECN) are carrying out a 2-year project to establish the capacity within India to enable individual small-scale projects to be bundled as a single CDM project.

Overall Objectives :

- To develop the necessary institutional capabilities to formulate and implement small-scale CDM projects in India.
- To provide a guide on how to bundle small-scale projects under the CDM in developing countries.
- To raise the awareness of the potential for investment in small-scale energy projects which can gain funding through the CDM

This project is partly financed by the European Commission under the EU-Synergy Program.

Three workshops have been held so far involving all stakeholders in the process of establishing the institutional capacity to enable development of small-scale CDM projects in India.

Source : www.cdmpool.com

5. The Clean Development Mechanism & Indian Industry (A United Kingdom Foreign & Commonwealth Office Funded Project)

Project Focus

The project will focus on several key sectors believed to offer some of the most significant GHG emissions abatement opportunities in the industrial sector in India. These sectors will include :

- Chemicals & fertiliser production
- Steel
- Cement
- Heavy engineering & automotive
- Pulp & paper

The project will have two main aims:

- To assist Indian industries in developing an understanding of identifying potential CDM projects through a supported process of project screening.
- Remove potential barriers to project development by bringing together under one roof a number of key stakeholders - including those from the finance, service provision sectors and from government.

The aim will be to build capacity through offering insights and skills relevant to CDM project development from the UK to India in a supportive environment.

UK- India Partnership

The UK has long standing links with business and the government in India. With this in mind the Indo- British Climate Change Agreement was announced in 2002, at the COP presided over by India in Delhi. As part of this agreement, the UK Government has asked EcoSecurities, a leading UK climate change consultancy, with a reputation for success in this field, to manage an activity that will support Indian industry engage in the CDM. The project will focus on how the CDM can be accessed by Indian Industry and how carbon credits can affect project financing.

The Project & Time Line:

The project will last up to 3 to 4 months, as participants are supported in assessing their internal emission reductions options. They will focus down on identifying the best CDM opportunities, and develop Project Idea

Notes (PINs), taking those first fundamental steps. Importantly the project will look to reduce emissions of all six Kyoto GHGs defined under the Kyoto Protocol.

The project has three main stages:

Stage 1 – Seminar and Participant Workshop (October 2003)

An opening seminar attended by high profile representatives from the British High Commission and the Indian Government will aim to set out what the project aims to achieve. It will also identify the practical steps Indian business must take to engage with the CDM. Project developers, at CEO and project manager level, will participate, as will stakeholders from Government, and the service provision and financial sectors.

Participants from industry will meet following the initial seminar to be briefed on the project activity, what they will be doing in the coming months, and how they will be supported. A series of one-to-ones will be held with EcoSecurities staff and individual participants to set out individual work programmes in identifying potential CDM projects.

Stage 2- Participant Workshop (November 2003)

A workshop will be held in Delhi in the week of CII's Climate Technology Bazaar. The workshop will focus on the initial CDM projects identified. During this workshop, via individual one-to-ones and subsequent e-mail and telephone support over the coming weeks, participants will refine this list down to the most promising CDM projects, and begin preparing PINs.

Stage 3- Final Seminar & PIN Delivery (January/February 2004)

The potential participant's CDM projects will have been refined to those most likely to ultimately be successful. They will be transposed into PIN format with the focus being to bring carbon buyers in at a very early stage in order to assess whether preliminary agreements can be struck.

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Source: www.ecosecurities.com/cdmindia

6. Ministry of Environment and Forests, Government of India and UNDP The Clean Development Mechanism and Biomethanation

Aim

The proposed project CDM and Biomethanation aims at orienting the national policies for biomethanation and capacity building with biomethanation stakeholders to increase access to financing under CDM to biomethanation projects in India.

Output

The direct outputs for the project would be :

- Increased capacity with biomethanation stakeholders for CDM projects developments
- Policy framework which facilitates increased share of Indian biomethanation projects under CDM

Expected outcome as a result of the project would be a significant number of biomethanation projects securing financing under CDM and other GHG finance mechanism. As a number of investment projects were facilitated under the broader GEF initiative in India (Titled : *Development of High Rate Biomethanation Process as Means of Reducing GHG emissions*), the learning from these project cycles would be used to determine human, institutional and systemic capacity requirements to package biomethanation projects for CDM funding.

Period : One year

Budget : Approximately 51,500 USD

Activities Planned

- Identification of stakeholders for biomethanation CDM projects and development of strategy for capacity building of the stakeholders in executing the CDM project cycle
- Assessment of the CDM potential for the projects implemented with UNDP/GEF support
- Review of developments at the CDM Executive Board, subsidiary bodies and Conference of Parties (COP) in terms of modalities and procedures
- Carryout baseline, additionality analysis for biomethanation projects from GEF and evaluation of transaction cost for development, validation, registration, monitoring, verification, certification and issuance of CERS and attractiveness of biomethanation projects under varying baselines, methodologies and CER revenues

7. Canadian Clean Development Mechanism Small Projects Facility (CDM SPF)

With the support of both the Department of Foreign Affairs and Trade (DFAIT) and the Canadian International Development Agency (CIDA), the Pembina Institute for Appropriate Development established the Canadian Clean Development Mechanism Small Projects Facility (CDM SPF) in 2002. The CDM SPF was developed to provide organisations with the funding to identify potential small-scale CDM projects and learn how to prepare project documents for CDM approval. Organisation eligible for funding include community-based organisations, NGOs and small enterprises who are planning development projects.

The objectives of the facility are:

- to promote small community-based renewable energy and other GHG reduction projects that qualify under the CDM simplified approval process
- to increase CDM opportunities in countries and regions with existing investment barriers
- to support communities, NGOs, SMEs, and other potential project hosts in preparing project documents for small CDM projects
- to link Canadian CDM investors with viable community-based projects from developing countries.

The facility is supporting eight small-scale renewable-energy projects in India (see Annexure 3).

During the course of the project, the project developers will undertake to draft their individual business plans, project financial analysis based on receipt of CDM funding and complete the required Project Design Documents.

The Pembina Institute reported on utilization of the simplified CDM baselines at a workshop sponsored by Canada's CDM/JI Office on February 27/28, 2003 based on work done by recipients of CDM SPF grants.

The Pembina Institute was able to report on utilization of the simplified CDM baselines at a workshop sponsored by Canada's CDM/JI Office on February 27/28, 2003 based on work done by recipients of CDM SPF grants.

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Annexure 3: Small-Scale CDM Projects Supported Under CDM SPF

Project No./ Description	Project 1	Project 2	Project 3	Project 4	Project 5	Project 6	Project 7	Project 8
Project proponent	India Rural Energy Network	IDE , New Delhi	Market Dynamics, Calcutta	NAMSI Solar, Bangalore Technology	Sahyadri, Bangalore	Sungrace, Energy Solutions, Bangalore Technology	Tara Nirman Kendra, Delh Technology	Vijay Engineering, Bangalore Technology
Technology	Solar Lanterns	Treadle Pumps	Solar Home Systems	Domestic Solar Water Heating	Remote area power schemes using micro hydro	Solar Lighting Products	Vertical Shaft Brick Kilns	Biomass Gasifiers
Description/Benefits	An India-wide Solar lantern project involving 20 NGO membes of IRENet. Expansion of the availability of solar lighting to village communities. The project is estimating a total installation of 10,000 lanterns over the life of the project. Project beneficiaries include households, farmers, market stallholders, local suppliers and maintenance shops	A major marketing expansion of IDE's innovative treadle pumps among small and marginal farmers as the most cost-effective means of irrigation for small holders.	Expansion of the PV lighting market in West Bengal with systems ranging from 17 to 72 Wp. The main beneficiaries of the project include remote area households, marginal farmers, and small and marginal entrepreneurs.	Installation of approximately 1500 SWH systems in Karnataka. This will help end users consume less grid power, saving considerably on their monthly electricity bills, and reducing environmental impacts from coal power generation.	Beneficiaries include remote villages, and individual farmers who would benefit from an uninterrupted supply of power.	Manufacturing and distribution of PV lighting products to the rural poor throughout India. The solar lanterns and home systems will provide both a source of energy-efficient lighting as well as income generation through rural cooperatives.	Construction of 20 sites that will use improved energy efficient brick kilns and concrete building material technology. This will lower the amount of coal that is burned in brick production and thus pollution levels surrounding the kilns.	Market expansion of small waste wood biomass gasifiers for thermal applications - primarily in small industries like textiles.
Source of GHG Emissions Reduction	The lanterns will displace the use of kerosene, batteries, and grid connections.	The pumps will replace the use of diesel pumps that use up to 1 litre of diesel fuel per hour	The lighting systems will replace kerosene and biomass for lighting, and diesel in cases where micro-enterprises use generator sets.	The systems will replace electrical boilers/geysers that use grid electricity. Most of the electricity in Karnataka is generated from t thermal power plants that use coal as the primary fuel.	The mini-grids will replace existing or planned diesel generators.	The lanterns will displace the use of kerosene, batteries, and temporary grid connections.	The new kilns will reduce the use of coal..	The gasifiers will replace diesel-fuelled boilers, now commonly used for small industrial thermal applications.

Annexure 4

Capacity Building Framework for Renewable Energy CDM sector in India (CAPACITY BUILDINGF-RECI)

Activity level	Stakeholders	Programme type	Subject level	Period	Outcome / Benefits / Indicators	Financial needs	Resources	Remarks
Policy and promotional level³¹	MNES ³² MEDA ³³ SMoP ³⁴ TCO ³⁵	General Awareness programme	General and Technical	1 week (one time exercise to be complemented with continuous access for updates)	Understanding : 1.Climate change, national CDM potential and international CER market 2.Appreciation of role of RE under CDM Participants: MNES : 1 MEDA:2 SMoP: 1	Rs. 6 Lakhs	ICS-CDM ³⁶ CDM NSS ³⁷ IGCAPACITY BUILDINGP-CDM ³⁸ ADB-CF ³⁹ MOEF ⁴⁰ MNES SNAs	Priority activity
	MNES MEDA SMoP TCO	Policy development programme	Policy and administration	3 days (one time exercise to be concluded with performance assessment workshop after 8 months)	Appreciation of: 1.the potential for RE under CDM 2.Prioritizing sectors in the state 3.simplifying and streamlining project development procedures 4.contributing to effective operation of DNA 5.gain more international perspective of CDM Participants: MNES : 1 SNA:2 SEM 1	Rs. 4 Lakhs	ICS-CDM CDM NSS IGCAPACITY BUILDINGP-CDM ADB-CF MOEF MNES SNAs	Priority activity

³¹ Does not cover facilitating establishment of Designated National Authority as it focuses in Renewable Energy only

³² Regional office of Ministry of Non-Conventional Energy Sources, Government of India

³³ State Nodal Agencies

³⁴ State Ministry of Power

³⁵ State level Technical Consultancy Organisation

³⁶ Japan Programme

³⁷ World Bank – TERI

³⁸ Indo-German Capacity Building Project - CDM by GTZ

³⁹ Asian development bank-CDM facility

⁴⁰ Ministry of Environment and Forest, Government of India

Activity level	Stakeholders	Programme type	Subject level	Period	Outcome / Benefits / Indicators	Financial needs	Resources	Remarks
	MEDA TCO	Training of trainers programme	Technical, Financial and Policy	3 days (one time exercise to be concluded with performance assessment workshop every 6 months)	Developing skills and capacities for similar transfer of skills and capacities to local stakeholders for enhanced and effective participation in CDM Participants⁴¹: SNA:2 SEM: 1 TCO: 2	Rs. 4 Lakhs Funding required for onward training of local stakeholders	ICS-CDM IGCAPACITY BUILDINGP-CDM ADB-CF MNES SNAs	Activity commencing after the completion of the above two activities
	MNES, MEDA, SMO P, TCO	Pilot projects development workshop	Technical, Financial, Policy and Implementation	3 days (one time exercise to be concluded with performance assessment workshop on pilot projects after 6 months)	1.Realisation of true CDM potential, project wise 2.Appreciation of transaction cost of CDM projects based on the national policy framework 3.Better understanding of facilitation of CDM projects by streamlined procedures Participants: MNES:2; SNA:2; SEM:1; TCO:2 from each state	Rs. 4 Lakhs Funding required for onward training of local stakeholders	ICS-CDM CDM NSS IGCAPACITY BUILDINGP-CDM ADB-CF MOEF MNES SNAs	Results of established country baselines, SD indicators, Types of CDM participation can be applied during this workshop
Analysis, participation and propagation level	NGOs, RI & AIs ⁴² , LC ⁴³ , Mass Media	General awareness and participatory workshop	Sustainable Development (SD), Technical, Financial, Policy and Implementation	2 days (one time exercise followed by such workshops organized by the project proponents and supported by state government from respective regions for updates)	Appreciate: 1.Climate change 2.Local benefits and SD 3.Role of RE in SD 4.RE CDM potential and CDM market Enhanced participation by LC Participants: NGOs: 5; MM: 5; RI: 3; AI: 3; LC: 5	Many (atleast 2 events) Rs. 3 Lakhs per event	ICS-CDM IGCAPACITY BUILDINGP-CDM ADB-CF MOEF MNES SNAs	Preparation of CDM brochures for LC in local languages and adequate mass media (MM) coverage is important during this exercise. Hence MM should be the participants

⁴¹ These trained personnel will have a commitment for imparting training, irrespective of their posting during the time of training. Other terms provided in the Framework conditions

⁴² Research and Academic Institutions

⁴³ Local Community

Funding level	Public and private financial institutions including local banks and insurance companies	General awareness, Project development techniques and project development for funding	Technical, Financial, Policy and Implementation	5 days (one time exercise followed by such workshops organized by the branches of FIs supported by state government from respective regions)	<p>Appreciate :</p> <ol style="list-style-type: none"> 1.Climate change 2.Potential projects for funding 3.Streamlining existing RE projects under CDM 4.RE CDM potential and CDM market 5.Better understanding of RE CDM projects formulation and ist associated risks 6.Development of CDM funding portfolio with innovative funding options 7.Actual funding of CDM projects (atleast 2 by each targetted FIs) <p>Participants: Public FI⁴⁴:3 Private FIs : 5, Bank Asstns : 3</p>	<p>Several (Atleast 2 events)</p> <p>Rs.5 Lakhs</p>	<p>All FIs CDM-NSS ICS-CDM IGCBP-CDM ADB-CF MOEF MNES</p>	
Facilitation and Implementation level	Consultants, project developers and project proponents	General awareness, Project development and CDM approval process techniques	Technical, Financial, Policy and Implementation	2 days for 3 cycles (first cycle to generate ideas and gain better understanding of the CDM process, second cycle to finalize projects and develop concrete proposal for submission and third cycle to discuss results and future action plan of such projects for debt and CDM funding)	<ol style="list-style-type: none"> 1.Generation of real projects 2.Developing project reports for debt funding and PDD for CDM funding 3.Enchanced capacity for developing and implementing more projects 	<p>Several (Atleast 2 events)</p> <p>Rs.2 Lakhs per event</p>	<p>All FIs CDM-NSS ICS-CDM IGCBP-CDM ADB-CF MOEF MNES</p>	

⁴⁴ Financing Institutions