CLEAN DEVELOPMENT MECHANISM
SMALL-SCALE PROGRAMME OF ACTIVITIES DESIGN DOCUMENT FORM
(CDM-SSC-PoA-DD) Version 01

CONTENTS

Annexes

NOTE:

(i) This form is for the submission of a CDM PoA whose CPAs apply a small scale approved methodology.

(ii) At the time of requesting registration this form must be accompanied by a CDM-SSC-CPA-DD form that has been specified for the proposed PoA, as well as by one completed CDM-SSC-CPA-DD (using a real case).

SECTION A. General description of small-scale programme of activities (PoA)

A.1 Title of the small-scale programme of activities (PoA):

>> Renewable Energy PoA in India
Version 9
Date: 21/9/2012

A.2. Description of the small-scale programme of activities (PoA):

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India has close to 177,000 MW of installed capacity for power generation, out of which the contribution of renewable energy sources (RES as per MNRE) is less than 10%[1]. This is typically due to high capital costs associated with implementing the renewable energy power plants in India. Government of India (GoI) is supporting Renewable Energy projects through various policy measures and incentives; however, the growth has been subdued as compared to the other forms of energy.

Additional revenues available under the CDM provide incentive to install grid connected renewable power plants in India. However, the high cost associated with CDM cycle along with registration uncertainty proves detrimental to the development of small scale renewable power projects.
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The coordinating & managing entity "Emission Reduction Services Private Limited" has started off with the proposed "Renewable Energy PoA in India" (henceforth RE PoA) to promote the development and implementation of small renewable power projects, with the objective to contribution towards increased generation of renewable energy in India.

The PoA would cover following renewable energy technologies:
- Wind Power
- Hydro Power
- Solar Power

1. General operating and implementing framework of PoA

The RE PoA will support the development of new, small scale, grid-connected renewable energy power plants in the India (Hydro, Solar & Wind). The PoA supports renewable energy generation delivering energy to a grid within the geographical boundary of the PoA. Each CPA under this PoA will comprise one or more than one power plant with a combined installed capacity up to 15 MW. The RE PoA is a voluntary action being coordinated and managed by the "Emission Reduction Services Private Limited" (henceforth CME), the coordinating entity. The CME will work closely with South Pole Carbon Asset Management Ltd (henceforth, South Pole) and the developers of the power plants (henceforth, CPA Implementers) to facilitate the development of new renewable energy power plants and their inclusion in the PoA.

2. Policy/measure or stated goal of the PoA

The objective of RE PoA is to facilitate the development of small scale renewable energy projects in India which currently face various technical, institutional & financial barriers. The RE PoA aims to provide synergies to overcome hurdles that are common to development of a small scale grid connected renewable energy project in India by providing an additional stream of revenue in the form of CDM

[1] http://cea.nic.in/reports/monthly/inst_capacity/jun11.pdf

benefits. The key goal of the RE PoA in India is to reduce dependence on fossil fuel based electricity generation in India by promoting the renewable energy.

In spite of abundant resources, renewable energy contributes only a small share to India's power generation. Primary reason for the current situation is the financial viability of the Renewable energy as compared to conventional non-renewable energy. As a result, the development of new renewable energy plants remains slow despite its huge potential as a source of clean energy.

The objective of the RE PoA is to develop a platform that can support the development of sustainable, renewable energy projects in the region. To reach this goal, the CME will raise awareness among developers on opportunities for generating CDM revenues and provide standardized and streamlined access to CDM services for renewable energy projects in India, including those that because of their associated financial risks, otherwise would not be able to reach financial closure or to generate CDM revenues. The CME will coordinate the inclusion of the CPA in the PoA, conduct the inclusion to the PoA of the CPA, provide monitoring and verification services to all CPAs, and support the effective commercialization of CERs. Over time, additional services will be added to support the effective development of the renewable energy sector across the host country.

In this way, the RE PoA will promote the development of renewable energy and facilitate the mitigation of greenhouse gas (GHG) emissions through displacement of electricity generated by grid connected power plants that contain a majority of fossil-fuel fired installations.

The contribution of the RE PoA to sustainable development is assessed as follows by using the sustainable development criteria of the Indian DNA under the Ministry of Environment and Forests:

Environmental benefits:

- The PoA encourages the development of renewable energy plants that replace non-renewable energy (typically energy generated from fossil fuels), reduce emissions of pollutants (per unit of energy generated) including GHG emissions.
- In contrast to most other sources of power, technologies included in this PoA, such as hydro power, wind power and Solar PV, do not produce solid waste; which addresses the problem of solid waste disposal encountered by most other sources of power.
- When used to generate electricity, Renewable energy contributes to natural resource conservation.

Economic benefits:

- The PoA increases employment opportunities in the area where each CPA is located, leading to a general increase in local-community income.
- The PoA/CPA enhances the local investment environment and improves the local economy.
- The PoA diversifies sources of electricity generation that are necessary to meet a growing demand for energy and facilitates the transition away from fossil fuel electricity generation.

Social benefits:

- The CPA improves access to electrical power in rural regions by increasing access and quality of electricity in the distribution network.
- During civil work, the CPA generates employment opportunities for the local population (in addition, various types of mechanical work generate employment on regular and permanent basis).

Technological benefits:

- The CPA supports technology/know-how transfer from other regions/countries via training and practical work experience.

3. Confirmation that the proposed PoA is a voluntary action by the coordinating/managing entity

The RE PoA is a voluntary action being coordinated and managed by the CME. Renewable Energy projects are voluntary in nature and are not a result of any legal mandates. Likewise, no mandatory laws or regulations exist requiring the coordinating/managing entity or any other party to develop a PoA for renewable generation plants in the host country.

A.3. Coordinating/managing entity and participants of SSC-POA:

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1. The "Emission Reduction Services Private Limited" will be the Coordinating/Managing Entity for the project activities under the Programme of Activities (PoA) and communicate with the CDM Executive Board.
2. Project participants being registered in relation to the proposed PoA are:

Name of Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (host)	Emission Reduction Services Private Limited (Private Entity)	No
Switzerland	Swiss Carbon Assets Ltd. (Private Entity)	No
Switzerland	South Pole Carbon Asset Management Ltd. (Private Entity)	No

Project participants may or may not be involved in the CPAs included in this PoA.

A.4. Technical description of the small-scale programme of activities:

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A.4.1. Location of the programme of activities:

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The PoA covers the geographical region of the country India.

A.4.1.1. Host Party(ies):

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India

A.4.1.2. Physical/ Geographical boundary:

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The boundary for the PoA in terms of geographical area within which all small-scale CDM Program Activities included in this PoA will be implemented, covers the entire geographical region of India. The physical boundary for each SSC CPA confines to the physical boundary and geographical area of the respective renewable energy projects covered in the SSC CPA. The physical boundary of each SSC CPA will be defined in the CPA-DD.

Fig. 1: Physical and Geographical boundary of the SSC PoA

A.4.2. Description of a typical small-scale CDM programme activity (CPA):

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A typical CPA under this PoA comprises one or more newly-built renewable energy power plants with an installed capacity of equal or less than 15 MW. Such plants shall be constructed by one or more third-party project owners and generate electricity from the following renewable resources:

- Hydropower
- Wind
- Solar

As outlined in Section A.4.2.2, a CPA participating in this PoA must not comprise an addition or retrofit/replace activity in an existing renewable energy plant.

A.4.2.1. Technology or measures to be employed by the SSC-CPA:

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The proposed PoA falls in the type I of the SSC category (As per Attachment A of Appendix B) scope 1 (Energy industries (renewable - / non-renewable sources) category.

The PoA will employ all technologies that harvest the kinetic or potential energy of water; or, wind; or solar radiation, to transform such energy into electricity.

Hydro Power:

The project would include hydro power projects up to the capacity of 15 MW. The projects would comprise of hydro projects with power density more than $10w/m^2$.

Small-scale hydropower plant will utilize river water flow to generate electricity without any significant environmental impact, as there will be no significant dam construction. The electricity generation will be then exported to the nearest grid through an interconnection point or sub-station as defined in the PPA. The technology employed by each small-scale hydropower plant in the proposed SSC-PoA may differ but nevertheless may comprise inter alia barrages, diversion tunnels, fore bays, spillways, pressure pipes, powerhouses, and booster stations. In addition to that, the proposed SSC-PoA will include all hydro power technologies such as Pelton, Kaplan, etc.

Solar Power:

The project would include either the Solar PV technology, the Solar Thermal technology or any other solar based renewable energy technology with a threshold of 15 MW.

Solar PV

The solar photovoltaic cells, also known as the solar cells, are used to convert solar energy into electrical energy. The solar cells are the basic elements of a solar module. Essentially, when light strikes the cell, a certain portion of it is absorbed within the semiconductor material. PV cells have one or more electric fields that act to force electrons freed by light absorption to flow in a certain direction. This flow of electrons constitutes an electric current, which can be drawn from the cell. This current, together with the cell's voltage defines the power that the solar cell can produce.

Solar Thermal

Solar thermal technology is applied for harnessing solar energy for thermal energy, which is then used to produce electricity. Solar thermal collectors can be classified as low, medium, or high temperature

collectors. High-temperature collectors concentrate sunlight using mirrors or lenses and are generally used for electric power production.

Wind Power:
Each project would include the basic machinery that converts wind power to electricity and is called a wind turbine, although it has many more parts than other kinds of turbines. The wind spins blades that are attached to a hub that turns as the blades turn. Together, the blades and hub are called the rotor. The turning rotor spins a generator, producing electricity. The capacity installed will be maximum 15 MW.

Detailed technical description of each individual projects would be provided in detail in the individual CPA DD.

Applicable national and/or sectoral policies and acts, which are relevant to the PoA

The PoA comprises Grid Connected Renewable Energy Power Projects (limited to Wind, Solar & Hydro). Below is a snapshot of policies applicable for grid connected renewable power generation:

POLICY SUPPORT FOR GRID INTERACTIVE RENEWABLE POWER[2]

Electricity Act 2003

Under the electricity act, to promote cogeneration and generation of electricity from renewable sources of Energy State would provide suitable measures for connectivity with the grid and sale of electricity to any person, and also specify, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee.

National Electricity Policy 2005

The National Electricity Policy 2005 stipulates that progressively the share of electricity from non-conventional sources would need to be increased; such purchase by distribution companies shall be through competitive bidding process; considering the fact that it will take some time before non-conventional technologies compete, in terms of cost, with conventional sources, the commission may determine an appropriate deferential in prices to promote these technologies.

Tariff Policy 2006

The Tariff Policy announced in January 2006 has the following provisions:

- Commission shall fix a minimum percentage for purchase of energy from renewable sources taking into account availability of such resources in the region and its impact on retail tariffs. Such percentages for purchase of energy should be made applicable for the tariffs to be determined by the State Electricity Regulation Commissions (SERCs).
- It will take some time before non-conventional technologies can compete with conventional sources in terms of cost of electricity. Therefore, procurement by distribution companies shall be done at preferential tariffs determined by the Appropriate Commission.
- Such procurement by Distribution Licensees for future requirements shall be done, as far as possible, through competitive bidding process within suppliers offering energy from same type of

[2] http://www.mnre.gov.in/policy/policy-support-grid.htm

non-conventional sources. In the long-term, these technologies would need to compete with other sources in terms of full costs.

- The Central Commission should lay down guidelines for pricing non-firm power, especially from non-conventional sources, to be followed in cases where such procurement is not through competitive bidding.

Although there are several policies and acts to support the development of Renewable Energy at the national level, but still Renewable Energy consists of less than 10% of total power production. Primary barrier being the investment barrier resulting into lower than expected returns mainly because of high initial costs and low production as compared to conventional sources of energy.

A.4.2.2. Eligibility criteria for inclusion of a SSC-CPA in the PoA:

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A CPA to be included in the proposed PoA shall:

Topic	No.	Eligibility Criteria	Possible Verification source
Geographical boundary	1	Being setup within the geographical boundary of India	Geographical co-ordinates of the CPA.
Double counting	2	CPA must be uniquely identified with the Geographical co-ordinates of the project location and should not result into double counting	- Unique geographical co-ordinates. - Confirmation from CPA owner on not applying as an individual CDM project neither being part of any other PoA. A check on the CDM website among registered projects and projects under Validation.
Technology	3	be a renewable energy power plant (one of solar PV, solar thermal, hydro or wind power plant)	Detailed project report
Start date	4	have a starting date after the validation start of the PoA	Start date of CPA can be verified from Equipment Purchase Contract in case available; can also be checked during physical site visit for projects where construction has not started yet.
Compliance with applied methodology	5	Complies with all applicability conditions listed in the applied methodology AMS I.D version 17. Such requirements are listed in section E.2 of the PoA-DD.	All requirements listed in section E.2 are met by complying with eligibility criteria no. 3, 10, 11, 12 and 13.
Additionality	6	Demonstrates that it is in compliance with one of the CPA additionality test as described in section E.5.2 of the PoA-DD.	As per details in CPA-DD and corresponding supporting documents

Local stakeholder consultation	7	Conducts a local stakeholder consultation	As per provided description of local stakeholder invitation, summary of comments received and how they have been taken into account, in the CPA-DD section D.
Environmental Impact Analysis	8	Shall show, based on national environmental policies applicable at time of inclusion, whether an environmental impact analysis is required or not. If required, the CPA shall conduct an environmental impact analysis.	- Policies showing a non requirement of an environmental impact analysis or; - Environmental impact analysis report outlined in section C of the CPA-DD
Diversion of official development assistance	9	CPA should not result into the diversion of official development assistance	- Declaration from CPA implementer - Loan funding documents in case available
Target group	10	not be a capacity addition/retrofit/replacement activity at an existing power plant. In other words the CPA to be included would only comprise of Greenfield renewable energy power plants.	Detailed project report and a potential physical site visit
	11	export the renewable electricity generated to a relevant and clearly identified grid within the geographical boundary of the host country[3]	Power Purchase Agreement/Detailed project report
	12	If the power plant is a hydroelectric plant that comprises a reservoir, the power density of the power plant shall be greater than 10 W/m2.	Calculations performed on the basis of Detailed project report
Small-scale threshold	13	Generates electricity with a capacity below or equal the type I small-scale threshold	Detailed project report
Micro-scale threshold	14	Has a maximum installed capacity below or equal to 5 MW, in the case CPA is following additionality test a, as described in section E.5.2 of the PoA-DD. If additionality test b is chosen, this eligibility criteria does not need to be considered	As per details in CPA-DD and corresponding supporting documents
Debundling check	15	The CPA included in the PoA is not a de-bundled component of another CDM programme activity (CPA) or CDM project activity: CPA shall be deemed to be a de-bundled component of a large scale activity if there is already an activity, which satisfies both conditions (a) and (b) below: (a) Has the same activity implementer as the	- If applicable, project list of same activity implementer as CPA implementer, applying the same technology/measure. - If applicable, list of CPAs of a large scale PoA with the same

[3] Is in line with applicable project types as listed in Table 2 of AMS I.D, version 17

		proposed small scale CPA or has a coordinating or managing entity, which also manages a large scale PoA of the same technology/measure, and; (b) The boundary is within 1 km of the boundary of the proposed small-scale CPA, at the closest point.	coordinating and managing entity applying the same technology/measure GPS coordinates of above projects near to the implemented CPA.
Other	16	have a contract of services and cessation of rights with the CME that governs the CPA's participation in the RE PoA, and comply with the code of conduct of the CME	Contract with CME
Other	17	be in line with laws and regulations available at the time of inclusion of the CPA into the PoA.	As per description in PoA-DD and CPA-DD

A.4.3. Description of how the anthropogenic emissions of GHG by sources are reduced by a SSC-CPA below those that would have occurred in the absence of the registered PoA (assessment and demonstration of additionality):

>> **Demonstration that the proposed PoA is a voluntary coordinated action**

The proposed PoA is a voluntary coordinated action;
As explained in section A.2, the proposed PoA will facilitate access to carbon revenues to renewable energy power developers. These developments will encourage renewable energy electricity generation in the host country. There are no mandatory laws or regulations in the host country stipulating to implement a Renewable Energy Plant or development of a PoA. Likewise, no obligation exists for private entities to utilize or develop renewable energy projects. The proposed PoA can be, therefore, regarded as a voluntary coordinated action.

Demonstration that the voluntary coordinated action would not be implemented in the absence of the PoA

In the absence of the proposed PoA, the voluntary coordinated actions outlined above would not be likely to be implemented. Virtually no change would take place with regard to the utilization of the abundant amount of renewable resources in India. As mentioned in the introductory section, the market-share of renewable resources has grown at a very low rate in spite of the potential in the country. Moreover, the majority of future generating capacity expected to come online over the next several years will be primarily fossil-fuel plants.

Considering the participation of renewable sources in the total electricity generation and the potential of the renewable resources in India, it can be concluded that in the absence of the capacity development and streamlined CDM services to be provided under the proposed PoA the financial incentives like CDM revenues will remain at insufficient levels to undertake the investments needed to establish new renewable plants. Consequently, the current dependence on thermal generation will remain.

The development of Renewable Energy projects in India is primarily slow due to poor return on investments offered by such projects as compared to the conventional fossil fuel based power generation. Thus the returns from the Renewable Energy projects are below the expected market returns based benchmark.

The Financial barrier, is preventing the development of renewable energy projects in India. By providing capacity building and carbon finance platforms to small renewable power plants, the proposed SSC-PoA will support the sector in overcoming these barriers.

The SSC-PoA is thus deemed additional.

As per paragraph 73 of the 47th EB meeting report "additionality is to be demonstrated either at the PoA level or at CPA level" and as prescribed in the Simplified modalities and procedures of small scale project activities, additionality shall be demonstrated as per Attachment A to Appendix B (EB63, Annex 24) or as per "Guidelines for Demonstrating Additionality of Microscale Project Activities" version 3, EB 63, Annex 23 . Hence, the PPs choose to demonstrate the additionality at CPA level by showing that the SSC-CPAs cannot be implemented in the absence of this PoA because of Investment barriers or as described in greater detail in section E.5.2 of this SSC-PoA-DD.

In view of the various cost and revenue variations across renewable energy projects in India the Financial barriers will be tested individually for each SSC-CPA (see section E.5.1).

Event	Reference	Date
South Pole board decision to start the development of a Renewable Energy PoA in India (project start date of the PoA)	Board meeting documents	30 March 2011
Status update of PoA implementation during board meeting	Board meeting documents	8 August 2011
Name Change from South Pole Carbon India Private Limited to Emission Reduction Services Private Limited	Name change approval documents	11th August 2011
Appointment of DOE (TUV-SUD)	Contract with DOE	24th August 2011
Webhosting of PoA DD	UNFCCC Website	26th August 2011
Validation Site Visit	DOE Records	26th September 2011

A.4.4. Operational, management and monitoring plan for the programme of activities (PoA):

A.4.4.1. Operational and management plan:

>> The proposed PoA involves a range of operational activities in order to implement and manage each CPA by the coordinating entity CME and CPA implementer within the RE PoA.

Entity Management Responsibilities and Arrangements

CME

- Development of CPA-DD documentation.
- CPA inclusion process into the PoA.
- Development of the Monitoring Plan set in the PoA-DD.
- Provide CDM-related training to the CPA Implementer.

- Be aware of any failure or deviation from the CPA Implementer in the application of the monitoring plan and request corrective actions as needed.
- Follow-through with the DOE of periodical PoA verifications and CERs issuances.
- Distribution of the CER's income to the CPA Implementers as per a previously mutually-agreed commercial model (and formalized in an ERPA).

CPA implementer

- Implement renewable energy plant project activity (construction, daily operation, and maintenance of power plant).
- Monitoring and recording the plant operation data.

The flow of information and administration of the PoA and CPA CDM development shall be based on a RACI diagram[4], which follows strict and efficient practices in order to ensure that all deliverables meet its high quality standards.

For each step of the CDM project cycle at PoA level and at CPA level is broken down in individual milestones. Closing of milestones is based on a 4-eye principle according to the assignment of responsibilities.

Quality checks (up to 8-eye principle) are enabled for key milestones: CPA-DD, CPA inclusion, monitoring, verification and CERs issuance.

The Data and Project Management System Tool allows implementing the above principles by allocating specific access rights for team members. E.g. only senior colleagues with quality check responsibilities will also be able to close such a check in the tool.

A separate Management System Procedure Manual elaborates the operational and management plan of the PoA in detail. Such manual will be subject to revision to allow continuous improvements.

In addition to the above management tasks, the CME will implement the following operational elements to ensure proper management and oversight of the proposed PoA.

(i) A record keeping system for each CPA under the PoA
In order to unambiguously identify the renewable energy plant participating in the PoA, a serial numbering system will be implemented that uniquely identify each power plant through numbers and letter for the CPA and the power facility. This serial numbering system will be used to record baseline and monitoring data on a continuous basis using a database. In this way, the PoA coordinating entity will be able to track the emission reduction of each power plant over the full duration of the crediting period.

- [4] *Responsible (R)* – The team members who carry-out the analyses and writing required to complete the task. In other words, the person who does the work to achieve the task.
- *Accountable (A)* – The team member who is accountable for the completion of the task. Accountable must sign off (Approve) on work that the 'Responsible' provides.
- *Consulted (C)* – Colleagues who are consulted during the completion of the tasks (two-way communication).
- *Informed (I)* – Colleagues who are kept up-to-date on progress (one-way communication) and should be notified of result.

In summary, the CME will record and document CPA detail information as follows:

- Name of the CPA and its installed capacity
- The name, address, and project owner details of each participating CPA
- The geographical coordinates of each CPA (GPS coordinates of the power house)
- The record of technology type (hydropower, wind or solar) employed in each power plant participating in the PoA
- The verification status (number of verification and associated monitoring period)

The CME will be responsible for the management of records and data associated with each CPA. The Excel database will be updated manually using the data supplied by the participating power plants. It will form the basis for the verification of CPAs and be available for inspection by the DOE at any point in time.

(ii) A system/procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has been already registered either as a CDM project activity or as a CPA of another PoA,

The database described above will be used to perform a double accounting check. Every new CPA will be compared to the already existing database and the list of project activities that are under validation or registered at the UNFCCC. Moreover as shown below, the project implementers will be made aware of the double accounting principle and will certify that the proposed CPA is not registered under the Clean Development Mechanism of the UNFCCC or any voluntary scheme for availing GHG emission reduction benefits. Should such a case occur then the coordinating entity will not proceed with inclusion of the corresponding CPA in the proposed PoA.

iii) The SSC-CPA included in the PoA is not a de-bundled component of another CDM programme activity (CPA) or CDM project activity:

For the purposes of registration of a Programme of Activities (PoA), a proposed small-scale CPA of a PoA shall be deemed to be a de-bundled component of a large scale activity if there is already an activity, which satisfies both conditions (a) and (b) below:
(a) Has the same activity implementer as the proposed small scale CPA or has a coordinating or managing entity, which also manages a large scale PoA of the same technology/measure, and;
(b) The boundary is within 1 km of the boundary of the proposed small-scale CPA, at the closest point.

For this PoA both of the above conditions would be checked at individual CPA level to confirm that SSC-CPA is not a de-bundled component of another CDM PoA or CDM project activity.

(iii) The provisions to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA;

In order to avoid double accounting and to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA, the project implementer of an CPA shall enter into a contractual arrangement with the coordinating entity including respective provisions that:

- The CPA has not been and will not be registered as a single CDM project activity or as a CPA under another PoA.
- The project implementer is aware that the CPA will be subscribed to the present PoA.
- The project implementer cedes its rights to claim and own emission reductions under the Clean Development Mechanism of the UNFCCC or any voluntary scheme to the managing entity of the PoA.

- Mechanism of the UNFCCC or any voluntary scheme.

A.4.4.2. Monitoring plan:

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For each Project Activity under a CPA, all relevant parameters defined under Section E.7.1 will be monitored by the CPA Implementer according to the procedures and monitoring framework established in E.7.2. The monitoring data will be submitted to the CME, who will check and finalize the monitoring documentation for verification by the DOE and store the data in a database in such a way that the status of verification can be determined for each CPA at any time.

For verification purposes, the CME will follow the procedure described below:

1- Maintenance of a list of verification procedures to be applied to each CPA
2- The coordinating entity collects the monitoring information for all SSC-CPAs that will be verified and prepares one monitoring report
3- Desk review and on-site assessment of the CPAs
4- The DOE computes total verified emission reductions by the PoA

1- Maintenance of a list of verification procedures to be applied to each CPA

The CME will develop and continuously update a list of all CPAs, will collect the monitoring information for all CPAs that will be verified and prepares one monitoring report which will be submitted to the DOE for verification of the PoA. Further, the list indicates the crediting period, monitoring period and verification status of each CPA. This list would at any time provide the accurate information regarding the verification status of each CPA.

2- Collection of monitored parameters and elaboration of the monitoring plan

The monitoring report will compile all required monitoring information for all CPAs that will be verified by the DOE. This report will unambiguously set out the data relating to the emission reductions generated by each specific SSC-CPA during the monitoring period consistent with the requirements of this SSC-PoA-DD and the corresponding SSC-CPA-DD.

The monitoring plan for parameters included in section E.7.1 will be implemented for each SSC-CPA with assistance from the coordinating entity as follows:

- SSC-CPA owner will implement each SSC-CPA individually and monitor and record all parameters included in section E.7.1.
- The coordinating entity will provide guidance to SSC-CPA owner on how monitoring should be conducted and data should be collected in regards to emission reductions calculation.
- The SSC-CPA owners will provide data on monitored parameters included in section E.7.1 to the coordinating entity.
- The coordinating entity will document and store all parameters included in section E.7.1 provided by SSC-CPA owners in an electronic database, while primary data will be stored by SSC-CPA owner
- The coordinating entity review relevant monitoring documents, prepare the monitoring report, and provide the latter to the DOE.

3- Desk review and on-site assessment of the CPAs

The DOE performs a desk review of the monitoring information of all to be verified CPAs and performs

on-site assessments in accordance with the prevailing guidelines and rules

At the end of the desk review and the on-site assessments, the coordinating entity shall provide an updated monitoring report elaborated in light of the DOE findings.

4- The DOE computes total verified emission reductions by the PoA

The DOE approves the final monitoring report provided by the coordinating entity and certifies that (i) the list and type of data collected and provided within the monitoring report is consistent with the monitoring plan of each CPA (ii) ERs are estimated as described in this PoA-DD and the respective CPA-DD and are not miscalculated.

A.4.5. Public funding of the programme of activities (PoA):

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The RE PoA does not receive any public funding.

SECTION B. Duration of the programme of activities (PoA)

B.1. Starting date of the programme of activities (PoA):

>>

30/03/2011, as per timeline of PoA-DD in section A.4.3 of the PoA-DD

B.2. Length of the programme of activities (PoA):

>>

28 Years.

SECTION C. Environmental Analysis

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C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:

1. Environmental Analysis is done at PoA level ☐
2. Environmental Analysis is done at SSC-CPA level ☑

Local and focalized impacts of each power project (depending on the technology, location, capacity, and construction or not of dam among others) justify a separate environmental assessment for each CPA. Environmental analysis will therefore be conducted for each power plant included in a CPA according to the applicable environmental policies in India at the time of inclusion of CPA to the PoA

C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:

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The environmental impacts analysis will be done at CPA level.

C.3. Please state whether in accordance with the host Party laws/regulations, an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA),:

>>

Environmental impact assessments will be conducted for each SSC-CPA according to the applicable laws and regulations at the time of inclusion of SSC-CPA to SSC-PoA.

SECTION D. Stakeholders' comments

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D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:

1. Local stakeholder consultation is done at PoA level ☐
2. Local stakeholder consultation is done at CPA level ☑

Local and focalized impacts of each renewable energy project (depending on the technology, location, capacity, and construction or not of dam among others) justify a LSC at CPA level.

D.2. Brief description how comments by local stakeholders have been invited and compiled:

>>

Local stakeholder consultation will be held at CPA level.

D.3. Summary of the comments received:

>>

Local stakeholder consultation will be held at CPA level.

D.4. Report on how due account was taken of any comments received:

>>

Local stakeholder consultation will be held at CPA level.

SECTION E. Application of a baseline and monitoring methodology

E.1. Title and reference of the approved SSC baseline and monitoring methodology applied to a SSC-CPA included in the PoA:

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Name of approved baseline and monitoring methodology:

AMS-I.D.: Grid connected renewable electricity generation --- Version 17, Sectoral Scope: 01
The methodology has been approved by EB for use in a PoA.

E.2. Justification of the choice of the methodology and why it is applicable to a SSC-CPA:

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The applicability criteria of AMS I.D. v17 are the following:	Methodology AMS I.D. v17 is applicable to an SSC-CPA under the proposed SSC-PoA because:
This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass: a. Supplying electricity to a national or a regional grid; or b. Supplying electricity to an identified	An SSC-CPA will consist of a renewable energy generation unit (hydro, wind, solar PV or solar thermal) that supplies electricity to a regional grid of India, as per eligibility criteria no. 3 and 11 in section A.4.2.2 of the PoA-DD.

consumer facility via national/regional grid through a contractual arrangement such as wheeling.	
This methodology is applicable to project activities that (a) install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) involve a capacity addition[5]; (c) involve a retrofit[6] of (an) existing plant(s); or (d) involve a replacement[7] of (an) existing plant(s).	PoA is limited to greenfield projects as per eligibility criteria no. 10 in section A.4.2.2 of the PoA-DD.
Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: • The project activity is implemented in an existing reservoir with no change in the volume of reservoir; • The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m^2; • The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m^2.	A hydro SSC-CPA that comprises a reservoir will have a power density greater than 10 W/m^2, as per eligibility criteria no. 12 in section A.4.2.2 of the PoA-DD.
If the unit added has both renewable and non-renewable components (e.g., a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the unit added co-fires fossil fuel[8], the capacity of the entire unit shall not exceed the limit of 15 MW.	Each SSC-CPA has only renewable components, as per eligibility criteria no. 3 and 13 in section A.4.2.2 of the PoA-DD.
Combined heat and power (co-generation) systems	Not applicable, the proposed SSC-PoA does not

[5] A capacity addition is an increase in the installed power generation capacity of an existing power plant through: (i) the installation of a new power plant besides the existing power plant/units, or (ii) the installation of new power units, additional to the existing power plant/units. The existing power plant/units continue to operate after the implementation of the project activity.

[6] Retrofit (or Rehabilitation or Refurbishment). It involves an investment to repair or modify an existing power plant/unit, with the purpose to increase the efficiency, performance or power generation capacity of the plant, without adding new power plants or units, or to resume the operation of closed (mothballed) power plants. A retrofit restores the installed power generation capacity to or above its original level. Retrofits shall only include measures that involve capital investments and not regular maintenance or housekeeping measures.

[7] Replacement. It involves investment in a new power plant or unit that replaces one or several existing unit(s) at the existing power plant. The installed capacity of the new plant or unit is equal to or higher than the plant or unit that was replaced.

[8] Co-fired system uses both fossil and renewable fuels.

are not eligible under this category.	include combined heat and power systems, as per eligibility criteria no. 3 in section A.4.2.2 of the PoA-DD.
In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct[9] from the existing units.	Capacity additions are not eligible under the proposed SSC-PoA. The SSC-CPA would only involve green field project activity, as per eligibility criteria no. 10 in section A.4.2.2 of the PoA-DD.
Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category. To qualify as a small-scale project, the total output of the modified or retrofitted unit shall not exceed the limit of 15 MW.	An SSC-CPA will not retrofit or modify an existing facility for renewable energy generation. The SSC-CPA would only involve green field project activity, as per eligibility criteria no. 10 in section A.4.2.2 of the PoA-DD.
In the specific case of biomass project activities the applicability of the methodology is limited to either project activities that use biomass residues only or biomass from dedicated plantations complying with the applicability conditions of AM0042.	Not applicable as per eligibility criteria no. 3 in section A.4.2.2 of the PoA-DD.
In the specific case of biomass project activities the determination of leakage shall be done following the general guidance for leakage in small-scale biomass project activities (attachment C of appendix B7 of simplified modalities and procedures for small-scale clean development mechanism project activities; decision 4/CMP.1) or following the procedures included in the leakage section of AM0042.	Not applicable as per eligibility criteria no. 3 in section A.4.2.2 of the PoA-DD.
In case the project activity involves the replacement of equipment, and the leakage from the use of the replaced equipment in another activity is neglected, because the replaced equipment is scrapped, an independent monitoring of scrapping of replaced equipment needs to be implemented. The monitoring should include a check if the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other. For this purpose scrapped equipment should be stored until such correspondence has been checked. The scrapping of replaced equipment should be documented and independently verified.	Not applicable as per eligibility criteria no. 10 in section A.4.2.2 of the PoA-DD.

[9] Physically distinct units are those that are capable of generating electricity without the operation of existing units, and that do not directly affect the mechanical, thermal, or electrical characteristics of the existing facility. For example, the addition of a steam turbine to an existing combustion turbine to create a combined cycle unit would not be considered "physically distinct".

E.3. Description of the sources and gases included in the SSC-CPA boundary

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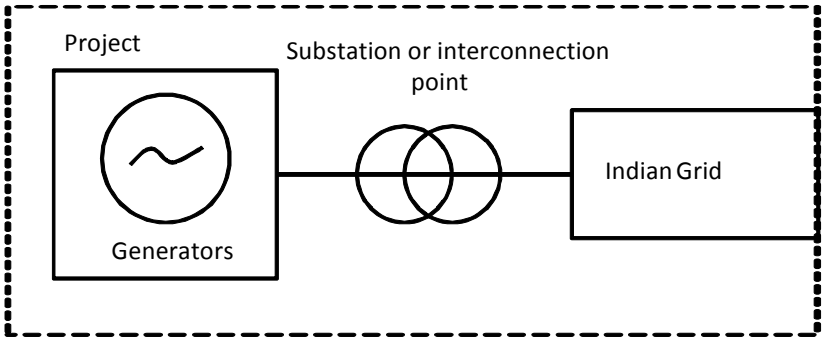
As per AMS I.D. v17, "The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to". The project boundary encompasses the power project site from the source intake to the substation or interconnection point where the electricity is delivered to the grid and also the power plants connected to the Grid.



The greenhouse gases and emission sources included in or excluded from the project boundary are shown in the table below.

Table 1: Emissions sources included in or excluded from the project boundary

Source		Gas	Included?	Justification / Explanation
Baseline	CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
Project Activity	CO_2 emissions from combustion of fossil fuels for electricity generation in solar thermal power plants	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
	For hydro power plants, emissions of CH_4 from the reservoir	CO_2	No	Minor emission source
		CH_4	No	Power density would be more than 10 W/m2
		N_2O	No	Minor emission source

E.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

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The baseline scenario is the generation of electricity in one of the Indian grids by its existing power plants, the baseline scenario is therefore in line with all laws and regulations of India.

As per AMS I.D. 17 paragraph 10 and because the project activity is the installation of a new grid-

connected renewable power plant/unit, the baseline scenario is the electricity delivered to the grid by the project activity that otherwise would have been generated by the operation of grid-connected power plants and by the addition of new generation sources.

The identified baseline scenario is as per the legal requirements/laws and the installation of project activity is not mandatory by any laws or requirements.

The baseline emissions are the product of electrical energy baseline $EG_{BL,y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by an emission factor of the Grid where electricity is displaced.

$$BE_y = EG_{BL,y} \bullet EF_{CO2} \quad (1)$$

Where:

$BE_{,y}$	Baseline Emissions in year *y*; t CO_2
$EG_{BL,y}$	Energy baseline in year *y*; MWh
EF_{CO2}	CO_2 Emission Factor in year y; t CO_2e/MWh

E.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the SSC-CPA being included as registered PoA (assessment and demonstration of additionality of SSC-CPA): >>

E.5.1. Assessment and demonstration of additionality for a typical SSC-CPA:

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As explained in section A.4.3, the main barrier to the development of small Renewable Energy power projects in India is the financial barrier. Each SSC-CPA is intrinsically different due to different financial parameters. The testing of these barriers would require specific assessments of the financial barrier for every SSC-CPA. In order to make the assessment of additionality as objective as possible, the PPs opt to test only for a subset of the barriers:

Test a: As per "Guidelines for Demonstrating Additionality of Microscale Project Activities" version 3: SSC-CPA will be considered additional if its installed capacity is below the 5 MW threshold and if it is undertaken in an underdeveloped zone of India or SSC-CPA employs specific renewable energy technologies/measures recommended by the host country DNA and approved by the Board to be additional in the host country.

Test b: The CME, will test the financial additionality of the SSC-CPA through an investment analysis or will apply the positive list as per para 2 of Attachment A to Appendix B version 8 (EB 63, Annex 24), if applicable.

To be additional, each SSC-CPA will have to pass **one of these two tests**. The procedure for conducting the tests at SSC-CPA level is described in detail in section E.5.2.

E.5.2. Key criteria and data for assessing additionality of a SSC-CPA:

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Applicable national and/or sectoral policies and acts, which are relevant to the PoA

The PoA comprises Grid Connected Renewable Energy Power Projects (limited to Wind, Solar & Hydro). Below is a snapshot of policies applicable for grid connected renewable power generation:

POLICY SUPPORT FOR GRID INTERACTIVE RENEWABLE POWER[10]

Electricity Act 2003

Under the electricity act, to promote cogeneration and generation of electricity from renewable sources of Energy State would provide suitable measures for connectivity with the grid and sale of electricity to any person, and also specify, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee.

National Electricity Policy 2005

The National Electricity Policy 2005 stipulates that progressively the share of electricity from non-conventional sources would need to be increased; such purchase by distribution companies shall be through competitive bidding process; considering the fact that it will take some time before non-conventional technologies compete, in terms of cost, with conventional sources, the commission may determine an appropriate deferential in prices to promote these technologies.

Tariff Policy 2006

The Tariff Policy announced in January 2006 has the following provisions:

- Commission shall fix a minimum percentage for purchase of energy from renewable sources taking into account availability of such resources in the region and its impact on retail tariffs. Such percentages for purchase of energy should be made applicable for the tariffs to be determined by the SERCs
- It will take some time before non-conventional technologies can compete with conventional sources in terms of cost of electricity. Therefore, procurement by distribution companies shall be done at preferential tariffs determined by the Appropriate Commission.
- Such procurement by Distribution Licensees for future requirements shall be done, as far as possible, through competitive bidding process within suppliers offering energy from same type of non-conventional sources. In the long-term, these technologies would need to compete with other sources in terms of full costs.
- The Central Commission should lay down guidelines for pricing non-firm power, especially from non-conventional sources, to be followed in cases where such procurement is not through competitive bidding.

Although there are several policies and acts to support the development of Renewable Energy at the national level, but still Renewable Energy consists of less than 10% of total power production. Primary barrier being the investment barrier resulting into lower than expected returns mainly because of high initial costs and low production as compared to conventional sources of energy.

As per paragraph 73 of the 47th EB meeting report "additionality is to be demonstrated either at the PoA level or at CPA level" and as prescribed in the Simplified modalities and procedures of small scale project

[10] http://www.mnre.gov.in/policy/policy-support-grid.htm

activities, additionality shall be demonstrated as per Attachment A to Appendix B (EB 63, Annex 24) or as per "Guidelines for Demonstrating Additionality of Microscale Project Activities" version 3, EB 63, Annex 23. Hence, the PPs choose to demonstrate the additionality at CPA level by showing that the SSC-CPAs cannot be implemented in the absence of this PoA. CME has also decided to incorporate "Guidelines for Demonstrating Additionality of Microscale Project Activities". Thus additionality would be proven at the CPA level based on one of the following two tests.

Test a: Is the installed capacity of the CPA below or equal to 5 MW, and is the SSC-CPA located in an underdeveloped area of India?

This additionality test is based on annex 23 of EB 63[11] according to which renewable energy projects are deemed additional if they have no more than 5 MW installed capacity and are located in a special underdeveloped zone of the host country. This EB guidance recognizes the specific barriers faced by very small projects and undertaken in underdeveloped areas - in line with the barriers described in section A.4.3.

For this test, the size of the renewable project is chosen as per the generator rated capacity(for wind/hydro) or the rated capacity of the PV plant as per the supplier. The definition of the special underdeveloped zone would be as per the list under the Ministry of Rural Development. The list identified by the Government before 28 May 2010 as per paragraph 2-a of EB 63 annex 23 will remain unchanged during the lifetime of the SSC-PoA. The location of the SSC-CPA will be determined as the location of the wind turbines/ hydro powerhouse/solar transformers.

Test	Yes	No
SSC-CPA capacity is below or equal to 5 MW		
SSC-CPA is undertaken in a special underdeveloped zone as defined by Ministry of Rural Development.		

Still as per paragraph 2-d of EB 63 annex 23, if at the date of SSC-CPA inclusion, applied technology of the SSC-CPA is recommended by the Host country DNA and approved by the board, test a will be simplified as follows:

Test	Yes	No
SSC-CPA capacity is below or equal to 5 MW		
Indian DNA has recommended applied small Renewable Energy technology/measure, which further has been approved by the Executive Board of the CDM to be additional.		

Test b: Additionality as per Attachment A to Appendix B version 8 (EB63, Annex 24):

This test is further broken down into two parts:

Test b.1: In case CPA to be included is a solar power project up to 15 MW capacity, then as per para 2 of Attachment A to Appendix B version 8 (EB63, Annex 24), such a CPA would be automatically defined as additional. Hence there is no requirement of any further additionality test in case of a CPA comprising Solar Power Generation or Off-shore Wind Power Generation.

[11] Guidelines for Demonstrating Additionality of Microscale Project Activities" version 3

Test B.2: In case CPA comprises of on-shore Wind & Hydro power generation para 1(a) of Attachment A to Appendix B version 8 (EB63, Annex 24) would be applied, by proving additionality over via investment barriers according to the details mentioned below[12].

Investment analysis

For qualifying SSC-CPAs that do not meet Test a described above, an investment analysis will be performed pursuant to Step 3 of the additionality tool (version 5.2). As each Renewable Energy project generates financial benefits other than CDM-related income, the benchmark analysis will be used to demonstrate additionality.

Since only newly built grid-connected Renewable Energy plants are eligible for participation in the proposed SSC-PoA, "non-action from the project proponent(s)" is a credible and realistic alternative to the project scenario. The financial viability of the development and operation of each SSC-CPA will be compared with a scenario where the SSC-CPA owner does not undertake the project ("non-action") and deploys the financial resources that would have been used to finance the construction of the project for alternative investments. To this end the project IRR (without CDM revenues) will be compared with a benchmark rate for investment returns available to a local investor in India. This benchmark represents the minimum project IRR that is required for the project to be financially viable relative to the "non-action" scenario.

For this SSC-PoA, the financial analysis involving the calculation of the project internal rate of return (project IRR) has been selected to demonstrate the additionality of each SSC-CPA. Pursuant to the Guidelines on the Assessment of Investment Analysis (version 3, Para 11), the investment analysis uses project IRR and its corresponding benchmark, pre- or post-tax.

Benchmark calculation
Renewable Energy projects in India are typically financed using a combination of loan and equity financing, so the appropriate benchmark rate of return is determined as the Weighted Average Cost of Capital (WACC)[13]. All benchmarks shall be determined as per investment decision date of the SSC-CPA.

The WACC is defined as the average return expected across the different types of capital that finance a given project. For the purpose of this PoA the WACC will be determined for each SSC-CPA by using the following rules:

- All financial information used for the benchmark determination will be sourced from independently verifiable sources

- The cost of equity will be determined using the capital asset pricing model (CAPM).

The WACC will be calculated as follows:[14]

[12] As per EB 35 Annex 34, best practice to prove investment barriers is to conduct a benchmark analysis where the project specific economic performance is compared with a suitable benchmark.

[13] As per paragraph 11 of the Guidance on the Assessment of Investment Analysis (Version 05, EB 62).

$$WACC = CD \times \%Debt + CE \times \%Equity$$

Depending on whether the comparison is to be done on a Post Tax or Pre Tax basis, the WACC will be determined as follows:

$$WACC(post-tax) = CD \times (1-T) \times \%Debt + CE \times \%Equity$$

The cost of equity will be determined based on the capital asset pricing model[15] (CAPM) :

$$CE = RFR + \beta \cdot (RP) + SP$$

Where:

$$\beta = \beta unlevered \times (1 + (1-T) \times D/E)$$

The WACC (pre-tax) will be determined by:

$$WACC(pre-tax) = WACC(post-tax)/(1-T)$$

Where:

Table 2: Parameters for calculation of benchmark

Parameters	Description	Possible sources and explanation
RFR	Risk Free Rate in a mature equity market	U.S long-term government bond is considered as risk free instrument. Bond rate is taken as the 6 month average prior to the investment decision and for a duration equal to the technical lifetime of the project activity Source: http://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yieldYear&year=2010
ß *unlevered*	Beta (unlevered)	Total Beta (*Unlevered*) from Damadoran (Stern University) for the relevant industrial sector; most recent before the investment decision was made. It reflects a firm's total exposure to risk rather than just the market risk component. It is a function of the market beta and the portion of the total risk that is market risk. These betas might provide better estimates of costs of equity for undiversified owners of

[14] Velez-Pareja, Ignacio and Tham, Joseph, "A Note on the Weighted Average Cost of Capital WACC" (August 7, 2005). Available at SSRN: http://ssrn.com/abstract=254587. Tax is excluded from the standard WACC formula to establish a pre-tax benchmark.

[15] Black, Fischer., Michael C. Jensen, and Myron Scholes (1972). The Capital Asset Pricing Model: Some Empirical Tests, pp. 79-121 in M. Jensen ed., Studies in the Theory of Capital Markets. New York: Praeger Publishers.

		businesses. http://pages.stern.nyu.edu/~adamodar/ "Total Beta by industry sector"
RP	Total Risk Premium	The Total Risk Premium includes an Equity Risk Premium and a Country Risk Premium. The reason behind this premium stems from the risk-return trade off, in which a higher rate of return is required to entice investors to take on riskier investments. http://pages.stern.nyu.edu/~adamodar/ "Risk Premium for other Markets"
SP	Size Premium.	Size premium is an investor's risk incurred when investing in a small project. Betas are generally calculated based on data for large corporations. However companies of different sizes face different levels of risk. The smaller the company the fewer the sources of capital and investors require additional returns to compensate for the lower marketability of shares. According to Ibbotson Associates' statistics for 2009 [16]for the New York Stock exchange reveals that risk premium increases as the size of a company reduces: The equity risk premium of the largest 10% of companies is -0.36% (i.e. the firms in the largest 10% have an equity risk premium that is 0.36% below average). The smallest 10% of companies (up to 128 ,million USD) have an equity risk premium of 5.81%. The usual way of accounting for this risk premium is to add this to the Cost of Equity (CE), as given in the equation for CE above. The Size risk premium can be sourced from the "*Ibbotson SBBI valuation yearbook"* published by Morningstar Inc.
CD	Cost of Debt	The cost of debt can be assumed as the commercial lending rate in the host country or the yield of a 10 year bond issued by the government of the host country or, if this is not available, the bond with the maturity which is closest to 10 years. - EB62 Annex 5, Para 16.) if a company's internal benchmark is used. If the WACC is based on parameters that are standard in the market, the cost of debt can be taken as the cost of financing in the capital markets, eg the host country commercial lending rate in the host country as per EB61 Annex 13, Para 16)
%Debt	% of finance from debt	As per EB 61, Annex 13, Para 17, 18

[16] Ibbotson SBBI 2009 Valuation Yearbook, Chapter 7, page 96

%Equity	% of finance from equity	As per EB 61, Annex 13, Para 17, 18
CE	Cost of Equity, ie Average expected return on equity	Calculated as per CAPM
T	Tax rate	

If over the course of the lifetime of the PoA, a parameter or the source of its value becomes unavailable or is replaced by a more relevant parameter and/or source, then this parameter and/or sources will be revised accordingly prior to acceptance from the DOE.

The determination of a WACC is time consuming and costly especially for small projects with an already low IRR. For simplification, a CPA implementer might opt to stop the WACC calculation after the determination of cost of debt (commercial lending rate) if already higher then the project IRR. Cost of debt can then be applied as alternative benchmark.

A WACC is per definition a more accurate benchmark then the commercial lending rate as typically investments are done with a debt and equity fraction. Due to the associated risk of an equity investment, return expectations are higher then for a loan. As a consequence, cost of equity will always be higher then cost of debt and cost of debt will always be lower then the WACC. Hence, if the commercial lending rate as a benchmark already proves additionality, the WACC will as well

Sensitivity analysis
As specified in the excel spreadsheet to be supplied to the DOE upon submission of a CPA DD, a sensitivity analysis will be conducted on variables that constitute more than 20% of either the total project costs or the total project revenues, and shall include the following variables: (1) total investment; (2) O&M, (3) Revenues (Electricity Production and power tariff)). As per Guidance 21 of the Guidelines on the assessment of investment analysis Version 04[17], as general point of departure variations in the sensitivity analysis should at least cover a range of +10% and -10%, unless it is deemed inappropriate in the context of the specific SSC-CPA's circumstances.

The full results of each sensitivity analysis will be reported in the respective SSC CPA-DD using the following format:

Table 3: Framework for reporting results of sensitivity analysis

	IRR
Investment -10%	
O&M -10%	
Revenues +10%	

If the IRR in the sensitivity analysis exceeds the benchmark while altering one the three parameters, the CPA implementers shall provide evidence that this scenario is unlikely to occur. If no sufficient proof is provided, the CPA will be considered non-additional. Otherwise the CPA shall be deemed additional.

[17] EB 61 Annex 13 "Guidelines on the assessment of investment analysis"

Project IRR calculation
Project IRR calculations will be based on a list of financial parameters provided by the CPA owner that were available at the time of making the investment decision. This list of parameters includes:

Table 4: Parameters for calculation of project IRR

	Unit	Comment
Technical lifetime	Year	As per manufacturer specification or as per expert's opinion.
Investment decision date	DD/MM/YYYY	
Construction start date	Year	
Date project starts operating	Year	
Annual electricity generation	MWh/year	As per Guidelines for the reporting and validation of plant load factors (version 01, EB 48, paragraph 3b), the plant load factor can be chosen as the value provided "to banks and/or equity financiers while applying the project activity for project financing" or as per independent expert opinion. Value is given at delivery or interconnected point as per PPA.
FINANCIAL PARAMETERS		
	Unit	**Comment**
Electricity tariff	Local currency unit/MWh	As per legislation at date of investment or as per PPA if signed at date of investment. The tariff will be indexed to inflation only if specified in the PPA or relevant policy.
Increase in electricity tariff	% per year	
Inflation	% per year	If not otherwise specified as per inflation rate during the last 5-10 years average from the date when investment decision was made
Exchange Rate	USD/Local currency unit	If some costs/revenues are provided in foreign currency the exchange rate as per date of investment decision shall be used to convert them into USD.
COSTS AND EQUIPMENT		
	Unit	**Comment**
Total investments	Local currency unit or USD	If the construction is expected to last several years, a yearly breakdown of investments can be provided. (Values to be taken as per the DPR)
(Other revenues)	Local currency unit or USD	
Operation & Maintenance cost	Local currency unit/year	If not specified otherwise, O&M would be as per the details mentioned in the DPR or as mentioned in the tariff policies if applicable.
(Other operating expenditure)	Local currency unit/year	
Insurance	% of Capex p.a.	

The parameters listed in Table 4 shall be obtained from documents provided by the SSC-CPA owner to financers or government agencies. Dates at which these documents were compiled will also be reported in the SSC-CPA-DD. If there is a substantial gap (> 1 year) between the date of the investment decision and the date at which the corresponding document was compiled, the respective item will be inflated accordingly using the Indian Inflation Index.

E.6. Estimation of Emission reductions of a CPA:

E.6.1. Explanation of methodological choices, provided in the approved baseline and monitoring methodology applied, selected for a typical SSC-CPA:

>>

The CPA would constitute of new grid connected Renewable Energy based power generation units.

Baseline:
The baseline emissions are the product of electrical energy baseline expressed in MWh of electricity produced by the Power generating unit multiplied by the grid emission factor. Details about calculation of grid emission factor are provided in this section below.

Project emissions:
The Renewable electricity generation units under this PoA may consume electricity from the grid in the form of imports or on-site DG sets. The amount of electricity and/or diesel consumption by each of the CPA will be recorded for estimation of project emissions as per AMS I.D v17. In the case of hydro power plants with power density of 4-10 W/m^2, project emissions from the reservoir are considered following ACM0002 v12.1.0.

Leakage
Since the PoA would involve in establishment of new Renewable Energy based power plant, leakage is considered as zero

As per paragraph 12 of AMS I.D. v17 the emission factor can be calculated as follows:

(a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the 'Tool to calculate the Emission Factor for an electricity system.

OR

(b) The weighted average emissions (in kg CO_2e/kWh) of the current generation mix. The data of the year in which project generation occurs must be used. Calculations must be based on data from an official source (where available) and made publicly available.

For all SSC-CPAs under this SSC-PoA option (a) will be used for calculating the baseline.

EF_{CO2} will be calculated as the Combined Margin (CM) emission factor determined using the *'Tool to calculate the Emission Factor for an electricity system'* version 02.2 as following:

STEP 1. Identify the relevant electricity systems.
STEP 2. Choose whether to include off-grid power plants in the project electricity system (optional).
STEP 3. Select a method to determine the operating margin (OM).
STEP 4. Calculate the operating margin emission factor according to the selected method.
STEP 5. Identify the group of power units to be included in the build margin (BM).
STEP 6. Calculate the build margin emission factor.
STEP 7. Calculate the combined margin (CM) emissions factor.

Step 1. Identify the relevant electricity systems

According to the "Tool to calculate the emission factor for an electricity system" (version 02.2), a project electricity system has to be defined by the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity and that can be dispatched without significant transmission constraints. Correspondingly, in this project activity the project electricity system include the project site and all power plants attached to grid as defined by Central Electricity Authority (CEA).

Step 2. Choose whether to include off-grid power plants in the project electricity system (optional)

According to the latest version of the tool, project participants may choose between the following two options to calculate the operating margin and build margin emission factor:

Option I: Only grid power plants are included in the calculation
Option II: Both grid power plants and off-grid power plants are included in the calculation

For the proposed SSC-PoA, project participants choose to apply Option I, which only power plants connected to the grids as defined by CEA.

Step 3. Select a method to determine the operating margin (OM)

The calculation of the operating margin emission factor ($EF_{grid,OM,y}$= EF_{CO2}) is based on one of the following methods:

(a) Simple OM, or
(b) Simple adjusted OM, or
(c) Dispatch data analysis OM, or
(d) Average OM.

Selection how to calculate the operating margin of each grid defined by CEA as applied in the ex-ante calculation will be based on DNA published value or CEA statistic and other made publicly available documentation.

Step 4. Calculate the operating margin emission factor according to the selected method

The simple OM emission factor is calculated as the generation-weighted average CO2 emissions per unit net electricity generation (tCO2/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units

The simple OM may be calculated:

Option A: Based on the net electricity generation and a CO2 emission factor of each power unit; or
Option B: Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

Option B can only be used if:
a) The necessary data for Option A is not available; and
b) Only nuclear and renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known; and
c) Off-grid power plants are not included in the calculation (i.e., if Option I has been chosen in Step 2).

For programme of activity, Option B has been used.
In the Simple OM method, the emission factor is calculated as generation weighted average emissions per electricity unit (tCO2/MWh) of all generating sources serving the system, not including low-operating cost and must-run power plants. The data vintage option selected is the ex-ante approach, where a 3 year average OM is calculated. The CEA baseline is derived using the following formulae to calculate simple OM.

$$EF_{grid,OMsimple,y} = \frac{\sum_{i} \left(FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y} \right)}{EG_{y}}$$

$EF_{grid,OM\ simple,\ y}$	Simple operating margin CO2 emission factor in year (tCO2/MWh)
$FC_{i,y}$	Amount of fossil fuel type i consumed by power plant/unit m year y (mass or unit volume unit)
$NCV_{i,y}$	Net calorific value (energy content) of fossil fuel type i in year y (GJ/mass or volume unit)
$EF_{co2,i,y}$	CO2 emission factor of fossil fuel type i in the year y (tCO2/GJ)
EG_{y}	Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost/must-run power plants/units, in year y (MWh)
i	All fossil fuel types combusted in power plant/ unit m in year y
y	The relevant year as per the data vintage chosen in Step 3

The operating margin emission factor has been calculated using a 3 year data vintage from CEA database[53]

Simple Operating Margin (tCO_2/MWh) (incl. Imports				**Average (tCO_2/MWh)**
	2007-08	2008-09	2009-10	
NEWNE	1.00	1.01	0.98	0.99
Southern	0.99	0.97	0.94	0.97
India	1.00	1.01	0.98	1.00

Step 5. Identify the group of power units to be included in the build margin (BM)

The sample group of power units m used to calculate the build margin consists of either:
(a) The set of five power units that have been built most recently; or
(b) The set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

Sample group of power units m used to calculate the ex-ante build margin of each grid defined by CEA.

Step 6. Calculate the build margin emission factor

The build margin emissions factor is the ex-ante generation-weighted average emission factor (tCO_2/MWh) of all power units m during the most recent year y for which power generation data is available based on DNA published value.

Build Margin (tCO_2/MWh)	2009-10
NEWNE	0.81
Southern	0.76
India	0.80

Step 7. Calculate the combined margin (CM) emission factor

The combined margin emissions factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM} \quad \textbf{(2)}$$

Where:

$EF_{grid,BM,y}$ Build margin CO_2 emission factor in year y (tCO_2/MWh)

$EF_{grid,OM,y}$ Operating margin CO_2 emission factor in year y (tCO_2/MWh)

w_{OM} Weighting of operating margin emissions factor (%)

w_{BM} Weighting of build margin emissions factor (%)

As per the "Tool to calculate emission factor for an electricity system, version 02.2", for wind and solar projects, the default weights are as follows: $w_{OM} = 0.75$ and $w_{BM} = 0.25$ (owing to their intermittent and non-dispatchable nature)

For Hydro projects the default weights are as follows: $w_{OM} = 0.5$ and $w_{BM} = 0.5$

Table 5: Operating, build and combined margins CO_2 emission factor of the grids that will be fixed for the first crediting period.

Grid	**Simple Operating Margin**	**Build Margin (tCO_2/MWh)**	**Combined Margin**	**Combined Margin (tCO_2/MWh) for**

	(tCO_2/MWh)		(tCO_2/MWh) for Solar & Wind	Hydro
NEWNE	0.99	0.81	0.94	0.9
Southern	0.97	0.76	0.92	0.86
India	1.00	0.80	0.95	0.9

E.6.2. Equations, including fixed parametric values, to be used for calculation of emission reductions of a SSC-CPA:

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Emission Reductions for a CPA shall be calculated according to the following formula:

$$ER_y = BE_y - PE_y - LE_y \quad \textbf{(3)}$$

Where:

ER_y Emission reductions in year y (t CO_2e/y)

BE_y Baseline Emissions in year y (t CO_2e/y)

PE_y Project emissions in year y (t CO_2e/y)

LE_y Leakage emissions in year y (t CO_2e/y)

Project Emissions

Project Emissions will be calculated as follows:

$$PE_y = PE_{FC,i,y} + PE_{HP,y} \quad (4)$$

PE_y Project emissions in year y (t CO_2e/y)

$PE_{FC,I,y}$ Project emissions from fossil fuel consumption in process j during year y (t CO_2/y)

$PE_{HP,y}$ Project emissions from water reservoir (t CO_2/y)

Emissions from fossil fuel consumption ($PE_{FC,i,y}$)

$PE_{FC,I,Y}$, as described in section A.4.4.2, shall only be accounted for hydro project, which have a diesel generator as a back-up, or solar thermal power plants with a fossil fuel component, according to the following formula:

$$PE_{FC,i,y} = \sum_i FC_{i,j,y} \times COEF_{i,y} \quad (5)$$

Where:

$PE_{FC,j,y}$ Project emissions from fossil fuel consumption in process j during year y (t CO_2/y)

$FC_{i,j,y}$	Is the quantity of fuel type I combusted in process j during the year y; tonne/yr
$COEF_{i,y}$	Is the CO2 emission coefficient of fuel type I in year y; tCO2/tonne
I	Are the fuel types combusted in process i during the year y

For CPAs that do not have any fossil fuel use, $PE_{FC,j,y}$ are 0.

Emissions from water reservoirs of hydro power plants ($PE_{HP,y}$)

The PoA only comprises of hydro power projects for which Power Density is greater than 10 W/m^2

Hence, there would be no project emissions in this case.

Such criteria shall be checked as per formulas provided in methodology ACM0002, version 12.3.0:

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}} \quad \textbf{(6)}$$

Where:

PD	=	Power density of the project activity (W/m^2)
Cap_{PJ}	=	Installed capacity of the hydro power plant after the implementation of the project activity (W)
Cap_{BL}	=	Installed capacity of the hydro power plant before the implementation of the project activity (W). For new hydro power plants and hence all CPAs, this value is zero
A_{PJ}	=	Area of the single or multiple reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m^2)
A_{BL}	=	Area of the single or multiple reservoirs measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2). For new reservoirs and hence all CPAs, this value is zero

Leakage

For all CPAs LE_y are 0.

Baseline Emissions

Baseline Emissions will be calculated as:

$$BE_y = EG_{BL,y} * EF_{CO_2} \quad \textbf{(7)}$$

Where:

BE_y Baseline Emissions in year y; t CO_2

$EG_{BL,y}$ Energy baseline in year y; MWh

EF_{CO2} CO_2 Emission Factor in year y; t CO_2e/MWh

As elaborated in section above, the combined margin is calculated and used as CO_2 emission factor. Hence:

$EF_{CO2} = EF_{CM,y}$

Depending on the type of project and name of grid the CPA is connected to, different CO_2 Emission Factors shall be chosen as per Table 5.

All emission factors will be fixed for one crediting period of the PoA-DD and will be revised as per available published values from the CEA/Indian DNA in the next crediting periods.

In case new grids will be developed in India, grid emission factor shall be calculated on CPA level as long the grid emission factor is not yet fixed in the PoA-DD.

E.6.3. Data and parameters that are to be reported in CDM-SSC-CPA-DD form:

Data / Parameter:	P_y
Data unit:	MW
Description:	Installed Power Generation Capacity based on the nameplate capacity at the generator for Hydro & Wind projects and based on supplier data for solar projects
Source of data to be used:	Detailed Project Report/Purchase contracts if available
Value applied	
Justification of the choice of data or description of measurement methods and procedures actually applied :	The values reflect the expected capacity to be installed at the power plant according to the plant design parameters.
Any comment:	The final capacity that will be installed at the plant might differ from the value declared in the CPA-DD since the technical parameters planned initially at the time of preparation of the SSC-CPA DD might undergo alterations during project implementation

If CPA complies a hydro power plant and consists of a reservoir

Data / Parameter:	Cap_{PJ}
Data unit:	MW
Description:	Installed capacity of the hydro power plant
Source of data to be	Feasibility Study report /Purchase orders/ EPC contracts if available

used:	
Value applied	
Justification of the choice of data or description of measurement methods and procedures actually applied :	The values reflect the expected capacity to be installed at the power plant according to the plant design parameters.
Any comment:	The final capacity that will be installed at the plant might differ from the value declared in the CPA-DD since the technical parameters planned initially at the time of preparation of the CPA-DD might undergo alterations during project implementation. This parameter shall be rechecked during the first verification of the CPA to revalidate eligibility criteria no. 12 in case generator purchase order has not yet been signed at the time of CPA inclusion

Data / Parameter:	A_{PJ}
Data unit:	m^2
Description:	Area of the reservoir from the hydro power plants, measured in the surface of the water
Source of data to be used:	Project Site (measured from topographical surveys, maps, satellite pictures, etc.)
Value applied	To be specified in each hydro CPA with a reservoir at time of inclusion date
Justification of the choice of data or description of measurement methods and procedures actually applied :	The design of the hydro power plant, including its dam, clearly defines the expected water surface area
Any comment:	The final capacity that will be installed at the plant might differ from the value declared in the CPA-DD since the technical parameters planned initially at the time of preparation of the CPA-DD might undergo alterations during project implementation. This parameter shall be rechecked during the first verification of the CPA to revalidate eligibility criteria no. 12 in case generator purchase order has not yet been signed at the time of CPA inclusion.

If CPA uses a fossil fuels

Data / Parameter:	$COEF_{i,y}$
Data unit:	$t.CO_2/t.fuel$
Description:	CO_2 emission factor from fuel type I
Source of data used:	IPCC 2006 value.
Value applied:	Diesel: 3.185 Residual Fuel Oil (RFO): 3.1107 Coal: 2.6488 LPG: 2.9853
Justification of the choice of data or description of measurement methods	Calculated by multiplying the following two values: i) Emission factor for Gas/Diesel oil: 74.10 tCO2/TJ; for RFO: 77.4 tCO2/TJ; for coking coal: 94.6 tCO2/TJ; for LPG: 63.1 tCO2/TJ and other fuels (Source: IPCC 2006, vol2, 2006 - Table 2.2 page 2.16cited at: http://www.ipcc-

and procedures actually applied:	nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf) ii) NCV for Gas/Diesel oil: 43.33 TJ/10^3 tonnes; for RFO: 40.19 tCO2/TJ; for coking coal: 28.00 tCO2/TJ; for LPG: 47.31 tCO2/TJ and other fuels (Source: Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Workbook cited at http://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch1wb1.pdf)
Any comment:	-

NEWNE Grid calculation

Data/Parameter:	$EF_{OM,y}$
Data unit:	tCO_2/MWh
Description:	$EF_{OM,y}$ is the average operating margin CO_2 emission factor of power plant connected to the NENWE electricity grid in 3 recent years available data, calculated using simple OM method for each year in which the project generation occurs. During the crediting period, this factor is calculated based on ex-ante emissions by using year 2008, 2009 and 2010 data.
Source of data to be used:	CEA database
Value applied	$EF_{OM,y} = 0.99\ tCO_2/MWh$
Justification of the choice of data or description of measurement methods and procedures actually applied :	No measurement required. Data is obtained based on CEA published information.
Any comment:	The value of $EF_{OM,y}$ is fixed for the first crediting period and would revised during the next crediting period based on the data published by CEA/Indian DNA

Data/Parameter:	$EF_{BM,y}$
Data unit:	tCO_2/MWh
Description:	$EF_{BM,y}$ is the build margin CO_2 emission factor of power plants in the sample group 'm' connected to the NEWNE in year 'y'. During the crediting period, this factor is calculated based on ex-ante emissions by using year 2010 data.
Source of data to be used:	CEA database
Value applied	$EF_{BM,y} = 0.81\ tCO_2/MWh$
Justification of the choice of data or description of measurement methods and procedures actually applied :	No measurement required. Data is obtained based on analysis of CEA published information.
Any comment:	The value of $EF_{BM,y}$ is fixed for the first crediting period and would revised during the next crediting period based on the data published by CEA/Indian DNA .

Data/Parameter:	$EF_{CM,y}$
Data unit:	tCO_2/MWh
Description:	$EF_{CM,y}$ is the combined margin CO_2 emission factor of power plants connected to the NEWNE electricity grid in year 'y', calculated ex-ante based on the weighted average of $EF_{OM,y}$ and $EF_{BM,y}$
Source of data to be used:	CEA database
Value applied	$EF_{CM,y}$ = 0.94 tCO2/MWh for solar & wind projects $EF_{CM,y}$ = 0.9 tCO2/MWh for hydro projects
Justification of the choice of data or description of measurement methods and procedures actually applied :	No measurement required. Data is obtained based on analysis of CEA published information.
Any comment:	The value of $EF_{CM,y}$ is fixed for the first crediting period and would revised during the next crediting period based on the data published by CEA/Indian DNA

Southern Grid calculation:

Data/Parameter:	$EF_{OM,y}$
Data unit:	tCO_2/MWh
Description:	$EF_{OM,y}$ is the average operating margin CO_2 emission factor of power plant connected to the Southern electricity grid in 3 recent years available data, calculated using simple OM method for each year in which the project generation occurs. During the crediting period, this factor is calculated based on ex-ante emissions by using year 2008, 2009 and 2010 data.
Source of data to be used:	CEA Database
Value applied	$EF_{OM,y}$ = 0.97 tCO_2/MWh
Justification of the choice of data or description of measurement methods and procedures actually applied :	No measurement required. Data is obtained based on analysis of CEA published information.
Any comment:	The value of $EF_{OM,y}$ is fixed for the first crediting period and would revised during the next crediting period based on the data published by CEA/Indian DNA

Data/Parameter:	$EF_{BM,y}$
Data unit:	tCO_2/MWh
Description:	$EF_{BM,y}$ is the build margin CO_2 emission factor of power plants in the sample group 'm' connected to the Southern electricity grid in year 'y'. During the

	crediting period, this factor is calculated based on ex-ante emissions by using year 2010 data.
Source of data to be used:	CEA Database
Value applied	$EF_{BM,y}$ = 0.76 tCO_2/MWh
Justification of the choice of data or description of measurement methods and procedures actually applied :	No measurement required. Data is obtained based on analysis of CEA published information.
Any comment:	The value of $EF_{BM,y}$ is fixed for the first crediting period and would revised during the next crediting period based on the data published by CEA/Indian DNA

Data/Parameter:	$EF_{CM,y}$
Data unit:	tCO_2/MWh
Description:	$EF_{CM,y}$ is the combined margin CO_2 emission factor of power plants connected to the Southern electricity grid in year 'y', calculated ex-ante based on the weighted average of $EF_{OM,y}$ and $EF_{BM,y}$
Source of data to be used:	CEA database
Value applied	$EF_{CM,y}$ = 0.92 tCO2/MWh for solar & wind projects $EF_{CM,y}$ = 0.86 tCO2/MWh for hydro projects
Justification of the choice of data or description of measurement methods and procedures actually applied :	No measurement required. Data is obtained based on analysis of CEA published information.
Any comment:	The value of $EF_{CM,y}$ is fixed for the first crediting period and would revised during the next crediting period based on the data published by CEA/Indian DNA

E.7. Application of the monitoring methodology and description of the monitoring plan:

E.7.1. Data and parameters to be monitored by each SSC-CPA:

Based on AMS I.D. v17, the following data and parameter will be monitored during the project crediting period:

Data / Parameter:	$EG_{BL,y}$
Data unit:	MWh
Description:	Electricity energy baseline in year *y*; (= Quantity of net electricity generation supplied by the project plant/unit to the grid in year y)

Source of data to be used:	Measured by electricity meter(s)
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be specified in each SSC-CPA
Description of measurement methods and procedures to be applied:	The electricity production will be measured continuously by a bi-directional energy meter with high accuracy as per government regulation at the interconnection point or sub-station as per agreed PPA. The net electricity production will be calculated by subtracting the electricity exported with the electricity imported by the SSC-CPA. Electricity production would be measured continuously and recorded at least monthly including the calculation of net electricity exported. The meter installed would be of accuracy 0.5 class at least. Depending on the project type metering procedures might differ and is described in detail in point number 5 of E.7.2. E.g. for wind power CPAs the metering procedure would be different due to presence of wind turbines of different project proponents at the same wind farm. Hence metering procedures would be specifically defined for each wind CPA separately in the respective CPA DD at the time of their inclusion in to the PoA.
QA/QC procedures to be applied:	Measuring equipment should be certified to national or IEC standards and calibrated according to the national standards and reference points or IEC standards and recalibrated at appropriate intervals according to manufacturer specifications, but at least once in three years. All the electricity meters installed at individual CPAs would be calibrated at least once in three years or as per the frequency stated in the PPA (whichever is lower). The meters would be calibrated according to the National or IEC standards. Net Electricity exported will also be crosschecked with the help of invoices available for power exported.
Any comment:	Electricity meters installed would be at least of accuracy 0.5 class.

Data / Parameter:	$FC_{i,j,y}$
Data unit:	Litre
Description:	Fuel consumption of fuel type i
Source of data to be used:	Fuel invoices
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be specified in each SSC-CPA
Description of measurement methods	Fuel consumption will be monitored through the collection of invoices or by monitoring the number of operation hours of the engine. In the latter case, the

and procedures to be applied:	volume of fuel consumed will be calculated by multiplying the number operation hours by the specific consumption of the engine. Monthly records of fossil fuel purchase invoices would be maintained. In case of operation hours of the engine; monthly records would be maintained on number of operating hours.
QA/QC procedures to be applied:	None
Any comment:	If the project emission of fossil fuel is less than 1% of total emission reduction, then this project emission could be excluded.

E.7.2. Description of the monitoring plan for a SSC-CPA:

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1. Monitoring Plan Objective and Organization

The purpose of the monitoring plan is to measure the net electricity delivered to the local electricity grid by the SSC-CPA. The net electricity will be calculated by subtracting the electricity exported with the electricity imported by the SSC-CPA, which is measured at the interconnection point or sub-station as per agreed PPA.

Details of the SSC-CPA monitoring plan will be described for each SSC-CPA but shall comprise the procedures outlined in this section.

2. Monitoring Data and archiving

Data to be monitored is the net electricity delivered to the local grid by the SSC-CPA and in the case of fossil use, the fossil fuel consumption.

Fossil fuel consumption:
Fuel consumption will be monitored through the collection of invoices or by monitoring the number of operation hours of the engine. In the latter case, the volume of fuel consumed will be calculated by multiplying the number operation hours by the specific consumption of the engine.
Monthly records of fossil fuel purchase invoices would be maintained. In case of operation hours of the engine; monthly records would be maintained on number of operating hours.

The data will be archived electronically and be stored for 2 years after the end of the crediting period of each SSC-CPA by the coordinating entity.

Net electricity delivered:
In India, procedures for meter reading are normally specified in the PPA. The detailed monitoring procedures will therefore be established for each SSC-CPA on the basis of the PPA. As a general guidance, at PoA level the PPs can only state that the monitoring data will be derived from periodic electricity meter records kept by the project owners and/or the grid company, which will be crosschecked with actual sales electricity receipts signed by project owners and the regional grid company. The operator of the Renewable Energy plant will be responsible for collecting the monitoring data and will provide the coordinating entity with meter readings for electricity delivered and if applicable calibration

certificates. The meters installed would be of accuracy 0.5 class at the minimum.

In case the main meter of SSC-CPAs break down, the net electricity delivered to the local grid will be derived from a back-up meter installed and operated by the project owners and/or the grid company. Furthermore, in the worst case, if there is no back-up revenue meter available at the interconnection point or sub-station, CME and the project owners will not claim any emission reductions during the breaking down of main revenue meter.

In India, it is a common practice that revenue coming from electricity generation are based on measurement at the interconnection point or sub-station, which is already considering technical transmission losses from power plant to the interconnection point. In case the metering equipment does not take into account the losses in the transmission lines, the CME will estimate in a conservative manner these losses (on the basis of an independent expert opinion) and discount the losses (as a percentage) from the total generation.

The data will be archived electronically and be stored for 2 years after the end of the crediting period of each SSC-CPA by the coordinating entity. The calibration would be carried out at minimum three years interval for the electricity meters.

All the electricity meters installed at individual CPAs would be calibrated at least once in three years or as per the frequency stated in the PPA (whichever is lower). The meters would be calibrated according to the National Standards maintained by NPL, India or according to IEC standards by accredited entities.

3. Calculation approaches

Calculation of ex-post baseline emission is carried out for each SSC-CPA as per following equation:

$$BE_{[CPA],y} = \left(EE_{[CPA],y} - EI_{[CPA],y} \right) \cdot EF_{[CPA],CO_2} \quad \textbf{(8)}$$

Where:

$BE_{i(CPA_i),y}$	Emission Reductions from [CPA] in year y; t CO_2
$EE_{i(CPA_i),y}$	Electricity exported by [CPA] in year y; MWh
$EI_{i(CPA_i),y}$	Electricity imported by [CPA] in year y; MWh
$EF_{i(CPA_i),CO2}$	CO_2 Emission Factor of the grid where the [CPA] is connected; t CO_2e/MWh

4. Quality Assurance and Quality Control

The installation location of the meters is detailed in each SSC-CPA. The project entity will implement QA&QC measures to calibrate and guarantee the accuracy of metering and safety of the project operation. The metering devices will be calibrated and inspected properly and periodically as per local/national standard and requirements at the date of inclusion of the CPA into the PoA. The grid company and the project owners are responsible for operation and maintenance of their respective electricity meters.

The meter(s) reading will be readily accessible for the Designated Operational Entity (DOE) carrying out the verification of monitoring data.

5. Special procedures to be applied in case of different Renewable Energy Power Projects:

Wind:

Separate metering system has to be adopted in case of some of the wind power projects as a typical wind farm is of large size and may contain several individual projects from different project participants. Moreover, the technology supplier or O&M company typically manages a single wind farm. Hence, common metering is employed for all the wind turbines in that particular farm at the grid interconnection point. There are several approaches adopted in different states of India for apportioning this electricity generation to different project proponents on the basis of which invoicing is done for the energy supplied to the GRID company.
Hence, monitoring systems would differ in case of CPAs comprising wind power plants and a overview is described below:

Typically there is a common joint meter at the substation (Substation/ Revenue meter) for multiple project proponents. The joint meter reading (JMR) taken on monthly basis at this meter, by the wind farm developer and the Grid agency/utility reflects the cumulative monthly generation for all wind turbines connected to this meter. Based on the JMR and the HT yard meter readings for individual WEG, the utility apportions the total monthly electricity generation and issues a certificate. The modalities, frequencies and procedures related to metering can be modified as per the instructions or procedures set out by the state nodal agency and or utility in line with the then prevailing guideline of state electricity regulator. The certificate issued by the utility or the wind farm developer then provides the details of gross, imported and net electricity exported by the wind turbines under each project proponent.

The meters installed would be of accuracy 0.5 class at the minimum. All the electricity meters installed at individual CPAs would be calibrated at least once in three years or as per the frequency stated in the PPA (whichever is lower). The meters would be calibrated according to the National Standards or IEC standards.

The procedures may differ slightly in different regions or may change altogether over the course of time. Hence, the metering procedure to determine the net electricity production at the interconnection point or sub-station of the CPA would be specifically outlined at the time of inclusion of the CPA dealing with wind power generation.

Solar & Hydro:

In case of solar and hydropower projects, there would be typically individual meters for each CPA.

For hydropower projects there would be a bidirectional meter installed at the powerhouse where readings would be noted. Also, bidirectional meter would be installed at the substation (delivery point). Monthly readings would be obtained from both the meters. In case of any difference between the two readings, meter reading at the delivery point would be considered as final. The meters installed would be of accuracy 0.5 class at the minimum. Also the all the electricity meters installed would be calibrated at least once in three years interval or as per the frequency stated in the PPA (whichever is lower).

In case of solar power projects, a bidirectional meter would be installed at the site as well as at the interconnection point (delivery point of the electricity). Monthly readings would be obtained from both the meters. In case of any difference between the two readings, meter reading at the delivery point would be considered as final. The meters installed would be of accuracy 0.5 class at the minimum. All the electricity meters installed at individual CPAs would be calibrated at least once in three years or as per the frequency stated in the PPA (whichever is lower). The meters would be calibrated according to the National Standards or IEC standards.

The procedures may differ slightly in different regions or may change altogether over the course of time. Hence, the metering procedure to determine the net electricity production at the interconnection point or sub-station of the CPA would be specifically outlined at the time of inclusion of the CPA dealing with wind power generation.

E.8 Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies)

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The baseline and monitoring sections have been prepared by South Pole Carbon Asset Management Ltd. (www.southpolecarbon.com). South Pole Carbon Asset Management Ltd. is assisting CME in project development and implementation.

South Pole Carbon Asset Management Ltd. is a project participant in the PoA.

Dated: 06/05/2011

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Annex 1

CONTACT INFORMATION ON COORDINATING/MANAGING ENTITY and PARTICIPANTS IN THE PROGRAMME of ACTIVITIES

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding envisaged under this Program of Activities

Annex 3

BASELINE INFORMATION

The baseline information was retrieved from CEA website:
http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

Annex 4

MONITORING INFORMATION

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