Programme of activities design document form
(Version 09.0)

BASIC INFORMATION	
Title of the PoA	Renewable Energy PoA in India
Version number of the PoA-DD	10.1
Completion date of the PoA-DD	07/12/2019
Coordinating/managing entity	Emission Reduction Services Private Limited
Host Parties	India
Applied methodologies and standardized baselines	AMS-I.D.: Grid connected renewable electricity generation --- Version 18
Sectoral scopes	Sectoral Scope 1

PART I. Programme of activities (PoA)

SECTION A. Description of PoA

A.1. Purpose and general description of 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 only 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.

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 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

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

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.2. Physical/geographical boundary of PoA

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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.3. Technologies/measures

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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/m2.

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 nonconventional 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 nonconventional 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

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

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 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. Coordinating/managing entity

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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.

A.5. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (host Party)	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 participant may or may not be involved in the CPAs included in this PoA

A.6. Public funding of PoA

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The RE PoA does not receive any public funding

SECTION B. Management system

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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[3], which follows strict and efficient practices in order to ensure that all deliverables meet its high-quality standards.

[3] *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.

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.

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.

(iv) 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

SECTION C. Demonstration of additionality of PoA

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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.

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.

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 (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 SSCCPAs 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[4] 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 C.

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:

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

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.

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[5].

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”) an 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 “nonaction” 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)[6]. 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:[7]

WACC = CD X %Debt +CE X %Equity

[5] 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.

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

[7] 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.

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× (1-T)×%Debt+CE ×%Equity

The cost of equity is determined using the capital asset pricing model[8] (CAPM):

CE = RFR +β · (RP) + SP

Where:

β = βunlevered × (1+ (1− T) × D/ E)

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

WACC(pre − tax) =WACC(post − tax) /(1−T)

Where:

Table 1: 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-chartcenter/interestrates/Pages/TextView.aspx?data=yieldYear&year=2010
ßunlevered	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 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

[8] 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.

		additional returns to compensate for the lower marketability of shares. According to Ibbotson Associates' statistics for 2009[9]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
% 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 0417, 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.

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

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

Table 2: 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.

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 3: 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 or USD /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 or USD /year	
Insurance	% of Capex p.a.	

The parameters listed in Table 3 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.

SECTION D. Start date and duration of PoA

D.1. Start date of PoA

>>
30/03/2011, as per timeline of PoA-DD

D.2. Duration of PoA

>>
First renewal period: 24th Sept 2012- 23rd Sept 2019
Second renewal period: 24th Sept 2019 – 23rd Sept 2026
28 years

SECTION E. Environmental impacts

E.1. Level at which environmental impacts analysis is undertaken

>>
The environmental impact analysis if done at CPA level

E.2. Analysis of environmental impacts

>>
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.

E.3. Environmental impact assessment

>>
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 F. Local stakeholder consultation

F.1. Level at which local stakeholder consultation is undertaken

>>
Local stakeholder consultation will be held 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. Stakeholder consultation will conduct at CPA level earliest of the start dates of the CPAs as defined in the “Glossary: CDM terms”.

F.2. Modalities for local stakeholder consultation

>>
Local stakeholder consultation will be done at CPA level

F.3. Summary of comments received

>>
Local stakeholder consultation will be held at CPA level

F.4. Consideration of comments received

>>
Local stakeholder consultation will be held at CPA level

SECTION G. Approval and authorization

>>
Letter of approval of host party is submitted.

PART II. Generic component project activity (CPA)

SECTION H. Description of generic CPA

H.1. Title of generic CPA

>>
"XYZ project at ABC location"

H.2. Reference number of generic CPA

>>
CPA 6161-XXXX

H.3. Purpose and general description of generic CPA

>>
The SSC-CPA involves the construction of a new grid connected "wind" power plant in "State" India. The SSC-CPA's installed capacity and estimated annual power generation are "xx" MW and "ABCD" MWh, respectively.

The project's purpose is to supply renewable electricity to the "XYZ" Grid.

This CPA is a part of the "Renewable Energy PoA in India". The CME for the PoA is "Emission Reduction Services Private Limited".

"Project Title" (referred later as the SSC-CPA "CPA NAME" or the project) is being implemented by "CPA Implementing Company" (referred later as the CPA implementer) and will generate renewable power and export the same to the grid, which will displace part of the electricity that would have otherwise been supplied by a majority of fossil fuel fired power plants constituting the grid mix. Thus, GHG emission reductions can be achieved via this SSC-CPA by avoiding the GHG emissions that would have occurred in the absence of the project activity.

The project's contributions to the sustainable development of the local area as well as the host country are as follows:

Social well-being:

- The SSC-CPA "CPA NAME" leads to more development in the rural region.
- During construction, the SSC-CPA "CPA NAME" is expected to generate considerable employment opportunities for the local population during the construction as well as operational phases.
- Various kinds of mechanical work generate employment on a regular and permanent basis for the local people that increase the young people's expertise and experiences in the region.

Economic well-being:

- The project activity creates jobs in the local region.
- Large investments in a rural region would not have been made in absence of the project.
- The project activity contributes to economic sustainability in and around the region.

Environmental well-being:

- The SSC-CPA "CPA NAME" utilizes "wind" energy to generate electricity, which otherwise would have been generated through a majority of fossil-fuel based power plants. This way it shall contribute to a reduction in specific emissions (emissions of pollutant/unit of energy generated), including GHG emissions.
- As "wind" power projects produce no end products in the form of solid waste (ash, etc.), they address the problem of solid waste disposal encountered by most other sources of power.
- Being a renewable energy source, "wind" energy used to generate electricity contributes to resource conservation.

Technological well-being:

- The project promotes new technology in the region in the form of "wind" power generation technology

H.4. Technologies/measures

>>
"CPA implementer" involves setting up of grid connected "installed capacity and technology: "wind" plant. Installations shall be "name of technology".
The grid connected "solar/wind/hydro" power generation scheme will mainly consist of "brief technical description"
SSC-CPA CPA NAME scheme.

Table 1: Main technical parameters of the proposed project activity

Main Parameters	Units	SSC-CPA "CPA Name"
Type of System	**-**	
Capacity of each turbine/unit proposed (if applicable)	**kW**	
Total Number of turbine	**Number**	
Proposed Capacity	**MW**	
Projected Net Energy for Sale	**MWh/yr**	
Plant Load Factor (PLF)	**%**	
Expected life of the project	**Year**	

Source: Technical specifications from the Detailed Project Report

"Technology Transfer Details"

SECTION I. Application of methodologies and standardized baselines

I.1. References to methodologies and standardized baselines

>>
Name of approved baseline and monitoring methodology:
AMS-I.D.: Grid connected renewable electricity generation --- Version 18, Sectoral Scope: 01

Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period Version 03.0.1.

The methodology has been approved by EB for use in a PoA.

I.2. Applicability of methodologies and standardized baselines

>>

The applicability criteria of AMS I.D. v18 are the following:	Methodology AMS I.D. v18 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 consumer facility via national/regional grid through a contractual arrangement such as wheeling.	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 K of the PoA DD.
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	PoA is limited to greenfield projects as per eligibility criteria no.10 in section K of the PoA DD

activity (Greenfield plant); (b) involve a capacity addition[10]; (c) involve a retrofit[11] of (an) existing plant(s); or (d) involve a replacement[12] of (an) existing plant(s).	
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 K 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[13], the capacity of the entire unit shall not exceed the limit of 15 MW.	Each SSC-CPA has only renewable components a per eligibility criteria no.3 and 13 in section K of PoA DD.
Combined heat and power (co-generation) systems are not eligible under this category.	Not applicable, the proposed SSC-PoA does not include combined heat and power systems as per eligibility criteria no 3 in section K 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[14] 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 K of the PoA DD
In the case of retrofit, rehabilitation or replacement, to qualify as a small-scale project, the total output of the retrofitted, rehabilitated or replacement	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,

[10] 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.

[11] 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.

[12] 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.

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

[14] 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”.

power plant/unit shall not exceed the limit of 15 MW.	as per eligibility criteria no 10 in section K of the PoA DD.
In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as "AMS-I.C.: Thermal energy production with or without electricity" shall be explored.	Not applicable as per eligibility criteria 3 in section K of the PoA DD.
In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply	Not applicable as per eligibility criteria 3 in section K of the PoA DD.

Baseline scenario for the second crediting period has been assessed in line with the "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period." Version 03.0.1.

This tool provides a stepwise procedure to assess the continued validity of the baseline and to update the baseline at the renewal of a crediting period, as required by paragraph 291 of Project Standard for programme of activities.

The tool stipulates the following steps to be carried out.

Step 1: Assess the validity of the current baseline for the next crediting period

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies

There is no legal and regulatory requirement that mandates the production of energy by the chosen technology. Investment in renewable energy projects in India and the Indian electricity grid are not mandatory. There are no national or local laws or regulations that require this investment to be undertaken, i.e., setting up of renewable power projects. The setting up of wind energy projects is a voluntary activity.

Hence the baseline for the project activity remains unchanged in the crediting period.

Step 1.2: Assess the impact of circumstances

As per the methodology AMS I.D. version 18, the alternative for the project activity is generation of equivalent amount of electricity by operation of grid-connected power plants and by addition of new generation sources. The alternative scenario for the project activity remains same and the grid still supplies primarily fossil fuel based electricity as reflected in the combined margin emission factor. Hence, circumstances and the externalities for determining the baseline for the project activity are same.

Therefore, there is no change in baseline scenario.

Step 1.3: Assess whether the continuation of the use of current baseline equipment(s) **or an investment is the most likely scenario for the crediting period for which renewal is requested**

This sub-step has to be applied if the baseline scenario identified at the validation of the project activity was the continuation of use of the current equipment(s) without any investment. Since this is not the case with the project activity under consideration, hence his condition is not applicable.

Step 1.4: Assessment of the validity of the data and parameters

This step stipulates that "Where emission factors, values or emission benchmarks are used and determined only once for the crediting period, they should be updated, except if the emission factors, values or emission

benchmarks are based on the historical situation at the site of the project activity prior to the implementation of the project and cannot be updated because the historical situation does not exist anymore."

In the context of the present project activity the emission factor has been updated along with the approach used to calculate the emission factor.

Step 2: Update the current baseline and the data and parameters

As evident from the explanation provided above the baseline scenario remains unchanged. Only the baseline emission factor has been updated as per the latest version of CEA database 14.0 available at the time of PD submission for renewal of crediting period.

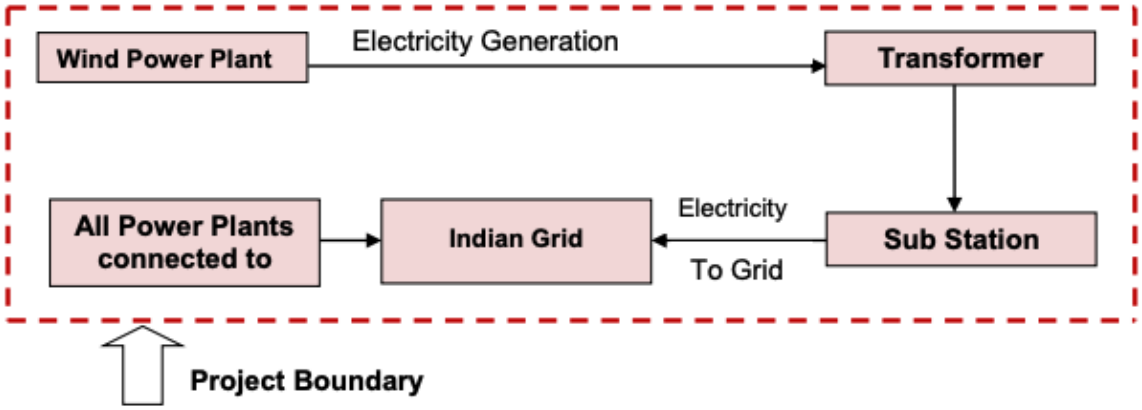
The approved consolidated baseline methodology, AMS I.D. version 18has been used to determine the baseline and the estimation of emission reductions for the applicable crediting period. As referred in the methodology "Tool to calculate the emission factor for an electricity system" (version 07.0) has been used to determine continued validity of the baseline based on combined margin (CM) calculations.

I.3. Application of multiple methodologies

>>
N/A

I.4. Project boundary, sources and greenhouse gases (GHGs)

>>
As per AMS I.D. v18, "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.

Source		GHG	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

I.5. Establishment and description of baseline scenario

>>
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. 18 paragraph 19 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. As per para 289 and 291 of CDM project standard for programmes of

activities, version 2, no impact of national and/or sectoral policies and circumstances on the modalities to estimate baseline GHG emissions. Ex-ante parameters updated as per latest available valid version of methodology AMS I.D. version 18.

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 $EG_{PJ,y}$ expressed in kWh of electricity produced by the renewable generating unit multiplied by an emission factor of the Grid where electricity is displaced.

$$BE_Y = EG_{PJ,y} * EF_{grid,y} \quad (1)$$

Where:

$BE_{,y}$	Baseline Emissions in year *y*; t CO_2
$EG_{PJ,y}$	Energy baseline in year *y*; kWh
$EF_{grid,y}$	CO_2 Emission Factor in year y; t CO_2e/kWh

I.6. Estimation of emission reductions

I.6.1. Explanation of methodological choices

>>
The CPA would constitute a 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 wind 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 v18.

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. v18 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 7 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. Calculate the build margin emission factor.
STEP 6. Calculate the combined margin (CM) emissions factor.

STEP 1: Identify the relevant electricity power systems

The tool defines that "for determining the electricity emission factors, identify the relevant electricity system. Similarly, identify any connected electricity systems". It also states that "If the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used". Keeping this into consideration, the Central Electricity Authority (CEA), Government of India has divided the Indian Power Sector into five regional grids viz. Northern, Eastern, Western, North-eastern and Southern. However since August 2006, however, all regional grids except the Southern Grid had been integrated and were operating in synchronous mode, i.e. at same frequency. Consequently, the Northern, Eastern, Western and North-Eastern grids were treated as a single grid named as NEWNE grid from FY 2007-08 onwards for the purpose of this CO_2 Baseline Database. As of 31 December 2013, the Southern grid has also been synchronised with the NEWNE grid, hence forming one unified Indian Grid. Since the project supplies electricity to the Indian grid, emissions generated due to the electricity generated by the Indian grid as per CM calculations will serve as the baseline for this project.

Table 2: Geographical Scope of Indian Electricity Grid

Northern	Eastern	Western	North-Eastern	Southern
Chandigarh	Bihar	Chhattisgarh	Arunachal Pradesh	Kerala
Delhi	Jharkhand	Gujarat	Assam	Karnataka
Haryana	Orissa	Daman & Diu	Manipur	Tamil Nadu
Himachal Pradesh	West Bengal	Dadar & Nagar Haveli	Meghalaya	**Andhra Pradesh**
Jammu & Kashmir	Sikkim	Madhya Pradesh	Mizoram	Telengana
Punjab	Andaman & Nicobar	Maharashtra	Nagaland	Puducherry
Rajasthan		Goa	Tripura	Lakshadweep
Uttar Pradesh				
Uttarakhand				

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

Project participants have the option of choosing 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. The Project Participant has chosen only grid power plants in the calculation.

STEP 3: Select a method to determine the operating margin (OM) method

The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods, which are described under Step 4: (a) Simple OM, or (b) Simple adjusted OM, or (c) Dispatch data analysis OM, or (d) Average OM. The data required to calculate simple adjusted OM or Dispatch data analysis is not possible due to lack of availability of this activity data to the project developers. The choice of other two options for calculating the operating margin emission factor depends on the generation of electricity from low cost/must run sources. In the context of the methodology low cost/must run resources typically include hydro, geothermal, wind, low cost biomass, nuclear and solar generation.

For the simple OM, the simple adjusted OM and the average OM, the emissions factor can be calculated using either of the two following data vintages: • Ex ante option: If the ex ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. Or • Ex post option: If the ex post option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring. PP has chosen ex ante option for the calculation of OM with 3 years generation weighted average of the most recent years available at the time of submission of CDM-SSC-PDD to the DOE for validation. OM determined at validation stage will be the same throughout the crediting period. There will be no requirement to monitor & recalculate the emission factor during the first crediting period.

STEP 4: Calculate the operating margin emission factor according to the selected method the operating margin emission factor has been calculated using a 3-year data vintage:
For example

Net Generation in Operating Margin (GWh) (incl. Imports)			
	2015-16	**2016-17**	**2017-18**
INDIAN Grid	871,753	916,278	960,693
Simple Operating Margin (tCO_2/MWh) (incl. Imports)			
INDIAN Grid	0.97	0.96	0.95
Weighted Generation Operating Margin			
INDIAN Grid	0.9610		

STEP 5: Calculate the build margin emission factor ($EF_{BM,y}$)

Option 1 as described above is chosen to calculate the build margin emission factor for the project activity. BM is calculated ex-ante based on the most recent information available at the time of submission of PDD and is fixed for the entire crediting period.

STEP 6: Calculate the combined margin (CM) emissions factor

Combined Margin – The combined margin is the weighted average of the simple operating Margin and the build margin. In particular, for intermittent and non-dispatchable generation types such as wind and solar photovoltaic, the Tool to calculate the emission factor for an electricity system, Version 07.0.0, EB 100, Annex 4, allows to weigh the operating margin and Build margin at 75% and 25%, respectively for wind and solar projects and 25% and 75%, respectively for hydro projects for second crediting period.

The baseline emission factor is calculated using the combined margin approach as described in the following steps:
Calculation of Baseline Emission Factor EF_y
The baseline emission factor EF_y is calculated as the weighted average of the Operating Margin emission factor ($EF_{OM,y}$) and the Build Margin emission factor ($EF_{BM,y}$):
$EF_y = w_{OM} * EF_{OM,y} + w_{BM} * EF_{BM,y}$

Where:
w_{OM} = 75% weight for wind energy projects
w_{BM} = 25% weight for wind energy projects
$EF_{OM,y}$ = calculated as described in Steps 3&4 above (tCO_2/MWh)
$EF_{BM,y}$ = calculated as described in Steps 5 above (tCO_2/MWh)

The above describe approach will be use as and when the CPA gets included or renewed.

I.6.2. Data and parameters fixed ex ante

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	"Detailed Project Report/Purchase contracts if available"
Value(s) applied	XX
Choice of data or Measurement methods and procedures	The values reflect the expected capacity to be installed at the power plant according to the plant design parameters.
Purpose of data	Baseline emission calculation
Additional 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 uses a fossil fuel

Data/Parameter	$COEF_{i,y}$
Data unit	tCO2/t.fuel
Description	CO_2 emission factor from fuel type I
Source of data	IPCC 2006 value
Value(s) applied	Diesel: 3.185 Residual Fuel Oil (RFO): 3.1107 Coal: 2.6488 LPG: 2.9853
Choice of data or Measurement methods and procedures	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-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf) ii) NCV for Gas/Diesel oil: 43.33 TJ/103 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.ipccnggip.iges.or.jp/public/gl/guidelin/ch1wb1.pdf)
Purpose of data	Baseline emission calculation
Additional comment	

Indian 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 Indian electricity grid as calculated and defined in the PoA-DD
Source of data	CEA Database
Value(s) applied	$EF_{OM,y}$ = 0.9610 tCO2/MWh (For example based on CE database version 14)
Choice of data or Measurement methods and procedures	No measurement required. Data is obtained based on EF database provided by CEA version 14.

Purpose of data	Baseline emission calculation
Additional comment	The value of $EF_{OM,y}$ is fixed for the first crediting period of the CPA-DD and will be revised for each crediting period applying the latest value in the PoA - DD

Data/Parameter	**$EF_{BM,y}$**
Data unit	tCO_2/MWh
Description	$EF_{BM,y}$ is the build margin CO2 emission factor of power plant in the sample group 'm' connected to the Indian electricity grid as calculated and defined in the PoA-DD
Source of data	CEA Database
Value(s) applied	$EF_{BM,y}$ = 0.86 tCO_2/MWh (For example based on CE database version 14)
Choice of data or Measurement methods and procedures	No measurement required. Data is obtained based on EF database provided by CEA version 14
Purpose of data	Baseline emission calculation
Additional comment	The value of $EF_{BM,y}$ is fixed for the first crediting period of the CPA-DD and will be revised for each crediting period applying the latest value in the PoA - DD

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 Indian electricity grid in the year 'y', calculated and defined as per PoA DD.
Source of data	CEA Database
Value(s) applied	$EF_{CM,y}$ = 0.9357 tCO2/MWh for solar and wind projects $EF_{CM,y}$ = 0.8853 tCO2/MWh for hydro projects (For example based on CE database version 14)
Choice of data or Measurement methods and procedures	No measurement required. Data is obtained based on EF database provided by CEA version 14
Purpose of data	Baseline emission calculation
Additional comment	The value of $EF_{CM,y}$ is fixed for the first crediting period of the CPA-DD and will be revised for each crediting period applying the latest value in the PoA - DD

I.6.3. Modalities for ex ante calculation of emission reductions

>>

The total emission reduction quantum of the SSC-CPA is calculated on the basis of the equations and parameters presented and explained in the section E.6.1 and B.5.1 of this document.

Baseline emissions

Table 4: Net electricity generation of the project

Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7
$EG_{BL,y}$ (MWh/year)	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ

$EF_{grid,y} = EF_{CM,y}$ = 0.XX tCO_2/MWh[15]

Equation:

$$BE_y = EG_{PJ,y} * EF_{grid,y} \quad (1)$$

Where:

BE_y	Baseline Emissions in year y; t CO_2
$EG_{PJ,y}$	Energy baseline in year y; MWh
$EF_{grid,y}$	CO_2 Emission Factor in year y; t CO_2e/MWh

Result:

Table 5: Baseline emissions from electricity generation

Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7
BE_y (tCO_2/year)	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ

Project Emissions

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

$PE_{FC,I,Y}$ 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:

$$PE_{FC,j,y} = \sum_i FC_{i,j,y} \times COEF_{i,y} \quad (2)$$

Where:

$PE_{FC,j,y}$	Are the CO_2 emissions from fossil fuel combustion in process j during the year y; tCO_2/yr
$FC_{i,j,y}$	Is the quantity of fuel type I combusted in process j during the year y; tonne/yr
$COEF_{i,y}$	Is the CO_2 emission coefficient of fuel type I in year y; tCO_2/tonne
i	Are the fuel types combusted in process i during the year y

"explanation of what applies to the SSC-CPA".

Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7
$PE_{FC,j,y}$(tCO_2/year)	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
$FC_{i,j,y}$ (tonne/year)	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
$COEF_{i,y}$ (t CO_2/tonne)	3.185	3.185	3.185	3.185	3.185	3.185	3.185

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.

[15] CEA published value.

The SSC-CPA is a "technology type with/without reservoir" and therefore "needs/does not need" to calculate the power density of hydro power plants.

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

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}} \quad (3)$$

Where:
PD = Power density of the project activity (W/m2)
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 (m2)
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 (m2). For new reservoirs and hence all CPAs, this value is zero

Year	Y1 – Y7
PD (W/m^2)	XYZ
Cap_{PJ} (W)	XYZ
A_{PJ}	XYZ

Leakage Emissions

$LE_y = 0$

Summary of ex-ante estimation of emission reductions

Year	Estimation of project activity emissions (tonnes of CO_2 e)	Estimation of baseline emissions (tonnes of CO_2 e)	Estimation of leakage (tonnes of CO_2 e)	Estimation of overall emission reductions (tonnes of CO_2 e)
Y1	XYZ	XYZ	XYZ	XYZ
Y2	XYZ	XYZ	XYZ	XYZ
Y3	XYZ	XYZ	XYZ	XYZ
Y4	XYZ	XYZ	XYZ	XYZ
Y5	XYZ	XYZ	XYZ	XYZ
Y6	XYZ	XYZ	XYZ	XYZ
Y7	XYZ	XYZ	XYZ	XYZ
Total estimated emissions and emission reductions in tonnes of CO_2 e	XYZ	XYZ	XYZ	XYZ

I.7. Monitoring plan

The monitoring plan of "name of SSC-CPA" is consistent with methodology AMS I.D. "Grid connected renewable electricity generation" (Version 18). Description of the monitoring plan is presented below.

1. Monitoring Plan Objective and Organisation

The project implementer will monitor the electricity delivered to the XYZ Grid by the respective project. The project implementer personnel will be trained adequately for this task. The data will be archived electronically and be stored for 2 years after the end of the crediting period of the SSC-CPA.
To ensure that the data is reliable and transparent, the project implementer will also establish Quality Assurance and Quality Control (QA/QC) measures to effectively control and manage data reading, recording, auditing as well as archiving data and all relevant documents.

2. Monitoring Data

Data to be monitored is the net electricity delivered to the XYZ Grid and the fossil fuel consumption by the project. The monitoring of net electricity delivered as follows:

a) Every month or as per grid companies requirements, the CPA implementer personnel and the grid company will take a meter reading and record this figure in the operational data record. The operational data record will be used as the electricity invoice preparation.
b) If electricity meter failed to record the exported electricity from the proposed SSC-CPA, the meter reading and record will be taken from the back-up meter reading that is installed near to the main meter. The entity responsible for monitoring, which is the CPA implementer, will provide the verifying DOE with meter readings for electricity delivered and calibration certificates. Net Electricity exported will also be crosschecked with the help of invoices available for power exported.

The monitoring of fossil fuel consumption is as follows:
Fuel consumption will be monitored by the CPA implementer 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.

3. Quality Assurance and Quality Control

QA&QC procedures for recording, maintaining and archiving data shall be implemented as part of this SSC-CPA.

The installation location of the meters will be at the first interconnected point with the "XX kV XYZ" Grid transmission line. The CPA implementer will implement QA&QC measures to calibrate and guarantee the accuracy of metering and safety of the project operation.
The electricity meter will be calibrated at least once per 5 years (as per CEA Guidelines[16]).. to guarantee its accuracy in metering and recording the net electricity production of the SSC-CPA.

4. Verification of Monitoring Results

The CPA implementer, with the help of the coordinating entity will carry the responsibility for providing the DOE with all required necessary information, before, during and in the event of queries, after the verification.

The CME will follow the procedures during the PoA verification, as per section I.7 of the PoA-DD.

As part of the PoA, the CPA implementer shall follow the instructions given by the CME and the DOE in the course of the verification.

[16] http://cea.nic.in/reports/regulation/amend_15122014.pdf

I.7.1. Data and parameters to be monitored

Data/Parameter	$EG_{PJ,y}$
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	Measured by electricity meter(s)
Value(s) applied	"To be specified"
Measurement methods and procedures	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 of the PoA-DD.
Monitoring frequency	Monthly
QA/QC procedures	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 five years. All the electricity meters installed at individual CPAs would be calibrated at least once in five 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. Net Electricity exported will also be crosschecked with the help of invoices available for power exported.
Purpose of data	Baseline emission calculation
Additional 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	Fuel invoices
Value(s) applied	"To be specified"
Measurement methods and procedures	Fuel consumption will be monitored through the collection of diesel invoices or by monitoring the number of operation hours of the diesel 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.
Monitoring frequency	Monthly
QA/QC procedures	None
Purpose of data	Baseline emission calculation
Additional comment	If the project emission of diesel fuel is less than 1% of total emission reduction, then this project emission could be excluded.

I.7.2. Sampling plan

>>
A sampling plan does not form part of this PoA

I.7.3. Other elements of monitoring plan

>>
N/A

SECTION J. Crediting period type and duration

>>
Renewable crediting period
Duration: DD/MM/YYYY to DD/MM/YYYY

SECTION K. Eligibility criteria for inclusion of CPAs

>>

SSC-CPA "CPA NAME" is eligible to be included to the SSC-PoA because it fulfils all eligibility requirement of the SSC-PoA:

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
1	Geographical boundary	Being setup within the geographical boundary of India	The SSC-CPA is being setup in geographical boundary of India as per the details in section A.4.1.2 of the CPA-DD.
2	Double counting	CPA must be uniquely identified with the Geographical co-ordinates of the project location and should not result into double counting	CPA has been uniquely identified as per the details in section A.4.1.2 of the CPADD.
3	Technology	be a renewable energy power plant (one of solar, hydro or wind power plant)	SSC-CPA "XYZ" is a "solar/hydro/wind" power plant generating electricity
4	Start date	have a starting date after the validation start of the PoA	PoA validation started at 26/08/11, which is previous to the project start date of the SSC-CPA as elaborated in section A.4.2.1 of the CPA-DD.
5	Compliance with applied methodology	Complies with all applicability conditions listed in the applied methodology AMS I.D Version 18. Such requirements are listed in section I.2 of the PoA-DD.	The methodological requirements as listed in section I.2 of the PoA-DD are met by complying with the eligibility criteria no. 3, 10, 11,12 and 13.
6	Additionality	Demonstrates that it is in compliance with one of the CPA additionality test as described in section C of the PoA-DD.	As per section B.3 of the CPA-DD, the CPA is deemed additional.
7	Local stakeholder consultation	Conducts a local stakeholder consultation	A local stakeholder consultation will conduct at CPA level earliest of the start dates of the CPAs as defined in the "Glossary: CDM terms".
8	Environmental Impact Analysis	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.	"Specification in line with section C of the CPA-DD "
9	Diversion of official development assistance	CPA should not result into the diversion of official development assistance	"Justification"

10	Target group	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.	The SSC-CPA is Greenfield project that does not involve a capacity addition/retrofit/replacement at any existing power plant
11		export the renewable electricity generated to a relevant and clearly identified grid within the geographical boundary of the host country	The SSC-CPA is connected to "Name of the Grid" Grid, which is relevant and clearly identified grid in the host country India.
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.	Not applicable, see justification for eligibility criteria 3.
13	Small-scale threshold	Generates electricity with a capacity below the type I small-scale threshold	The installed capacity of the CPA is "ABC" MW, which is below the type I small-scale threshold of 15MW.
14	Micro-scale threshold	Has a maximum installed capacity below or equal to 5 MW, in the case CPA is following additionality test a, as described in section C of the PoA-DD. If additionality test b is chosen, this eligibility criteria does not need to be considered	"Justification"
15	Debundling check	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 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.	"Justification"
16	Other	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	The CPA implementer contractually ceded its rights to claim and own emission reductions under the Clean Development Mechanism or any voluntary scheme to the coordinating entity of the SSC-PoA.
17	Other	be in line with laws and regulations available at the time of inclusion of the CPA into the PoA.	SSC-CPA Dante is inline with Indian laws and regulations available at the time of inclusion of the SSC-CPA into the SSC-PoA. "Justification"

Case 2: CPA with AMS I D methodology for Hydro Projects

PART II. Generic component project activity (CPA)

SECTION H. Description of generic CPA

H.1. Title of generic CPA

>>
"XYZ project at ABC location"

H.2. Reference number of generic CPA

>>
CPA 6161-XXXX

H.3. Purpose and general description of generic CPA

>>
The SSC-CPA involves the construction of a new grid connected "solar/wind/hydro" power plant in "State" India. The SSC-CPA's installed capacity and estimated annual power generation are "xx" MW and "ABCD" MWh, respectively.

The project's purpose is to supply renewable electricity to the "XYZ" Grid. The expected annual net electricity generation from the project is "ABCD" MWh.

This CPA is a part of the "Renewable Energy PoA in India". The CME for the PoA is "Emission Reduction Services Private Limited".

"Project Title" (referred later as the SSC-CPA "CPA NAME" or the project) is being implemented by "CPA Implementing Company" (referred later as the CPA implementer) and will generate renewable power and export the same to the grid, which will displace part of the electricity that would have otherwise been supplied by a majority of fossil fuel fired power plants constituting the grid mix. Thus, GHG emission reductions can be achieved via this SSC-CPA by avoiding the GHG emissions that would have occurred in the absence of the project activity.

The project's contributions to the sustainable development of the local area as well as the host country are as follows:

Social well-being:

- The SSC-CPA "CPA NAME" leads to more development in the rural region.
- During construction, the SSC-CPA "CPA NAME" is expected to generate considerable employment opportunities for the local population during the construction as well as operational phases.
- Various kinds of mechanical work generate employment on a regular and permanent basis for the local people that increase the young people's expertise and experiences in the rural region.

Economic well-being:

- The project activity creates jobs in the local region.
- Large investments in a rural region would not have been made in absence of the project.
- The project activity contributes to economic sustainability in and around the rural region.

Environmental well-being:

- The SSC-CPA "CPA NAME" utilizes "solar/wind/hydro" energy to generate electricity, which otherwise would have been generated through a majority of fossil-fuel based power plants. This way it shall contribute to a reduction in specific emissions (emissions of pollutant/unit of energy generated), including GHG emissions.
- As "solar/wind/hydro" power projects produce no end products in the form of solid waste (ash, etc.), they address the problem of solid waste disposal encountered by most other sources of power.
- Being a renewable energy source, "solar/wind/hydro" energy used to generate electricity contributes to resource conservation.

Technological well-being:

- The project promotes new technology in the region in the form of "solar/wind/hydro" power generation technology

H.4. Technologies/measures

>>
"CPA implementer" involves setting up of grid connected "installed capacity and technology:
"Hydro" plant. Installations shall be "name of technology".
The grid connected "solar/wind/hydro" power generation scheme will mainly consist of "brief technical description"
SSC-CPA CPA NAME scheme.
Table 1: Main technical parameters of the proposed project activity

Main Parameters	Units	SSC-CPA "CPA Name"
Type of System	-	
Capacity of each turbine	kW	
Proposed Capacity	MW	
Projected Net Energy for Sale	MWh/yr	
Plant Load Factor (PLF)	%	
Expected life of the project	Year	

Source: Technical specifications from the Detailed Project Report
"Technology Transfer Details"

SECTION I. Application of methodologies and standardized baselines

I.1. References to methodologies and standardized baselines

>>
Name of approved baseline and monitoring methodology:
AMS-I.D.: Grid connected renewable electricity generation --- Version 18, Sectoral Scope: 01
Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period Version 03.0.1

The methodology has been approved by EB for use in a PoA.

I.2. Applicability of methodologies and standardized baselines

>>

The applicability criteria of AMS I.D. v18 are the following:	**Methodology AMS I.D. v18 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 consumer facility via national/regional grid through a contractual arrangement such as wheeling.	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 K of the PoA DD.
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	PoA is limited to greenfield projects as per eligibility criteria no.10 in section K of the PoA DD

activity (Greenfield plant); (b) involve a capacity addition[17]; (c) involve a retrofit[18] of (an) existing plant(s); or (d) involve a replacement[19] of (an) existing plant(s).	
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 K 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[20], the capacity of the entire unit shall not exceed the limit of 15 MW.	Each SSC-CPA has only renewable components a per eligibility criteria no.3 and 13 in section K of PoA DD.
Combined heat and power (co-generation) systems are not eligible under this category.	Not applicable, the proposed SSC-PoA does not include combined heat and power systems as per eligibility criteria no 3 in section K 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[21] 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 K of the PoA DD
In the case of retrofit, rehabilitation or replacement, to qualify as a small-scale project, the total output of the retrofitted, rehabilitated or replacement	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,

[17] 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.

[18] 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.

[19] 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.

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

[21] 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”.

power plant/unit shall not exceed the limit of 15 MW.	as per eligibility criteria no 10 in section K of the PoA DD.
In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as "AMS-I.C.: Thermal energy production with or without electricity" shall be explored.	Not applicable as per eligibility criteria 3 in section K of the PoA DD.
In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply	Not applicable as per eligibility criteria 3 in section K of the PoA DD.

Baseline scenario for the second crediting period has been assessed in line with the "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period." Version 03.0.1.

This tool provides a stepwise procedure to assess the continued validity of the baseline and to update the baseline at the renewal of a crediting period, as required by paragraph 291 of Project Standard for programme of activities.

The tool stipulates the following steps to be carried out.

Step 1: Assess the validity of the current baseline for the next crediting period

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies

There is no legal and regulatory requirement that mandates the production of energy by the chosen technology. Investment in renewable energy projects in India and the Indian electricity grid are not mandatory. There are no national or local laws or regulations that require this investment to be undertaken, i.e., setting up of renewable power projects. The setting up of wind energy projects is a voluntary activity.

Hence the baseline for the project activity remains unchanged in the crediting period.

Step 1.2: Assess the impact of circumstances

As per the methodology AMS I.D. version 18, the alternative for the project activity is generation of equivalent amount of electricity by operation of grid-connected power plants and by addition of new generation sources. The alternative scenario for the project activity remains same and the grid still supplies primarily fossil fuel based electricity as reflected in the combined margin emission factor. Hence, circumstances and the externalities for determining the baseline for the project activity are same.

Therefore, there is no change in baseline scenario.

Step 1.3: Assess whether the continuation of the use of current baseline equipment(s) **or an investment is the most likely scenario for the crediting period for which renewal is requested**

This sub-step has to be applied if the baseline scenario identified at the validation of the project activity was the continuation of use of the current equipment(s) without any investment. Since this is not the case with the project activity under consideration, hence his condition is not applicable.

Step 1.4: Assessment of the validity of the data and parameters

This step stipulates that "Where emission factors, values or emission benchmarks are used and determined only once for the crediting period, they should be updated, except if the emission factors, values or emission

benchmarks are based on the historical situation at the site of the project activity prior to the implementation of the project and cannot be updated because the historical situation does not exist anymore."

In the context of the present project activity the emission factor has been updated along with the approach used to calculate the emission factor.

Step 2: Update the current baseline and the data and parameters
As evident from the explanation provided above the baseline scenario remains unchanged. Only the baseline emission factor has been updated as per the latest version of CEA database 14.0 available at the time of PD submission for renewal of crediting period.

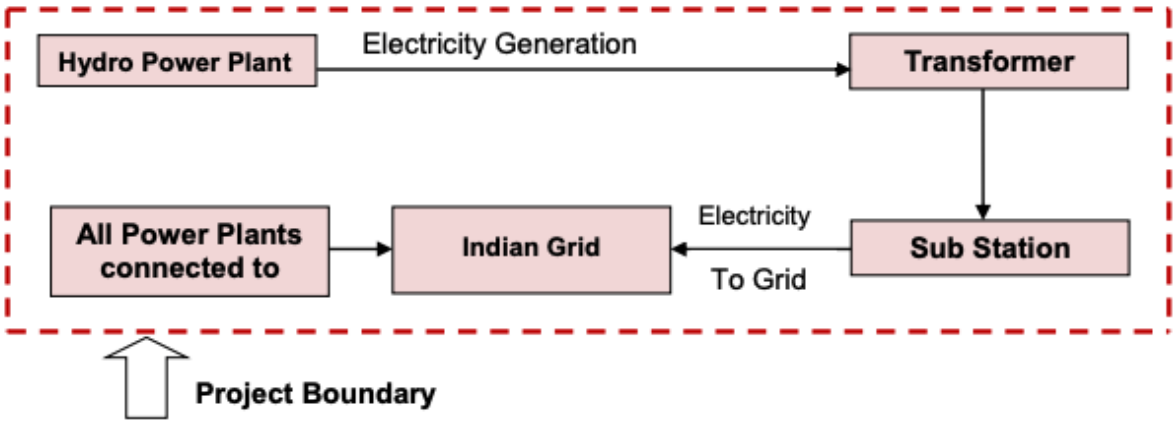
The approved consolidated baseline methodology, AMS I.D. version 18has been used to determine the baseline and the estimation of emission reductions for the applicable crediting period. As referred in the methodology "Tool to calculate the emission factor for an electricity system" (version 07.0) has been used to determine continued validity of the baseline based on combined margin (CM) calculations.

I.3. Application of multiple methodologies

>>
N/A

I.4. Project boundary, sources and greenhouse gases (GHGs)

>>
As per AMS I.D. v18, "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.

Source		GHG	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

I.5. Establishment and description of baseline scenario

>>
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. 18 paragraph 19 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. As per para 289 and 291 of CDM project standard for programmes of activities, version 2, no impact of national and/or sectoral policies and circumstances on the modalities to estimate baseline GHG emissions. Ex-ante parameters updated as per latest available valid version of methodology AMS I.D. version 18.

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

$$\mathbf{BE_Y = EG_{PJ,Y} * EF_{grid,y}} \quad \textbf{(3)}$$

Where:

$BE_{,y}$ Baseline Emissions in year *y*; t CO_2

$EG_{PJ,y}$ Energy baseline in year *y*; kWh

$EF_{grid,y}$ CO_2 Emission Factor in year y; t CO_2e/kWh

I.6. Estimation of emission reductions

I.6.1. Explanation of methodological choices

>>
The CPA would constitute a 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 hydro 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 in case of load shedding. The amount of electricity and/or diesel consumption by each of the CPA will be recorded for estimation of project emissions.

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. v18 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 7 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. Calculate the build margin emission factor.
STEP 6. Calculate the combined margin (CM) emissions factor.

STEP 1: Identify the relevant electricity power systems
The tool defines that "for determining the electricity emission factors, identify the relevant electricity system. Similarly, identify any connected electricity systems". It also states that "If the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used". Keeping this into consideration, the Central Electricity Authority (CEA), Government of India has divided the Indian Power Sector into five regional grids viz. Northern, Eastern, Western, North-eastern and Southern. However, since August 2006, however, all regional grids except the Southern Grid had been integrated and were operating in synchronous mode, i.e. at same frequency. Consequently, the Northern, Eastern, Western and North-Eastern grids were treated as a single grid named as NEWNE grid from FY 2007-08 onwards for the purpose of this CO_2 Baseline Database. As of 31 December 2013, the Southern grid has also been synchronised with the NEWNE grid, hence forming one unified Indian Grid. Since the project supplies electricity to the Indian grid, emissions generated due to the electricity generated by the Indian grid as per CM calculations will serve as the baseline for this project.

Table 2: Geographical Scope of Indian Electricity Grid

Northern	Eastern	Western	North-Eastern	Southern
Chandigarh	Bihar	Chhattisgarh	Arunachal Pradesh	Kerala
Delhi	Jharkhand	Gujarat	Assam	Karnataka
Haryana	Orissa	Daman & Diu	Manipur	Tamil Nadu
Himachal Pradesh	West Bengal	Dadar & Nagar Haveli	Meghalaya	**Andhra Pradesh**
Jammu & Kashmir	Sikkim	Madhya Pradesh	Mizoram	Telengana
Punjab	Andaman & Nicobar	Maharashtra	Nagaland	Puducherry
Rajasthan		Goa	Tripura	Lakshadweep
Uttar Pradesh				
Uttarakhand				

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

Project participants have the option of choosing 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. The Project Participant has chosen only grid power plants in the calculation.

STEP 3: Select a method to determine the operating margin (OM) method

The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods, which are described under Step 4: (a) Simple OM, or (b) Simple adjusted OM, or (c) Dispatch data analysis OM, or (d) Average OM.
The data required to calculate simple adjusted OM or Dispatch data analysis is not possible due to lack of availability of this activity data to the project developers. The choice of other two options for calculating the operating margin emission factor depends on the generation of electricity from low cost/must run sources. In the context of the methodology low cost/must run resources typically include hydro, geothermal, wind, low cost biomass, nuclear and solar generation.
For the simple OM, the simple adjusted OM and the average OM, the emissions factor can be calculated using either of the two following data vintages: • Ex ante option: If the ex ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. Or • Ex post option: If the ex post option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring. PP has chosen ex ante option for the calculation of OM with 3 years generation weighted average of the most recent years available at the time of submission of CDM-SSC-PDD to the DOE for validation. OM determined at validation stage will be the same throughout the crediting period. There will be no requirement to monitor & recalculate the emission factor during the first crediting period.

STEP 4: Calculate the operating margin emission factor according to the selected method the operating margin emission factor has been calculated using a 3-year data vintage:
For example:

Net Generation in Operating Margin (GWh) (incl. Imports)			
	2015-16	**2016-17**	**2017-18**
INDIAN Grid	871,753	916,278	960,693
Simple Operating Margin (tCO_2/MWh) (incl. Imports)			
INDIAN Grid	0.97	0.96	0.95
Weighted Generation Operating Margin			
INDIAN Grid	0.9610		

STEP 5: Calculate the build margin emission factor ($EF_{BM,y}$)

Option 1 as described above is chosen to calculate the build margin emission factor for the project activity. BM is calculated ex-ante based on the most recent information available at the time of submission of PDD and is fixed for the entire crediting period.

STEP 6: Calculate the combined margin (CM) emissions factor

Combined Margin – The combined margin is the weighted average of the simple operating Margin and the build margin. In particular, for intermittent and non-dispatchable generation types such as wind and solar photovoltaic, the Tool to calculate the emission factor for an electricity system, Version 07.0.0, EB 100, Annex 4, allows to weigh the operating margin and Build margin at 75% and 25%, respectively for wind and solar projects and 25% and 75%, respectively for hydro projects for second crediting period.

The baseline emission factor is calculated using the combined margin approach as described in the following steps:
Calculation of Baseline Emission Factor EF_y
The baseline emission factor EF_y is calculated as the weighted average of the Operating Margin emission factor ($EF_{OM,y}$) and the Build Margin emission factor ($EF_{BM,y}$):
$EF_y = w_{OM} * EF_{OM,y} + w_{BM} * EF_{BM,y}$

Where:
w_{OM} = 50% weight for hydro energy projects
w_{BM} = 50% weight for hydro energy projects
$EF_{OM,y}$ = calculated as described in Steps 3&4 above (tCO_2/MWh)
$EF_{BM,y}$ = calculated as described in Steps 5 above (tCO_2/MWh)

The above describe approach will be use as and when the CPA gets included or renewed.

I.6.2. Data and parameters fixed ex ante

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	"Detailed Project Report/Purchase contracts if available"
Value(s) applied	XX
Choice of data or Measurement methods and procedures	The values reflect the expected capacity to be installed at the power plant according to the plant design parameters.
Purpose of data	Baseline emission calculation
Additional 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 after the implementation of the project activity.
Source of data	"Feasibility Study report /Purchase orders/ EPC contracts if available"
Value(s) applied	XX
Choice of data or Measurement methods and procedures	The values reflect the expected capacity to be installed at the power plant according to the plant design parameters.
Purpose of data	Baseline emission calculation
Additional 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

Data/Parameter	A
Data unit	M^2
Description	Area of the reservoir from the hydro power plants, measured in the surface of the water
Source of data	Project site (measured from topographical surveys, maps, satellite pictures etc.)
Value(s) applied	XX
Choice of data or Measurement methods and procedures	The design of the hydro power plant, including its dam, clearly defines the expected water surface area
Purpose of data	Baseline emission calculation
Additional comment	This parameter shall only be applied for non-runoff river hydro power plants.

If CPA uses a fossil fuel

Data/Parameter	**$COEF_{i,y}$**
Data unit	tCO2/t fuel
Description	CO_2 emission factor from fuel type I
Source of data	IPCC 2006 value
Value(s) applied	Diesel: 3.185 Residual Fuel Oil (RFO): 3.1107 Coal: 2.6488 LPG: 2.9853
Choice of data or Measurement methods and procedures	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-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf) ii) NCV for Gas/Diesel oil: 43.33 TJ/103 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.ipccnggip.iges.or.jp/public/gl/guidelin/ch1wb1.pdf)
Purpose of data	Baseline emission calculation
Additional comment	

Indian 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 Indian electricity grid as calculated and defined in the PoA-DD
Source of data	CEA Database
Value(s) applied	$EF_{OM,y}$ = 0.9610 tCO2/MWh (For example based on CE database version 14)
Choice of data or Measurement methods and procedures	No measurement required. Data is obtained based on EF database provided by CEA version 14.
Purpose of data	Baseline emission calculation
Additional comment	The value of $EF_{OM,y}$ is fixed for the first crediting period of the CPA-DD and will be revised for each crediting period applying the latest value in the PoA - DD

Data/Parameter	**$EF_{BM,y}$**
Data unit	tCO_2/MWh
Description	$EF_{BM,y}$ is the build margin CO2 emission factor of power plant in the sample group 'm' connected to the Indian electricity grid as calculated and defined in the PoA-DD
Source of data	CEA Database
Value(s) applied	$EF_{BM,y}$ = 0.86 tCO_2/MWh (For example based on CE database version 14)
Choice of data or Measurement methods and procedures	No measurement required. Data is obtained based on EF database provided by CEA version 14
Purpose of data	Baseline emission calculation

Additional comment	The value of $EF_{BM,y}$ is fixed for the first crediting period of the CPA-DD and will be revised for each crediting period applying the latest value in the PoA - DD

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 Indian electricity grid in the year 'y', calculated and defined as per PoA DD.
Source of data	CEA Database
Value(s) applied	$EF_{CM,y}$ = 0.9357 tCO2/MWh for solar and wind projects $EF_{CM,y}$ = 0.8853 tCO2/MWh for hydro projects (For example based on CE database version 14)
Choice of data or Measurement methods and procedures	No measurement required. Data is obtained based on EF database provided by CEA version 14
Purpose of data	Baseline emission calculation
Additional comment	The value of $EF_{CM,y}$ is fixed for the first crediting period of the CPA-DD and will be revised for each crediting period applying the latest value in the PoA - DD

I.6.3. Modalities for ex ante calculation of emission reductions

>>

The total emission reduction quantum of the SSC-CPA is calculated on the basis of the equations and parameters presented and explained in the section I5 and I6 of the SSC-PoA-DD

Baseline emissions

Table 6: Net electricity generation of the project

Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7
$EG_{BL,y}$ (MWh/year)	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ

$EF_{grid,y} = EF_{CM,y} = 0.XX\ tCO_2/MWh$[22]

Equation:

$$\mathbf{BE_y = EG_{PJ,y} * EF_{grid,y}} \quad (4)$$

Where:

BE_y Baseline Emissions in year y; t CO_2

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

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

[22] CEA published value.

Result:

Table 7: Baseline emissions from electricity generation

Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7
BE_y (tCO_2/year)	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ

Project Emissions

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

$$PE_{FC,j,y} = \sum_i FC_{i,j,y} \times COEF_{i,y} \quad \textbf{(3)}$$

Where:

$PE_{FC,j,y}$	Are the CO_2 emissions from fossil fuel combustion in process j during the year y; tCO_2/yr
$FC_{i,j,y}$	Is the quantity of fuel type I combusted in process j during the year y; tonne/yr
$COEF_{i,y}$	Is the CO_2 emission coefficient of fuel type I in year y; tCO_2/tonne
i	Are the fuel types combusted in process i during the year y

The project emissions will be monitored if the project implementer has a diesel genset as a back-up during power plant shutdown.

"explanation of what applies to the SSC-CPA".

Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7
$PE_{FC,j,y}$(tCO_2/year)	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
$FC_{i,j,y}$ (tonne/year)	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
$COEF_{i,y}$ (t CO_2/tonne)	3.185	3.185	3.185	3.185	3.185	3.185	3.185

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.

The SSC-CPA is a "technology type with/without reservoir" and therefore "needs/does not need" to calculate the power density of hydro power plants.

$$PE_{HP,y} = 0 \quad \textbf{(4)}$$

The power density of the project activity (*PD*) is calculated as follows:

$$PD = \frac{P_y}{A} \quad \textbf{(5)}$$

Where:

PD	=	Power density of the project activity (W/m^2)
P_y	=	Installed capacity of the hydro power plant after the implementation of the project

activity (W)

A = Area of the reservoir measured in the surface of the water (m^2)

Year	Y1 – Y7
PD (W/m^2)	XYZ
P_y (W)	XYZ
A	XYZ

Leakage Emissions

$LE_y = 0$

Summary of ex-ante estimation of emission reductions

Year	Estimation of project activity emissions (tonnes of CO_2 e)	Estimation of baseline emissions (tonnes of CO_2 e)	Estimation of leakage (tonnes of CO_2 e)	Estimation of overall emission reductions (tonnes of CO_2 e)
Y1	XYZ	XYZ	XYZ	XYZ
Y2	XYZ	XYZ	XYZ	XYZ
Y3	XYZ	XYZ	XYZ	XYZ
Y4	XYZ	XYZ	XYZ	XYZ
Y5	XYZ	XYZ	XYZ	XYZ
Y6	XYZ	XYZ	XYZ	XYZ
Y7	XYZ	XYZ	XYZ	XYZ
Total estimated emissions and emission reductions in tonnes of CO_2 e	XYZ	XYZ	XYZ	XYZ

I.7. Monitoring plan

The monitoring plan of "Name of SSC-CPA" is consistent with methodology AMS 1.D. "Grid connected renewable electricity generation" (Version 18). Description of the monitoring plan is presented below.

1. Monitoring Plan Objective and Organisation

The project implementer will monitor the electricity delivered to the XYZ Grid by the respective project. The project implementer personnel will be trained adequately for this task. The data will be archived electronically and be stored for 2 years after the end of the crediting period of the SSC-CPA.
To ensure that the data is reliable and transparent, the project implementer will also establish Quality Assurance and Quality Control (QA/QC) measures to effectively control and manage data reading, recording, auditing as well as archiving data and all relevant documents.

2. Monitoring Data

Data to be monitored is the net electricity delivered to the XYZ Grid by the project. The monitoring of electricity delivered as follows:
a) Every month the CPA implementer personnel and the grid company will take a meter reading and record this figure in the operational data record. The operational data record will be used as the electricity invoice preparation.
b) If electricity meter failed to record the exported electricity from the proposed SSC-CPA, the meter reading and record will be taken from the back-up meter reading that is installed near to the main meter.
The entity responsible for monitoring, which is the CPA implementer, will provide the verifying DOE with meter readings for electricity delivered and calibration certificates. Net Electricity exported could also be crosschecked with the help of invoices available for power exported.

3. Quality Assurance and Quality Control

QA&QC procedures for recording, maintaining and archiving data shall be implemented as part of this SSC-

CPA.

The installation location of the meters will be at the first interconnected point with the 33 kV NEWNE Grid transmission line. The CPA implementer will implement QA&QC measures to calibrate and guarantee the accuracy of metering and safety of the project operation.
The electricity meter will be calibrated at least once per 5 years as per CEA Guidelines[23]) to guarantee its accuracy in metering and recording the net electricity production of the SSC-CPA.

4. Verification of Monitoring Results

The CPA implementer, with the help of the coordinating entity will carry the responsibility for providing the DOE with all required necessary information, before, during and in the event of queries, after the verification.

The CME will follow the procedures during the PoA verification, as per section I.7 of the PoA-DD.

As part of the PoA, the CPA implementer shall follow the instructions given by the CME and the DOE in the course of the verification.

5. Special procedures to be applied in case of different Renewable Energy 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 five 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 five 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

[23] http://cea.nic.in/reports/regulation/amend_15122014.pdf

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 five 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.

I.7.1. Data and parameters to be monitored

Data/Parameter	$EG_{PJ,Y}$
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	Measured by electricity meter(s)
Value(s) applied	"To be specified"
Measurement methods and procedures	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 of the PoA-DD.
Monitoring frequency	Monthly
QA/QC procedures	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 five years. All the electricity meters installed at individual CPAs would be calibrated at least once in five 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. Net Electricity exported could also be crosschecked with the help of invoices available for power exported.
Purpose of data	Baseline emission calculation
Additional comment	Electricity meters installed would be at least of accuracy 0.5 class.

Data/Parameter	$FC_{i,j,,Y}$
Data unit	Litre
Description	Diesel consumption in the onsite DG sets
Source of data	Diesel invoices
Value(s) applied	"To be specified"
Measurement methods and procedures	Diesel consumption will be monitored through the collection of diesel invoices or by monitoring the number of operation hours of the diesel 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 auxiliaries. Monthly records of diesel purchase invoices would be maintained. In case of operation hours of diesel engine; monthly records would be maintained on number of operating hours.
Monitoring frequency	Monthly
QA/QC procedures	None
Purpose of data	Baseline emission calculation
Additional comment	If the project emission of diesel fuel is less than 1% of total emission reduction, then this project emission could be excluded.

I.7.2. Sampling plan

>>
A sampling plan does not form part of this PoA

I.7.3. Other elements of monitoring plan

>>
N/A

SECTION J. Crediting period type and duration

>>
Renewable crediting period
Duration: DD/MM/YYYY to DD/MM/YYYY

SECTION K. Eligibility criteria for inclusion of CPAs

>>

SSC-CPA "CPA NAME" is eligible to be included to the SSC-PoA because it fulfils all eligibility requirement of the SSC-PoA:

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
1	Geographical boundary	Being setup within the geographical boundary of India	The SSC-CPA is being setup in geographical boundary of India using geographical coordinates of CPA
2	Double counting	CPA must be uniquely identified with the Geographical co-ordinates of the project location and should not result into double counting	• Unique geographical coordinates • 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
3	Technology	be a renewable energy power plant (one of solar, hydro or wind power plant)	SSC-CPA Dante is a "solar/hydro/wind" power plant generating electricity as per the Detailed Project Report
4	Start date	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.
5	Compliance with applied methodology	Complies with all applicability conditions listed in the applied methodology AMS I.D Version 18. Such requirements are listed in section I.2 of the PoA-DD.	The methodological requirements as listed in section I.2 of the PoA-DD are met by complying with the eligibility criteria no. 3, 10, 12.
6	Additionality	Demonstrates that it is in compliance with one of the CPA additionality test as described in section C of the PoA-DD.	As per the CPA-DD, and corresponding documents
7	Local stakeholder consultation	Conducts a local stakeholder consultation	As per the documentation of local stakeholder invitation, summary of comments and how they have been taken into account. Stakeholder consultation will conduct at CPA level earliest of the start dates of the CPAs as defined in the "Glossary: CDM terms".

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
8	Environmental Impact Analysis	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.	"Specification in line with section C of the CPA-DD "
9	Diversion of official development assistance	CPA should not result into the diversion of official development assistance	"Justification"
10	Target group	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.	The SSC-CPA is Greenfield project that does not involve a capacity addition/retrofit/replacement at any existing power plant
11		export the renewable electricity generated to a relevant and clearly identified grid within the geographical boundary of the host country	The SSC-CPA is connected to "Name of the Grid" Grid, which is relevant and clearly identified grid in the host country India.
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.	Not applicable, see justification for eligibility criteria 3.
13	Small-scale threshold	Generates electricity with a capacity below the type I small-scale threshold	The installed capacity of the CPA is "ABC" MW, which is below the type I small-scale threshold of 15MW.
14	Micro-scale threshold	Has a maximum installed capacity below or equal to 5 MW, in the case CPA is following additionality test a, as described in section C of the PoA-DD. If additionality test b is chosen, this eligibility criteria does not need to be considered	"Justification"
15	Debundling check	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: (c) 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; (d) The boundary is within 1 km of the boundary of the proposed small-scale CPA, at the closest point.	"Justification"

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
16	Other	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	The CPA implementer contractually ceded its rights to claim and own emission reductions under the Clean Development Mechanism or any voluntary scheme to the coordinating entity of the SSC-PoA.
17	Other	be in line with laws and regulations available at the time of inclusion of the CPA into the PoA.	SSC-CPA Dante is inline with Indian laws and regulations available at the time of inclusion of the SSC-CPA into the SSC-PoA. "Justification"

Case 3: CPA with AMS I D methodology for Solar Projects

PART II. Generic component project activity (CPA)

SECTION H. Description of generic CPA

H.1. Title of generic CPA

>>
"XYZ project at ABC location"

H.2. Reference number of generic CPA

>>
CPA 6161-XXXX

H.3. Purpose and general description of generic CPA

>>
The SSC-CPA involves the construction of a new grid connected "solar/wind/hydro" power plant in "State" India. The SSC-CPA's installed capacity and estimated annual power generation are "xx" MW and "ABCD" MWh, respectively.

The project's purpose is to supply renewable electricity to the "XYZ" Grid. The expected annual net electricity generation from the project is "ABCD" MWh.

This CPA is a part of the "Renewable Energy PoA in India". The CME for the PoA is "Emission Reduction Services Private Limited".

"Project Title" (referred later as the SSC-CPA "CPA NAME"or the project) is being implemented by "CPA Implementing Company" (referred later as the CPA implementer) and will generate renewable power and export the same to the grid, which will displace part of the electricity that would have otherwise been supplied by a majority of fossil fuel fired power plants constituting the grid mix. Thus, GHG emission reductions can be achieved via this SSC-CPA by avoiding the GHG emissions that would have occurred in the absence of the project activity.

The project's contributions to the sustainable development of the local area as well as the host country are as follows:

Social well-being:

- The SSC-CPA "CPA NAME" leads to more development in the rural region.
- During construction, the SSC-CPA "CPA NAME" is expected to generate considerable employment opportunities for the local population during the construction as well as operational phases.
- Various kinds of mechanical work generate employment on a regular and permanent basis for the local people that increase the young people's expertise and experiences in the rural region.

Economic well-being:

- The project activity creates jobs in the local region.
- Large investments in a rural region would not have been made in absence of the project.
- The project activity contributes to economic sustainability in and around the rural region.

Environmental well-being:

- The SSC-CPA "CPA NAME" utilizes "solar/wind/hydro" energy to generate electricity, which otherwise would have been generated through a majority of fossil-fuel based power plants. This way it shall contribute to a reduction in specific emissions (emissions of pollutant/unit of energy generated), including GHG emissions.
- As "solar/wind/hydro" power projects produce no end products in the form of solid waste (ash, etc.), they address the problem of solid waste disposal encountered by most other sources of power.
- Being a renewable energy source, "solar/wind/hydro" energy used to generate electricity contributes to resource conservation.

Technological well-being:

- The project promotes new technology in the region in the form of "solar/wind/hydro" power generation technology

H.4. Technologies/measures

>>
"CPA implementer" involves setting up of grid connected "installed capacity and technology:
"Solar" plant. Installations shall be "name of technology".
The grid connected "solar/wind/hydro" power generation scheme will mainly consist of "brief technical description"
SSC-CPA CPA NAME scheme.
Table 1: Main technical parameters of the proposed project activity

Main Parameters	Units	SSC-CPA "CPA Name"
Type of System	-	
Capacity of each Module/unit proposed (if applicable)	Wp	
Proposed Capacity	MW	
Projected Net Energy for Sale	MWh/yr	
Plant Load Factor (PLF)	%	
Expected life of the project	Year	

Source: Technical specifications from the Detailed Project Report
"Technology Transfer Details"

SECTION I. Application of methodologies and standardized baselines

I.1. References to methodologies and standardized baselines

>>
Name of approved baseline and monitoring methodology:
AMS-I.D.: Grid connected renewable electricity generation --- Version 18, Sectoral Scope: 01

Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period Version 03.0.1.

The methodology has been approved by EB for use in a PoA.

I.2. Applicability of methodologies and standardized baselines

>>

The applicability criteria of AMS I.D. v18 are the following:	**Methodology AMS I.D. v18 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 consumer facility via national/regional grid through a contractual arrangement such as wheeling.	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 K of the PoA DD.
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	PoA is limited to greenfield projects as per eligibility criteria no.10 in section K of the PoA DD

The applicability criteria of AMS I.D. v18 are the following:	Methodology AMS I.D. v18 is applicable to an SSC-CPA under the proposed SSC-PoA because:
activity (Greenfield plant); (b) involve a capacity addition24; (c) involve a retrofit25 of (an) existing plant(s); or (d) involve a replacement26 of (an) existing plant(s).	
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/m2; • 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/m2.	A hydro SSC-CPA that comprises a reservoir will have a power density greater than 10 W/m2, as per eligibility criteria no.12 in section K 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 fuel27, the capacity of the entire unit shall not exceed the limit of 15 MW.	Each SSC-CPA has only renewable components a per eligibility criteria no.3 and 13 in section K of PoA DD.
Combined heat and power (co-generation) systems are not eligible under this category.	Not applicable, the proposed SSC-PoA does not include combined heat and power systems as per eligibility criteria no 3 in section K 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 distinct28 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 K of the PoA DD

[24] 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.

[25] 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.

[26] 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.

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

[28] 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”.

The applicability criteria of AMS I.D. v18 are the following:	Methodology AMS I.D. v18 is applicable to an SSC-CPA under the proposed SSC-PoA because:
In the case of retrofit, rehabilitation or replacement, to qualify as a small-scale project, the total output of the retrofitted, rehabilitated or replacement power plant/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 K of the PoA DD.
In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as "AMS-I.C.: Thermal energy production with or without electricity" shall be explored.	Not applicable as per eligibility criteria 3 in section K of the PoA DD.
In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply	Not applicable as per eligibility criteria 3 in section K of the PoA DD.

Baseline scenario for the second crediting period has been assessed in line with the "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period." Version 03.0.1.

This tool provides a stepwise procedure to assess the continued validity of the baseline and to update the baseline at the renewal of a crediting period, as required by paragraph 291 of Project Standard for programme of activities.

The tool stipulates the following steps to be carried out.
Step 1: Assess the validity of the current baseline for the next crediting period
Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies

There is no legal and regulatory requirement that mandates the production of energy by the chosen technology. Investment in renewable energy projects in India and the Indian electricity grid are not mandatory. There are no national or local laws or regulations that require this investment to be undertaken, i.e., setting up of renewable power projects. The setting up of wind energy projects is a voluntary activity.

Hence the baseline for the project activity remains unchanged in the crediting period.

Step 1.2: Assess the impact of circumstances

As per the methodology AMS I.D. version 18, the alternative for the project activity is generation of equivalent amount of electricity by operation of grid-connected power plants and by addition of new generation sources. The alternative scenario for the project activity remains same and the grid still supplies primarily fossil fuel based electricity as reflected in the combined margin emission factor. Hence, circumstances and the externalities for determining the baseline for the project activity are same.

Therefore, there is no change in baseline scenario.

Step 1.3: Assess whether the continuation of the use of current baseline equipment(s) **or an investment is the most likely scenario for the crediting period for which renewal is requested**

This sub-step has to be applied if the baseline scenario identified at the validation of the project activity was the continuation of use of the current equipment(s) without any investment. Since this is not the case with the project activity under consideration, hence his condition is not applicable.

Step 1.4: Assessment of the validity of the data and parameters
This step stipulates that "Where emission factors, values or emission benchmarks are used and determined only once for the crediting period, they should be updated, except if the emission factors, values or emission benchmarks are based on the historical situation at the site of the project activity prior to the implementation of the project and cannot be updated because the historical situation does not exist anymore."

In the context of the present project activity the emission factor has been updated along with the approach used to calculate the emission factor.

Step 2: Update the current baseline and the data and parameters
As evident from the explanation provided above the baseline scenario remains unchanged. Only the baseline emission factor has been updated as per the latest version of CEA database 14.0 available at the time of PD submission for renewal of crediting period.

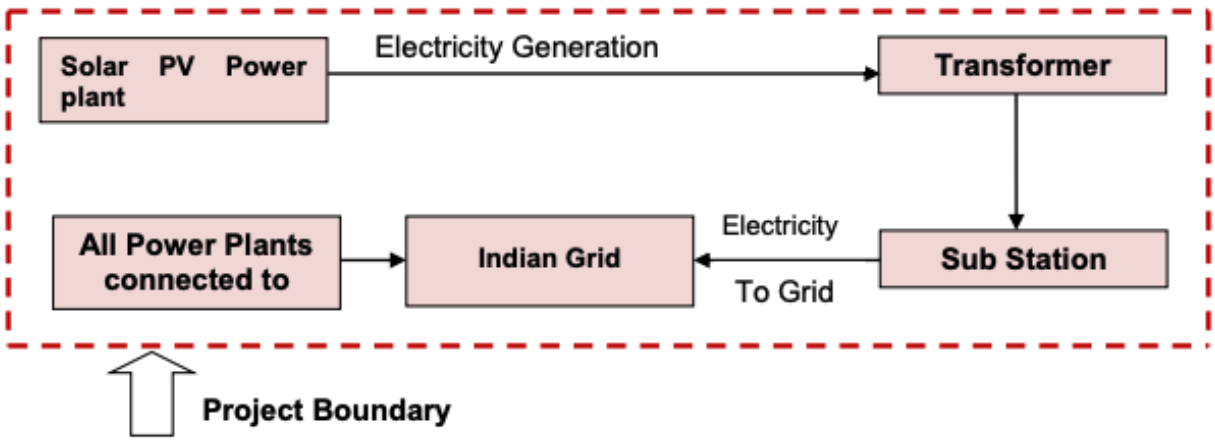
The approved consolidated baseline methodology, AMS I.D. version 18has been used to determine the baseline and the estimation of emission reductions for the applicable crediting period. As referred in the methodology "Tool to calculate the emission factor for an electricity system" (version 07.0) has been used to determine continued validity of the baseline based on combined margin (CM) calculations.

I.3. Application of multiple methodologies

>>
N/A

I.4. Project boundary, sources and greenhouse gases (GHGs)

>>
As per AMS I.D. v18, "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.

Source		GHG	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

I.5. Establishment and description of baseline scenario

>>
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. 18 paragraph 19 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. As per para 289 and 291 of CDM project standard for programmes of activities, version 2, no impact of national and/or sectoral policies and circumstances on the modalities to estimate baseline GHG emissions. Ex-ante parameters updated as per latest available valid version of methodology AMS I.D. version 18.

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

$$\mathbf{BE_y = EG_{PJ,y} * EF_{grid}} \quad \textbf{(5)}$$

Where:

$BE_{,y}$ Baseline Emissions in year *y*; t CO_2

$EG_{PJ,y}$ Energy baseline in year *y*; kWh

EF_{grid} CO_2 Emission Factor in year y; t CO_2e/kWh

I.6. Estimation of emission reductions

I.6.1. Explanation of methodological choices

>>
The CPA would constitute a 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 Solar 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 in case of load shedding. The amount of electricity and/or diesel consumption by each of the CPA will be recorded for estimation of project emissions.

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. v18 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 7 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. Calculate the build margin emission factor.
STEP 6. Calculate the combined margin (CM) emissions factor.

STEP 1: Identify the relevant electricity power systems
The tool defines that "for determining the electricity emission factors, identify the relevant electricity system. Similarly, identify any connected electricity systems". It also states that "If the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used". Keeping this into consideration, the Central Electricity Authority (CEA), Government of India has divided the Indian Power Sector into five regional grids viz. Northern, Eastern, Western, North-eastern and Southern. However, since August 2006, however, all regional grids except the Southern Grid had been integrated and were operating in synchronous mode, i.e. at same frequency. Consequently, the Northern, Eastern, Western and North-Eastern grids were treated as a single grid named as NEWNE grid from FY 2007-08 onwards for the purpose of this CO_2 Baseline Database. As of 31 December 2013, the Southern grid has also been synchronised with the NEWNE grid, hence forming one unified Indian Grid. Since the project supplies electricity to the Indian grid, emissions generated due to the electricity generated by the Indian grid as per CM calculations will serve as the baseline for this project.

Table 2: Geographical Scope of Indian Electricity Grid

Northern	Eastern	Western	North-Eastern	Southern
Chandigarh	Bihar	Chhattisgarh	Arunachal Pradesh	Kerala
Delhi	Jharkhand	Gujarat	Assam	Karnataka
Haryana	Orissa	Daman & Diu	Manipur	Tamil Nadu
Himachal Pradesh	West Bengal	Dadar & Nagar Haveli	Meghalaya	**Andhra Pradesh**
Jammu & Kashmir	Sikkim	Madhya Pradesh	Mizoram	Telengana
Punjab	Andaman & Nicobar	Maharashtra	Nagaland	Puducherry
Rajasthan		Goa	Tripura	Lakshadweep
Uttar Pradesh				
Uttarakhand				

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

Project participants have the option of choosing 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. The Project Participant has chosen only grid power plants in the calculation.

STEP 3: Select a method to determine the operating margin (OM) method

The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods, which are described under Step 4: (a) Simple OM, or (b) Simple adjusted OM, or (c) Dispatch data analysis OM, or (d) Average OM. The data required to calculate simple adjusted OM or Dispatch data analysis is not possible due to lack of availability of this activity data to the project developers. The choice of other two options for calculating the operating margin emission factor depends on the generation of electricity from low cost/must run sources. In the context of the methodology low cost/must run resources typically include hydro, geothermal, wind, low cost biomass, nuclear and solar generation.
For the simple OM, the simple adjusted OM and the average OM, the emissions factor can be calculated using either of the two following data vintages: • Ex ante option: If the ex ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. Or • Ex post option: If the ex post option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring. PP has chosen ex ante option for the calculation of OM with 3 years generation weighted average of the most recent years available at the time of submission of CDM-SSC-PDD to the DOE for validation. OM determined at validation stage will be the same throughout the crediting period. There will be no requirement to monitor & recalculate the emission factor during the first crediting period.

STEP 4: Calculate the operating margin emission factor according to the selected method the operating margin emission factor has been calculated using a 3-year data vintage:
For Example

Net Generation in Operating Margin (GWh) (incl. Imports)			
	2015-16	**2016-17**	**2017-18**
INDIAN Grid	871,753	916,278	960,693
Simple Operating Margin (tCO_2/MWh) (incl. Imports)			
INDIAN Grid	0.97	0.96	0.95
Weighted Generation Operating Margin			
INDIAN Grid	0.9610		

STEP 5: Calculate the build margin emission factor ($EF_{BM,y}$)

Option 1 as described above is chosen to calculate the build margin emission factor for the project activity. BM is calculated ex-ante based on the most recent information available at the time of submission of PDD and is fixed for the entire crediting period.

STEP 6: Calculate the combined margin (CM) emissions factor

Combined Margin – The combined margin is the weighted average of the simple operating Margin and the build margin. In particular, for intermittent and non-dispatchable generation types such as wind and solar photovoltaic, the Tool to calculate the emission factor for an electricity system, Version 07.0.0, EB 100, Annex 4, allows to weigh the operating margin and Build margin at 75% and 25%, respectively for wind and solar projects and 25% and 75%, respectively for hydro projects for second crediting period.

The baseline emission factor is calculated using the combined margin approach as described in the following steps:
Calculation of Baseline Emission Factor EF_y
The baseline emission factor EF_y is calculated as the weighted average of the Operating Margin emission factor ($EF_{OM,y}$) and the Build Margin emission factor ($EF_{BM,y}$):
$EF_y = w_{OM} * EF_{OM,y} + w_{BM} * EF_{BM,y}$

Where:
w_{OM} = 75% weight for solar energy projects
w_{BM} = 25% weight for solar energy projects
$EF_{OM,y}$ = calculated as described in Steps 3&4 above (tCO_2/MWh)
$EF_{BM,y}$ = calculated as described in Steps 5 above (tCO_2/MWh)

The above describe approach will be use as and when the CPA gets included or renewed.

I.6.2. Data and parameters fixed ex ante

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	"Detailed Project Report/Purchase contracts if available"
Value(s) applied	XX
Choice of data or Measurement methods and procedures	The values reflect the expected capacity to be installed at the power plant according to the plant design parameters.
Purpose of data	Baseline emission calculation
Additional 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 uses a fossil fuel

Data/Parameter	$COEF_{i,y}$
Data unit	tCO2/t fuel
Description	CO_2 emission factor from fuel type I
Source of data	IPCC 2006 value
Value(s) applied	Diesel: 3.185 Residual Fuel Oil (RFO): 3.1107 Coal: 2.6488 LPG: 2.9853
Choice of data or Measurement methods and procedures	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-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf) ii) NCV for Gas/Diesel oil: 43.33 TJ/103 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.ipccnggip.iges.or.jp/public/gl/guidelin/ch1wb1.pdf)
Purpose of data	Baseline emission calculation
Additional comment	

Indian 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 Indian electricity grid as calculated and defined in the PoA-DD
Source of data	CEA Database
Value(s) applied	$EF_{OM,y}$ = 0.9610 tCO2/MWh (For example based on CE database version 14)
Choice of data or Measurement methods and procedures	No measurement required. Data is obtained based on EF database provided by CEA version 14.

Purpose of data	Baseline emission calculation
Additional comment	The value of $EF_{OM,y}$ is fixed for the first crediting period of the CPA-DD and will be revised for each crediting period applying the latest value in the PoA - DD

Data/Parameter	**$EF_{BM,y}$**
Data unit	tCO_2/MWh
Description	$EF_{BM,y}$ is the build margin CO2 emission factor of power plant in the sample group 'm' connected to the Indian electricity grid as calculated and defined in the PoA-DD
Source of data	CEA Database
Value(s) applied	$EF_{BM,y}$ = 0.86 tCO_2/MWh (For example based on CE database version 14)
Choice of data or Measurement methods and procedures	No measurement required. Data is obtained based on EF database provided by CEA version 14
Purpose of data	Baseline emission calculation
Additional comment	The value of $EF_{BM,y}$ is fixed for the first crediting period of the CPA-DD and will be revised for each crediting period applying the latest value in the PoA - DD

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 Indian electricity grid in the year 'y', calculated and defined as per PoA DD.
Source of data	CEA Database
Value(s) applied	$EF_{CM,y}$ = 0.9357 tCO2/MWh for solar and wind projects $EF_{CM,y}$ = 0.8853 tCO2/MWh for hydro projects (For example based on CE database version 14)
Choice of data or Measurement methods and procedures	No measurement required. Data is obtained based on EF database provided by CEA version 14
Purpose of data	Baseline emission calculation
Additional comment	The value of $EF_{CM,y}$ is fixed for the first crediting period of the CPA-DD and will be revised for each crediting period applying the latest value in the PoA - DD

I.6.3. Modalities for ex ante calculation of emission reductions

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The total emission reduction quantum of the SSC-CPA is calculated on the basis of the equations and parameters presented and explained in the section I5 and I6 of the SSC-PoA-DD

Baseline emissions

Table 8: Net electricity generation of the project

Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7
$EG_{BL,y}$ (MWh/year)	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ

EF_{grid}= $EF_{CM,y}$ = 0.XX tCO_2/MWh[29]

Equation:

$$BE_y = EG_{PJ,y} * EF_{grid} \quad (6)$$

Where:

BE_y	Baseline Emissions in year y; t CO_2
$EG_{PJ,y}$	Energy baseline in year y; MWh
EF_{grid}	CO_2 Emission Factor in year y; t CO_2e/MWh

Result:

Table 9: Baseline emissions from electricity generation

Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7
BE_y (tCO_2/year)	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ

Project Emissions

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

$$PE_{FC,j,y} = \sum_i FC_{i,j,y} \times COEF_{i,y} \quad (6)$$

Where:

$PE_{FC,j,y}$	Are the CO_2 emissions from fossil fuel combustion in process j during the year y; tCO_2/yr
$FC_{i,j,y}$	Is the quantity of fuel type I combusted in process j during the year y; tonne/yr
$COEF_{i,y}$	Is the CO_2 emission coefficient of fuel type I in year y; tCO_2/tonne
i	Are the fuel types combusted in process i during the year y

The project emissions will be monitored if the project implementer has a diesel genset as a back-up during power plant shutdown.

"explanation of what applies to the SSC-CPA".

Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7
$PE_{FC,j,y}$(tCO_2/year)	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
$FC_{i,j,y}$ (tonne/year)	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
$COEF_{i,y}$ (t CO_2/tonne)	3.185	3.185	3.185	3.185	3.185	3.185	3.185

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.

[29] CEA published value.

The SSC-CPA is a "technology type with/without reservoir" and therefore "needs/does not need" to calculate the power density of hydro power plants.

$$PE_{HP,y} = 0 \quad \textbf{(7)}$$

The power density of the project activity (*PD*) is calculated as follows:

$$PD = \frac{P_y}{A} \quad \textbf{(8)}$$

Where:

PD = Power density of the project activity (W/m^2)
P_y = Installed capacity of the hydro power plant after the implementation of the project activity (W)
A = Area of the reservoir measured in the surface of the water (m^2)

Year	Y1 – Y7
PD (W/m^2)	XYZ
P_y (W)	XYZ
A	XYZ

Leakage Emissions

$LE_y = 0$

Summary of ex-ante estimation of emission reductions

Year	Estimation of project activity emissions (tonnes of CO_2 e)	Estimation of baseline emissions (tonnes of CO_2 e)	Estimation of leakage (tonnes of CO_2 e)	Estimation of overall emission reductions (tonnes of CO_2 e)
Y1	XYZ	XYZ	XYZ	XYZ
Y2	XYZ	XYZ	XYZ	XYZ
Y3	XYZ	XYZ	XYZ	XYZ
Y4	XYZ	XYZ	XYZ	XYZ
Y5	XYZ	XYZ	XYZ	XYZ
Y6	XYZ	XYZ	XYZ	XYZ
Y7	XYZ	XYZ	XYZ	XYZ
Total estimated emissions and emission reductions in tonnes of CO_2 e	XYZ	XYZ	XYZ	XYZ

I.7. Monitoring plan

The monitoring plan of "name of SSC-CPA" is consistent with methodology AMS 1.D. "Grid connected renewable electricity generation" (Version 18). Description of the monitoring plan is presented below.

1. Monitoring Plan Objective and Organisation

The project implementer will monitor the electricity delivered to the XYZ Grid by the respective project. The project implementer personnel will be trained adequately for this task. The data will be archived electronically and be stored for 2 years after the end of the crediting period of the SSC-CPA.

To ensure that the data is reliable and transparent, the project implementer will also establish Quality Assurance and Quality Control (QA/QC) measures to effectively control and manage data reading, recording, auditing as well as archiving data and all relevant documents.

2. Monitoring Data

Data to be monitored is the net electricity delivered to the XYZ Grid by the project. The monitoring of electricity delivered as follows:
c) Every month the CPA implementer personnel and the grid company will take a meter reading and record this figure in the operational data record. The operational data record will be used as the electricity invoice preparation.
d) If electricity meter failed to record the exported electricity from the proposed SSC-CPA, the meter reading and record will be taken from the back-up meter reading that is installed near to the main meter.
The entity responsible for monitoring, which is the CPA implementer, will provide the verifying DOE with meter readings for electricity delivered and calibration certificates. Net Electricity exported could also be crosschecked with the help of invoices available for power exported.

3. Quality Assurance and Quality Control

QA&QC procedures for recording, maintaining and archiving data shall be implemented as part of this SSC-CPA.

The installation location of the meters will be at the first interconnected point with the 33 kV NEWNE Grid transmission line. The CPA implementer will implement QA&QC measures to calibrate and guarantee the accuracy of metering and safety of the project operation.
The electricity meter will be calibrated at least once per 5 years (as per CEA Guidelines[30]). to guarantee its accuracy in metering and recording the net electricity production of the SSC-CPA.

4. Verification of Monitoring Results

The CPA implementer, with the help of the coordinating entity will carry the responsibility for providing the DOE with all required necessary information, before, during and in the event of queries, after the verification.

The CME will follow the procedures during the PoA verification, as per section I.7 of the PoA-DD.

As part of the PoA, the CPA implementer shall follow the instructions given by the CME and the DOE in the course of the verification.

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

[30] http://cea.nic.in/reports/regulation/amend_15122014.pdf

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 five 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 five 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 five 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.

I.7.1. Data and parameters to be monitored

Data/Parameter	$EG_{PJ,Y}$
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	Measured by electricity meter(s)
Value(s) applied	"To be specified"
Measurement methods and procedures	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 of the PoA-DD.
Monitoring frequency	Monthly
QA/QC procedures	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 five years. All the electricity meters installed at individual CPAs would be calibrated at least once in five 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. Net Electricity exported could also be crosschecked with the help of invoices available for power exported.
Purpose of data	Baseline emission calculation
Additional comment	Electricity meters installed would be at least of accuracy 0.5 class.

Data/Parameter	$FC_{i,j,,Y}$
Data unit	Litre
Description	Diesel consumption in the onsite DG sets
Source of data	Diesel invoices
Value(s) applied	"To be specified"
Measurement methods and procedures	Diesel consumption will be monitored through the collection of diesel invoices or by monitoring the number of operation hours of the diesel 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 auxiliaries. Monthly records of diesel purchase invoices would be maintained. In case of operation hours of diesel engine; monthly records would be maintained on number of operating hours.
Monitoring frequency	Monthly
QA/QC procedures	None
Purpose of data	Baseline emission calculation
Additional comment	If the project emission of diesel fuel is less than 1% of total emission reduction, then this project emission could be excluded.

I.7.2. Sampling plan

>>
A sampling plan does not form part of this PoA

I.7.3. Other elements of monitoring plan

>>
N/A

SECTION J. Crediting period type and duration

>>
Renewable crediting period
Duration: DD/MM/YYYY to DD/MM/YYYY

SECTION K. Eligibility criteria for inclusion of CPAs

>>

SSC-CPA "CPA NAME" is eligible to be included to the SSC-PoA because it fulfils all eligibility requirement of the SSC-PoA:

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
1	Geographical boundary	Being setup within the geographical boundary of India	The SSC-CPA is being setup in geographical boundary of India using geographical coordinates of CPA
2	Double counting	CPA must be uniquely identified with the Geographical co-ordinates of the project location and should not result into double counting	• Unique geographical coordinates • 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
3	Technology	be a renewable energy power plant (one of solar, hydro or wind power plant)	SSC-CPA Dante is a "solar/hydro/wind" power plant generating electricity as per the Detailed Project Report
4	Start date	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.
5	Compliance with applied methodology	Complies with all applicability conditions listed in the applied methodology AMS I.D Version 18. Such requirements are listed in section I.2 of the PoA-DD.	The methodological requirements as listed in section I.2 of the PoA-DD are met by complying with the eligibility criteria no. 3, 10, 12.
6	Additionality	Demonstrates that it is in compliance with one of the CPA additionality test as described in section C of the PoA-DD.	As per the CPA-DD, and corresponding documents
7	Local stakeholder consultation	Conducts a local stakeholder consultation	As per the documentation of local stakeholder invitation, summary of comments and how they have been taken into account. Stakeholder consultation will conduct at CPA level earliest of the start dates of the CPAs as defined in the "Glossary: CDM terms".
8	Environmental	Shall show, based on national	"Specification in line with section C of

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
	Impact Analysis	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.	the CPA-DD "
9	Diversion of official development assistance	CPA should not result into the diversion of official development assistance	"Justification"
10	Target group	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.	The SSC-CPA is Greenfield project that does not involve a capacity addition/retrofit/replacement at any existing power plant
11		export the renewable electricity generated to a relevant and clearly identified grid within the geographical boundary of the host country	The SSC-CPA is connected to "Name of the Grid" Grid, which is relevant and clearly identified grid in the host country India.
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.	Not applicable, see justification for eligibility criteria 3.
13	Small-scale threshold	Generates electricity with a capacity below the type I small-scale threshold	The installed capacity of the CPA is "ABC" MW, which is below the type I small-scale threshold of 15MW.
14	Micro-scale threshold	Has a maximum installed capacity below or equal to 5 MW, in the case CPA is following additionality test a, as described in section C of the PoA-DD. If additionality test b is chosen, this eligibility criteria does not need to be considered	"Justification"
15	Debundling check	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: (e) 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; (f) The boundary is within 1 km of the boundary of the proposed small-scale CPA, at the closest point.	"Justification"

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
16	Other	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	The CPA implementer contractually ceded its rights to claim and own emission reductions under the Clean Development Mechanism or any voluntary scheme to the coordinating entity of the SSC-PoA.
17	Other	be in line with laws and regulations available at the time of inclusion of the CPA into the PoA.	SSC-CPA Dante is inline with Indian laws and regulations available at the time of inclusion of the SSC-CPA into the SSC-PoA. "Justification"

Appendix 1. Contact information of coordinating/managing entity and project participants

Coordinating/managing entity and/or project participants	☒ Coordinating/managing entity ☐ Project participant
Organization name	Emission Reduction Services Private Limited
Country	India
Address	2nd Floor, 136B, Safdarjung Enclave, Block B6, Humayunpur, New Delhi - 110029
Telephone	+91-11-46120783
Fax	
E-mail	registration@southpole.com
Website	Southpole.com
Contact person	Rohit Garg

Coordinating/managing entity and/or project participants	☐ Coordinating/managing entity ☒ Project participant
Organization name	South Pole Carbon Asset Management Ltd.
Country	Switzerland
Address	Technoparkstrasse 1, CH 8005, Zurich
Telephone	+41 43 501 35 50
Fax	+41 43 501 35 99
E-mail	registration@southpole.com
Website	Southpole.com
Contact person	Renat Heuberger

Coordinating/managing entity and/or project participants	☐ Coordinating/managing entity ☒ Project participant
Organization name	Swiss Carbon Assets Ltd.
Country	Switzerland
Address	Technoparkstrasse 1, CH 8005, Zurich
Telephone	+41 43 501 35 50
Fax	+41 43 501 35 99
E-mail	registration@southpole.com
Website	Southpole.com
Contact person	Renat Heuberger

Appendix 2. Affirmation regarding public funding

There is no public funding envisaged under this Program of Activities

Appendix 3. Applicability of methodologies and standardized baselines

Refer section I.2 of each generic CPAs

Appendix 4. Further background information on ex ante calculation of emission reductions

Not applicable

Appendix 5. Further background information on monitoring plan

Not applicable

Appendix 6. Summary report of comments received from local stakeholders

Local stakeholder consultation will be held at CPA level

Appendix 7. Summary of post-registration changes

Not applicable

Document information

Version	*Date*	*Description*
09.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the "CDM project standard for programmes of activities" (CDM-EB93-A07-STAN); • Make editorial improvements.
08.1	28 June 2017	Revision to: • Remove a duplicated instruction; • Make editorial improvement.
08.0	7 June 2017	Revision to: • Improve consistency with the "CDM project standard for programmes of activities" and with the PDD and CPA-DD forms; • Make editorial improvement.

Version	*Date*	*Description*
07.0	25 May 2017	Revision to: • Ensure consistency with the “CDM project standard for programmes of activities” (CDM-EB93-A07-STAN) (version 01.0); • Incorporate the “Programme design document form for small-scale CDM programmes of activities” (CDM-SSC-PoA-DD-FORM); • Make editorial improvement.
06.0	15 April 2016	Revision to ensure consistency with the “Standard: Applicability of sectoral scopes” (CDM-EB88-A04-STAN) (version 01.0).
05.0	9 March 2015	Revision to: • Include provisions related to choice of start date of PoA; • Include provisions related to delayed submission of a monitoring plan; • Provisions related to local stakeholder consultation; • Add exception for generic CPA where technology is under positive lists; • Make editorial improvement.
04.1	5 August 2014	Editorial revision to correct the document information table.
04.0	25 June 2014	Revision to: • Include the Attachment: Instructions for filling out the project design document form for CDM programme of activities (these instructions supersede the Guideline: Completing the programme design document form for CDM programme of activities (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the PoA in B.4 and Appendix 1; • Add general instructions on post-registration changes in paragraphs 2 and 3 of general instructions and Appendix 6; • Change the reference number from F-CDM-PoA-DD to CDM-PoA-DD-FORM; • Make editorial improvement.
03.0	3 December 2012	EB 70 Revision to reflect changes to the *Guideline: Completing the programme design document form for CDM programmes of activities* (EB 70, Annex 6).
02.0	13 March 2012	EB 66 Revision required to ensure consistency with the "Guidelines for completing the programme design document form for CDM programmes of activities" (EB 66, annex 12).
01.0	27 July 2007	EB 33, Annex 41 Initial publication.

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