



**PROGRAMME DESIGN DOCUMENT FORM FOR CDM PROGRAMMES OF ACTIVITIES
(F-CDM-PoA-DD)
Version 02.0**

PROGRAMME OF ACTIVITIES DESIGN DOCUMENT (PoA-DD)

PART I. Programme of activities (PoA)

SECTION A. General description of PoA

A.1. Title of the PoA

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Title: Welspun Renewable Energy Program

Version: 03.1

Date: 24/10/2012

A.2. Purpose and general description of the PoA

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Welspun Renewables Energy Limited (WREL) is a wholly owned subsidiary of Welspun Energy Limited which is in the business of generation of electricity through thermal and renewable energy sources. The proposed PoA is a step towards ensuring energy security, diversification of the grid generation mix and sustainable growth of the electricity generation sector in India.

WREL's long term vision to implement more than 1,000 MW of renewable energy projects in the country and the significant importance of revenues from sale of Certified Emission Reductions (CERs) to achieve this goal forms the basis of the implementation of this PoA. The PoA is a voluntary action and WREL will be the Coordinating / Managing Entity (CME) for all the component project activities (CPAs).

The PoA will support the development of new grid-connected renewable energy power plants in India and will cover the solar and wind energy technologies. It seeks to enable investment in large and small grid connected plants that export their generated output to the regional / national electricity grid in India. The implementation of these technologies currently faces various technological, institutional and financial barriers.

In the last six decades, India's energy use has increased 16 times and the installed electricity capacity by 84 times. In 2008, India's energy use was the fifth highest in the world. Nevertheless, India as a country suffers from significant energy poverty and pervasive electricity deficits. In recent years, India's energy consumption has been increasing at a relatively fast rate due to population growth and economic development, even though the base rate may be somewhat low. With an economy projected to grow at 8-9% per annum, rapid urbanization and improving standards of living for millions of Indian households, the demand is likely to grow significantly¹.

WREL shall constitute a CDM PoA team for coordinating and managing all operational aspects related to the implementation of the PoA. The team would also be responsible for the management of records and data associated with each CPA. The team may also hire consultants, if deemed necessary, for this purpose.

The PoA is a voluntary action being coordinated and managed by WREL. There are no mandatory laws or regulations existing in India requiring WREL or any other party to develop a programme for renewable generation plants.

¹[http://www.jseejournal.com/JSEE%202012/PDF%20file%20JSEE%203\(1\)%202012/7.Energy%20scenarios%20pp.%207-17.pdf](http://www.jseejournal.com/JSEE%202012/PDF%20file%20JSEE%203(1)%202012/7.Energy%20scenarios%20pp.%207-17.pdf) (Page 1)

WREL has obtained a clarification AM_CLA_0227 “Application of combination of large scale methodology ACM0002 and small-scale methodology AMS I.D in a renewable energy PoA”² from the Meth Panel permitting use of combination of ACM0002 and AMS-I.D in the PoA, where each CPA will apply only one technology and only one of the two methodologies.

The PoA and CPAs proposed to be included under it would contribute to sustainable development of the local area as well as the host country as follows:

Social well being:

- The CPAs under the PoA would lead to generation of business opportunities and employment in the region thereby contributing towards social upliftment through direct and indirect benefits.
- The CPAs in their execution will also lead to development of infrastructure in the region and promotion of businesses through the improvement in electricity generation capacity of the grid.

Economic well-being:

- The CPAs would lead to an investment in the region accompanied with business and employment benefits along with improvement of grid supply.
- The clean electricity generated through the CPAs would be fed into the grid thereby improving the availability of electricity in the region. This would provide a better scenario for local industries and businesses to improve their production capacities thereby contributing towards the overall economic development of the region.

Environmental well being:

- The CPAs would employ clean technology for generation of electricity thereby displacing fossil fuels which are being rapidly consumed to meet the growing demand of electricity in the country, thus contributing towards reduction in GHG emissions.
- The CPAs under the PoA would not generate any end products in the form of solid waste (ash etc.) compared to alternative modes of power generation (e.g. coal based on which the Indian grid is primarily dependent). Hence they would be cleaner sources of power generation and encouraging greener practices in the region.

Technological well being:

- The CPAs would use solar/wind power technology for power generation thereby demonstrating the viability of these technologies to other project developers in the region.
- The CPAs under the PoA would generate electricity through technologies that are environmentally safe and sound.

The National CDM Authority has also mandated project proponents of large scale project activities to commit a minimum of 2% earning (net realization value) from sale of CERs towards Sustainable Development activities including society and community development activities. This commitment would be realized based on the actual CER revenue received by the project proponents after meeting the statutory tax requirements and CER revenue sharing requirements with the utility as per the provisions of the PPA.

A.3. CMEs and participants of PoA

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Welspun Renewables Energy Limited will be the CME of the PoA and will communicate with the Executive Board. It is also the project participant of the PoA.

² <http://cdm.unfccc.int/methodologies/PAmethodologies/clarifications/58686>

A.4. Party(ies)

Name of Party involved (host) indicates a host Party	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (host)	Welspun Renewables Energy Limited (Private entity)	No

A.5. Physical/ Geographical boundary of the PoA

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The boundary for the PoA, in terms of geographical area within which all CPAs included in this PoA will be implemented, covers the entire geographical region of India.

The physical boundary for each CPA confines to the physical boundary and geographical area of the respective renewable energy projects covered in the CPA. The physical boundary of each CPA will be defined in the CPA-DD.



Fig. 1: Physical and geographical boundary of the PoA - India

A.6. Technologies/measures

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The proposed project activities fall under Sectoral Scope I: “Energy industries (renewable-/non-renewable sources)”.

The renewable energy generation technologies proposed to be employed under the CPA’s will be either:

- (i) Solar Power Plant/Unit; or

- In case of photovoltaic (PV) plant/unit, the project activity would use solar energy to generate direct current from photo voltaic modules that will be converted into alternating current by inverters.
- In case of solar thermal power plant/unit, the project activity would use mirrors or lenses to concentrate a sunlight or solar thermal energy onto a small area converting to heat which drives a heat engine like steam turbine to generate electrical energy.

Project activities involving a combination of solar PV and solar thermal technologies are not proposed to be included under the PoA.

(ii) Wind Power Plant/Unit

Wind power plant/unit uses the kinetic energy available in wind and converts it into mechanical energy using a wind turbine. By connecting the turbine to a generator, the mechanical energy is converted into electricity energy.

The CPAs will be grid connected and will install a new power plant (based entirely on either solar PV or solar thermal or wind energy) at a site where no renewable power plant was operating prior to the implementation of the project activity (green-field plant). The generated electricity would be exported to the regional/national electricity grid in India.

A.7. Public funding of PoA

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The PoA has no recourse to any public funding. The required funds would be raised through various financial institutions and equity of CPA implementing agency. WREL would ensure that there would be no divergence of Official Development Assistance (ODA) in any of the CPAs under PoA. This would be confirmed through undertaking / declaration from the CPA owner submitted to WREL.

SECTION B. Demonstration of additionality and development of eligibility criteria

B.1. Demonstration of additionality for PoA

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The PoA would facilitate project proponent's access to carbon revenues which are essential to feasibility of proposed large and small scale renewable energy project activities. As discussed earlier in section A.2, the PoA is a voluntary action being coordinated and managed by WREL. Renewable Energy projects are voluntary in nature and are not a result of any legal mandates in India. Likewise, there are no mandatory laws or regulations existing in India requiring WREL or any other party to develop a programme for renewable generation plants.

According to the information from Central Electricity Authority (CEA), as of 30 June 2012, India has about 24.8 GW of installed renewable energy capacity (excluding large hydro), which is just 12.1% of India's total installed capacity of 205.3 GW³.

India's on-shore wind capacity potential is about 48.5 GW⁴. Industry associations assert that taking into account hub heights greater than 50 m and improving conversion efficiencies from technology advancements and aggressive policy action, the potential is much greater with ranges between 65 GW and 242 GW⁵. However, as of 31 March 2012, just over 17.35 GW of installed wind capacity has been realized⁶.

Further, as of 31 March 2012, the total installed grid-connected solar power has also reached just 0.94 GW⁷ which is very low for a tropical country endowed with vast solar energy potential.

Thus it can be observed that there has not been significant investment in development of renewable energy projects in the country. This can in part be attributed to the low rates of return on investments offered by such projects as compared to the benchmark rate of return expected from projects in the power sector and in part to various barriers such as technological, institutional and financial. Thus, the PoA seeks to provide additional revenue from CDM to alleviate existing barriers and make investment in these renewable energy projects financially viable. In the absence of CDM, none of the implemented CPAs would have occurred.

Further, the eligibility criteria for inclusion of a CPA in the PoA as provided in section B.2 also includes additionality-related eligibility criteria that ensure all the relevant additionality-related guidelines and tools embedded in the methodologies are met.

B.2. Eligibility criteria for inclusion of a CPA in the PoA

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The eligibility criteria for inclusion of a CPA under the PoA have been provided below in accordance with the "Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities" (EB 65, Annex 3). These criteria check the applicability of CPAs under the respective methodology (AMS I.D for micro and small scale CPAs and ACM0002 for large scale CPAs) and also check the additionality of the CPAs as per the respective methodology.

The criteria have been grouped into four categories:

- General criteria (to be fulfilled by all CPAs for inclusion in the PoA)
- Micro-scale CPA criteria (to be fulfilled by only micro-scale CPAs for inclusion in the PoA)

³ http://www.cea.nic.in/reports/monthly/executive_rep/jun12/8.pdf

⁴ <http://www.direc2010.gov.in/pdf/India's-RE-Sector-Potential-and-Investment-opportunities-SSM.pdf> (Page 5)

⁵ <http://www.direc2010.gov.in/pdf/Indian-Renewable-Energy-Status-Report.pdf> (Page 10)

⁶ <http://mnre.gov.in/file-manager/akshay-urja/march-april-2012/EN/52.pdf>

⁷ <http://mnre.gov.in/file-manager/akshay-urja/march-april-2012/EN/52.pdf>



- Small-scale CPA criteria (to be fulfilled by only small-scale CPAs for inclusion in the PoA)
- Large-scale CPA criteria (to be fulfilled by only large-scale CPAs for inclusion in the PoA)

1. General criteria

S. No.	Criteria	Response required for eligibility for inclusion in PoA	Documentary Evidence
1.1.	Does the proposed CPA comprise of only one type of new renewable energy technology - either solar PV or solar thermal or wind energy?	Yes	Detailed Project Report prepared by third party/submitted to banks for financing, Clearances, Purchase Orders
1.2.	Is the proposed CPA located at a site where there was no renewable energy power plant operating prior to the implementation of the proposed CPA (Greenfield plant)?	Yes	Detailed Project Report prepared by third party/submitted to banks for financing, Land Documents, Clearances, Purchase Orders
1.3.	Is the project activity located in the Republic of India?	Yes	Land Documents, GPS Coordinates
1.4.	Does the CPA supply electricity to the national/regional grid?	Yes	Detailed Project Report prepared by third party/submitted to banks for financing, Power Purchase Agreement, Grid Evacuation approval/agreement
1.5.	Has the CPA owner entered into a contractual agreement with WREL at the CPA level?	Yes	Contract with WREL
1.6.	Is the proposed CPA a voluntary initiative, not mandated by any policy and/or regulation in the host country?	Yes	Relevant abstracts from public/regulatory sources to demonstrate that the project is not mandated by law/regulation.
1.7.	Is the CPA in conformance with mandatory laws and regulations?	Yes	Relevant abstracts from public/regulatory sources or clearances to demonstrate that the project is in conformance with mandatory laws and regulations.
1.8.	Is the proposed CPA already registered as a part of a PoA or as an individual CDM project?	No	GPS coordinates, Undertaking from the CPA owner, Analysis of projects in the CDM pipeline
1.9.	Is the start date of the proposed CPA prior to the commencement of the validation of the PoA, i.e. the date on which the PoA-DD is first published for global stakeholder consultation	No	Purchase orders/contracts for equipment or construction/operation services or any other documents as stated in the Glossary of CDM terms
1.10.	Can the electricity generated from the	Yes	Monitoring plan, Details of



	individual CPA be accurately measured and recorded to calculate actual emission reductions according to the applied baseline and monitoring methodology?		monitoring equipment
1.11.	Has the CPA conducted an environmental impact assessment and achieved clearance / approval from the environmental agency, if required by host country regulations?	Yes if required by host country regulations, else not applicable	EIA Report/clearance from the Government Agency
1.12.	Has the CPA conducted a local stakeholder consultation?	Yes	Minutes of meeting of local stakeholder consultation, attendance records, photographs, invitation letters, newspaper advertisements
1.13.	Does the CPA involve funding from Annex I parties that results in a diversion of official development assistance?	No	Undertaking from the CPA owner
1.14.	Does the CPA have a Plant Load Factor available as per the “Guidelines for the reporting and validation of plant load factors”?	Yes	Application to banks and/or equity financiers for project financing, application to government for project activity implementation approval, study by a third party contracted by the project participants (e.g. an engineering company) or any other document as per latest version of guidance
1.15.	Will the CPA conduct calibration of energy meters at least once every three years?	Yes	Monitoring plan of CPA, Calibration certificates by owner

2. Micro-scale CPA criteria

2.1.	Will the aggregate installed capacity of the CPA remain less than the 5 MW threshold throughout the crediting period of the CPA in accordance with the “Guidelines for demonstrating additionality of microscale project activities”?	Yes	Detailed Project Report prepared by third party / submitted to banks for financing, Clearances, Purchase Orders
2.2.	Does the CPA comply with the applicability conditions of AMS I.D Version 17?	Yes	Detailed Project Report prepared by third party / submitted to banks for financing, Clearances, Purchase Orders, Power Purchase Agreement and Grid Evacuation approval / agreement
2.3.	In order to determine the occurrence of de-bundling in accordance with the “Guidelines on assessment of de-bundling	No	Detailed Project Report prepared by third party / submitted to banks for



	for SSC project activities” Version 03, does the CPA satisfy both of the following conditions? (a) There is another project activity by the same CPA implementing agency or has a CME which also manages a small scale PoA of the same technology/measure; and (b) The boundary of the other project activity is within 1 km of the boundary of the proposed micro-scale CPA, at the closest point		financing, GPS Coordinates, Undertaking from WREL, Clearances, Purchase Orders, Contract with WREL
2.4.	Does the CPA fulfill one of the following criteria: (a) employ a specific renewable energy technology / measure recommended by the India’s designated national authority (DNA) and approved by the Board to be additional in the host country in accordance with the “Guidelines for demonstrating additionality of microscale project activities”; or (b) form part of positive list of grid-connected renewable electricity generation technologies in the “Guidelines on the demonstration of additionality of small-scale project activities”; or (c) face investment barrier demonstrated as per the “Guidelines on the assessment of investment analysis”; or (d) face barriers other than investment barrier that are demonstrated as per the “Guidelines for objective demonstration and assessment of barriers”.	Yes	(a) Detailed Project Report prepared by third party / submitted to banks for financing, Clearances, Purchase Orders (b) Detailed Project Report prepared by third party / submitted to banks for financing, Clearances, Purchase Orders (c) Detailed Project Report prepared by third party / submitted to banks for financing, Clearances, Purchase Orders, calculations of project financial indicator and benchmark using Benchmark Analysis as per the “Guidelines on the assessment of investment analysis” (d) Documents required as per the “Guidelines on the demonstration of additionality of small-scale project activities”

3. Small-scale CPA criteria

3.1.	Will the aggregate installed capacity of the CPA remain less than the 15 MW threshold throughout the crediting period of the CPA in accordance with the “General Guidelines to SSC CDM methodologies”?	Yes	Detailed Project Report prepared by third party / submitted to banks for financing, Clearances, Purchase Orders
3.2.	Does the CPA comply with the applicability conditions of AMS I.D Version 17?	Yes	Detailed Project Report prepared by third party / submitted to banks for financing, Clearances, Purchase Orders, Power Purchase Agreement and



			Grid Evacuation approval / agreement
3.3.	<p>In order to determine the occurrence of debundling in accordance with the “Guidelines on assessment of debundling for SSC project activities” Version 03, does the CPA satisfy both of the following conditions?</p> <p>(a) There is another project activity by the same CPA implementing agency or has a CME which also manages a large scale PoA of the same technology/measure; and</p> <p>(b) The boundary of the other project activity is within 1 km of the boundary of the proposed small-scale CPA, at the closest point</p>	No	Detailed Project Report prepared by third party / submitted to banks for financing, Clearances, Purchase Orders, Contract with WREL
3.4.	<p>Is the CPA additional as per the “Guidelines on the demonstration of additionality of small-scale project activities” by fulfilling one of the following criteria:</p> <p>(a) forms part of positive list of grid-connected renewable electricity generation technologies; or</p> <p>(b) faces investment barrier demonstrated as per the “Guidelines on the assessment of investment analysis”; or</p> <p>(c) faces barriers other than investment barrier that are demonstrated as per the “Guidelines for objective demonstration and assessment of barriers”.</p>	Yes	<p>(a) Detailed Project Report prepared by third party / submitted to banks for financing, Clearances, Purchase Orders</p> <p>(b) Detailed Project Report prepared by third party / submitted to banks for financing, Clearances, Purchase Orders, calculations of project financial indicator and benchmark using Benchmark Analysis as per the “Guidelines on the assessment of investment analysis”</p> <p>(c) Documents required as per the “Guidelines on the demonstration of additionality of small-scale project activities”</p>

4. Large-scale CPA criteria

4.1.	Does the CPA comply with the applicability conditions of ACM0002 Version 12.3.0?	Yes	Detailed Project Report prepared by third party / submitted to banks for financing, Clearances, Purchase Orders, Power Purchase Agreement and Grid Evacuation approval / agreement
4.2.	Is the CPA additional in accordance with the “Tool for the demonstration and assessment of additionality” Version	Yes	Applied methodology ACM0002, Detailed Project Report prepared by third

	06.1.0?	party / submitted to banks for financing, Clearances, Purchase Orders, calculations of project financial indicator and benchmark using Benchmark Analysis as per the “Tool for the demonstration and assessment of additionality” and “Guidelines on the assessment of investment analysis” or other documents required to demonstrate barriers as per the tool, capacity of plants of various technologies installed in the country
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If required by the eligibility criteria provided above for inclusion of a proposed CPA in PoA, the Benchmark Analysis would be conducted as follows:

A financial indicator (project IRR or equity IRR) would be chosen for the proposed CPA and justification for its selection would be provided. Subsequently, a benchmark would be adopted which is appropriate to the type of financial indicator calculated and could be chosen as either of the following:

Indicator chosen	Benchmark (any one of the below)
Equity IRR	<ul style="list-style-type: none"> a. Default value for the expected return on equity for India as per the “Guidelines on the assessment of investment analysis” (increased by applicable tax rate in case of pre-tax IRR⁸) b. Cost of equity determined using best financial practices (such as Capital Asset Pricing Model) using data sources which can be clearly validated while properly justifying all underlying factors in accordance with the “Guidelines on the assessment of investment analysis” c. Government/official approved benchmark where such benchmarks are used for investment decisions
Project IRR	<ul style="list-style-type: none"> a. Local commercial lending rates applicable in the country (pre-tax rate used in case of pre-tax IRR) b. Weighted Average Costs of Capital (WACC) calculated as: $WACC = \{D/(D+E)\} * \{1-T/100\} * \text{Cost of Debt} + \{E/(D+E)\} * \text{Cost of Equity (tax-rate not applied in case of pre-tax IRR)}$ Where, Cost of Debt is determined as local commercial lending rate applicable in the country and Cost of Equity is determined from any of the options listed above under Equity IRR. c. Government/official approved benchmark⁹ where such benchmarks are used for investment decisions

⁸ Appendix para 8 of the “Guidelines on the assessment of investment analysis” Version 05 states that the default values for the expected return on equity are calculated after taxes

⁹ According to EB 40 meeting report, paragraph 40, a benchmark based on tariff orders published in accordance with the Central Electricity Regulation Commission is not a suitable benchmark.

Financial indicator calculations will be done using a financial model based on a list of economic parameters provided by the CPA implementing agency and in accordance with “Guidelines on the assessment of investment analysis”. This list of parameters would include at least the following:

Parameter	Unit	Source/Comment
Technical lifetime	Year	Based on “Tool to determine the remaining lifetime of equipment”: (a) Manufacturer’s information on the technical lifetime of equipment; or (b) Expert evaluation; or (c) Default values
Investment decision date	DD/MM/YYYY	
Construction start date	DD/MM/YYYY	
Date project starts operating	DD/MM/YYYY	
Annual electricity generation	MWh/year	As per the “Guidelines for the reporting and validation of plant load factors”: (a) The plant load factor provided to banks and/or equity financiers while applying the project activity for project financing, or to the government while applying the project activity for implementation approval; or (b) The plant load factor determined by a third party contracted by the project participants (e.g. an engineering company)
Annual degradation	% per annum	Pre-feasibility assessment / Detailed Project Report prepared by third party / Manufacturer specifications / Tariff order of the state electricity regulatory commission / CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations / Technical expert opinion
Electricity tariff	INR/kWh	Will be determined on a case-by-case basis in accordance with either of the following (as applicable on the date of investment decision): <ul style="list-style-type: none"> • Power Purchase Agreement • Tariff order of the state electricity regulatory commission • State specific power policy applicable for wind / solar technologies
Escalation in electricity tariff	% per year or INR/kWh/year	
Exchange rate	Foreign/local currency	If some costs/revenues are provided in foreign currency the exchange rate in public domain as per date of investment decision shall be used to convert to local currency
Cost of Project	INR	Pre-feasibility assessment report / Detailed Project Report prepared by third party / Quotations from suppliers
Total investment	INR	If the construction is expected to last several years, a yearly breakdown of investments can be provided
Subsidy	INR	National or state-specific policy applicable for wind / solar technologies



Other revenues	INR	To be included in the calculation only if applicable to CPA and not covered under tariff. This could be Generation Based Incentive from Indian Renewable Energy Development Agency Ltd. (IREDA) or any other revenue as per state/national regulatory policies applicable on the date of investment decision.
Operation & Maintenance cost (including escalation)	% project cost or INR/ year	Pre-feasibility assessment/ Detailed Project Report prepared by third party / Tariff order of the state electricity regulatory commission / CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations / Technical expert opinion
Insurance	% project cost p.a.	Pre-feasibility assessment report/Detailed Project Report prepared by third party / Quotations from suppliers/ Tariff order of the state electricity regulatory commission / CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations / Technical expert opinion
Tax Rate	%	As per rates in the Income Tax Act, 1961 and/or any other future legislation applicable on the date of investment decision. Tax shield (if applicable) shall also be considered in accordance with the act/legislation
Depreciation Rate (Based on WDV method for tax calculation)	%	As per rates in the Income Tax Act, 1961 and/or any other future legislation applicable on the date of investment decision
Depreciation Rate (Based on SLM method for P&L statement)	%	As per rates in the Companies Act, 1956 Schedule XIV and/or any other future legislation applicable on the date of investment decision
Percentage of debt sourcing	% of total investment	Pre-feasibility assessment/ Detailed Project Report prepared by third party /typical debt:equity finance structure observed in the power sector of India / Tariff order of the state electricity regulatory commission / CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations
Interest on term loan	% per annum	Pre-feasibility assessment/ Detailed Project Report prepared by third party / Commercial Lending Rate prevailing at the time of investment decision / Tariff order of the state electricity regulatory commission / CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations
Loan Moratorium	months	Pre-feasibility assessment/ Detailed Project Report prepared by third party / typical loan repayment period observed in the power sector of India / Tariff order of the state electricity regulatory commission / CERC (Terms and Conditions for Tariff determination from Renewable Energy

		Sources) Regulations
Loan Repayment Period	years	Pre-feasibility assessment/ Detailed Project Report prepared by third party / typical loan repayment period observed in the power sector of India/ Tariff order of the state electricity regulatory commission / CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations
Working Capital components	Provision for: <ul style="list-style-type: none"> • Receivables • O&M expenses • Maintenance and spares 	Pre-feasibility assessment/ Detailed Project Report prepared by third party / Tariff order of the state electricity regulatory commission / CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations
Working Capital Interest rate	% per annum	Pre-feasibility assessment/ Detailed Project Report prepared by third party / Commercial Lending Rate prevailing at the time of investment decision / Tariff order of the state electricity regulatory commission / CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations
Salvage value	% of project cost	Pre-feasibility assessment/ Detailed Project Report prepared by third party / Tariff order of the state electricity regulatory commission / CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations / Technical expert opinion

The financial indicator should be lower than the benchmark to demonstrate additionality.

The financial indicator would also require to be subjected to a sensitivity analysis ($\pm 10\%$) by varying critical parameters in the financial model to assess the robustness of the result. The following parameters need to be subjected to the sensitivity analysis:

- Energy generation
- Capital Cost
- Operation & Maintenance cost
- Tariff rate

In case the financial indicator remains lower than the benchmark in spite of favourable variations, it can be concluded that the CPA is unlikely to be financially attractive and would not have been implemented without CDM revenues.

Since the CPAs are measures involving use of renewable energy, the steps provided in paragraph 47 of the “Tool for the demonstration and assessment of additionality” Version 06.1.0 would be followed for common practice analysis. The parameters N_{all} and N_{diff} shall be referred from publicly available information such as:

- Related government ministries/departments
- Solar / Wind / Renewable Energy Industry associations
- Solar / Wind / Renewable Energy International associations
- Sectoral publications on Solar / Wind / Renewable energy installations
- Market penetration of different renewable energy technologies

Project activities that are registered under CDM or undergoing validation shall be checked from the CDM website.

Revision of eligibility criteria

The above mentioned eligibility criteria for inclusion of a CPA in the PoA would be appropriately revised in case of any of the following conditions:

- If ACM0002 Version 12.3.0 or AMS-I.D Version 17 is revised or replaced, subsequent to being placed on hold, the eligibility criteria shall be revised according to the requirements of the revised or new methodologies with immediate effect.
- If ACM0002 Version 12.3.0 or AMS-I.D Version 17 is revised or replaced and the meeting of the Executive Board specifically indicates that this change requires updating of eligibility criteria of PoA
- If the boundary of the PoA is amended post-registration to expand the geographic coverage to include other host parties in addition to India
- If the Executive Board has identified an issue related to environment integrity at any time during the lifetime of the PoA
- At the renewal of the crediting period of the PoA (at the renewal of the first CPA), WREL shall update the eligibility criteria as per the latest revised applicable methodologies.
- In case there is any change in circumstances like revision of guidelines.

In the above cases, a new version of the PoA-DD and generic CPA-DD containing updated eligibility criteria validated by a DOE shall be submitted to the Board for approval.

B.3. Application of methodologies

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The PoA will support the development of new grid-connected renewable energy power plants in India and will cover solar and wind power renewable energy technologies.

The CPAs will be grid connected and will install a new power plant at a site where no renewable power plant was operating prior to the implementation of the project activity (green-field plant). The generated electricity would be exported to the NEWNE regional grid or Southern regional grid (or an integrated national grid if created in future).

WREL has obtained a clarification AM_CLA_0227 “Application of combination of large scale methodology ACM0002 and small-scale methodology AMS I.D in a renewable energy PoA”¹⁰ from the Meth Panel permitting use of combination of ACM0002 and AMS-I.D in the PoA, where each CPA will apply only one technology and only one of the two methodologies. Accordingly,

- ❖ In case of large scale projects, i.e. CPAs with total installed capacity > 15 MW:

Title: Consolidated baseline methodology for grid-connected electricity generation from renewable sources

Reference: ACM0002 Version 12.3.0¹¹

- ❖ In case of small scale projects, i.e. CPAs with total installed capacity ≤ 15 MW:

Title: Grid connected renewable electricity generation

Reference: AMS I.D Version 17

¹⁰ <http://cdm.unfccc.int/methodologies/PAmethodologies/clarifications/58686>

¹¹ Requests for registration for PoA can be submitted until 11 Jan 2013 23:59:59 GMT

SECTION C. Management system

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WREL is the Coordinating / Managing Entity (CME) for the PoA and is the overall in-charge for operational and management arrangements for the implementation of the PoA. It shall have the following responsibilities with respect to the implementation of the PoA:

- Creating PoA documentation (forms F-CDM-PoA-DD and F-CDM-CPA-DD)
- Check for compliance of CPAs with inclusion eligibility criteria
- Obtaining a Letter of Authorization from the host country
- Obtaining a Letter of Approval from the host country and the Annex I party involved for the CPA
- Coordinating and communicating with the validating/verifying DoE and the EB
- Conduct training and capacity building exercises for personnel of CPA implementing bodies for data monitoring, recording and reporting in accordance with CPA-DD
- Periodically collecting data on monitoring parameters from CPA implementing bodies as per the monitoring plan defined in the respective CPA-DD
- Drafting monitoring reports for all CPAs in accordance with the methodology outlined in the PoA-DD
- Requesting the UNFCCC to issue CERs into a registry account of the CER buyer(s)

A CDM PoA team shall be constituted by WREL to check compliance of new CPAs proposed for inclusion under the PoA. All eligibility criteria for inclusion of new CPAs in the CPA as provided in section B.2 of this document shall be checked thoroughly against any of the suggested documentary evidence sources provided in the same section. The team shall consist of professionals with sufficient competence to assess eligibility of CPAs for inclusion under the PoA. The team may hire consultants, if deemed necessary, for this purpose.

WREL shall maintain a record keeping system for each CPA under the PoA. This would include:

- Serial Number of the CPA
- GPS coordinates (latitude and longitude) of the CPA power house(s) for solar projects or turbines for wind projects
- Name of the CPA implementing body
- Name and contact details of the authorized representative of the CPA
- Energy generation capacity of plants/units in the CPA (MW)
- Date of inclusion in the CPA
- Duration of crediting period of CPA
- Periods for which verification of the CPA has been completed along with quantum of CERs issued
- Periods for which verification of the CPA is under progress
- Data on monitoring parameters for each verification period along with their sources and any other records related to verification
- Trainings and capacity building exercises conducted for personnel of CPA implementing bodies

WREL will also be responsible for the management of records and data associated with each CPA. The database will be updated manually using the data supplied by the participating CPAs and will form the basis for the verification of CPAs. The same shall also be available for inspection to the DOE at any point of time.

WREL would ensure that each CPA being proposed for inclusion in the PoA does not result in double-counting of emission reductions. This would be done through the following:

- Checking CPA plant/unit details against the record keeping system being maintained for PoA
- Checking CPA plant/unit details against the projects already under validation / registered under CDM independently or part of another PoA

- Undertaking from the CPA implementing body confirming that project activity is not an individual CDM project or part of any other PoA

WREL shall also ensure that the CPA implementing body has entered into a contract with it. The same also forms a part of eligibility conditions for inclusion under the PoA. With the contract, the CPA implementing body shall concede its rights to claim and own emission reductions under the Clean Development Mechanism of the UNFCCC or any voluntary scheme to WREL. It shall also confirm that CPA or any part of it has not been and will not be registered as a single CDM project activity or as a CPA under another PoA and that the implementing body is aware that the CPA will be subscribed to the present PoA.

WREL shall further conduct training and capacity building exercises for its own personnel based on any identified needs to ensure that continuous improvements of the PoA management system are taking place.

In addition, each CPA implementing body shall also have the following responsibilities with respect to participation in the PoA:

- Implementing the renewable energy power plant/unit (construction, commissioning, operation and maintenance of power plant)
- Monitor, record and report data on monitoring parameters defined in the CPA-DD to WREL as per the defined monitoring plan
- Ensure plant personnel attend trainings related to monitoring, recording and reporting of data.

The plant personnel shall be trained on the following aspects of equipments involved in the project activity – start up techniques, operation, maintenance, monitoring of parameters, precautions, safety instructions and emergency preparedness etc. The following procedure will be followed for training:

- A copy of Operation and Maintenance manual, Safety instructions related to the equipment involved in the project activity will be made available to all employees involved in the project.
- During commissioning of the new equipments (of the project activity), training on all above aspects to all employees involved in the project activity will be provided.
- Whenever an employee handles the equipments involved in the project activity first time, training will be provided to him on start up techniques, operation, maintenance, monitoring of parameters, precautions, safety instructions and emergency preparedness etc.
- The training will be provided by respective equipment supplier and expert O & M personnel of the company.



SECTION D. Duration of PoA

D.1. Start date of PoA

>>

12/05/2012

The start date of the PoA has been considered as the date of publication of the PoA for global stakeholder consultation.

D.2. Length of the PoA

>>

28 years

**SECTION E. Environmental impacts****E.1. Level at which environmental analysis is undertaken**

>>

The environmental analysis will be undertaken at the CPA level.

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

E.2. Analysis of the environmental impacts

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The environmental impacts analysis will be done at CPA level.

E.3. Environmental impact assessment

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The assessment of significant environmental impacts (if any) of the CPA shall be conducted as per the applicable laws and regulations at the time of inclusion of CPA to the PoA.

SECTION F. Local stakeholder comments**F.1. Solicitation of comments from local stakeholders**

>>

The Local Stakeholder Consultations will be held at the CPA level, taking into consideration the scale and different technologies of the CPAs. It is essential to capture the stakeholders' views on the impact of each of the different technologies implemented in the CPAs. Further, taking into consideration the differences of circumstances and opinions of each and every community in which each CPA is located, it is essential to capture each community's view on the impact of the CPA implemented in their surroundings.

Each CPA will apply the following approach as considered appropriate for stakeholder consultation and document the same in the respective CPA-DD:

- a. Identification of Stakeholders. The list would normally include among others:
 - Representatives of indigenous communities and vulnerable groups
 - Local inhabitants (including farmers, villagers, local contractors etc.) who have sold their land for the project activity
 - Technology providers/suppliers
 - Participants from government agencies providing approval for the project
 - Participants from local NGOs (not mandatory)
- b. Invitation – to be sent at least 10 days in advance
 - Personalized invitation letters to be sent to representatives of village governing bodies or heads of local communities/groups; and/or
 - Public notices to be put up at notice boards in popular locations such as office of the village governing body and/or local community centres; and/or
 - Notification in local newspapers in regional/local language
- c. Fixing time and venue for the meeting
 - The time and venue chosen should be such that it allows maximum participation from various sections/groups
- d. Conducting the meeting at the site/chosen venue keeping in mind the following:
 - Appropriateness of location for maximum representation
 - Availability of space to accommodate anticipated gathering
- e. Address by the senior management representative of the project (in the form of a presentation) in local language, which should include:
 - Description of the project activity
 - Associated benefits e.g. greenhouse gas emissions mitigation, control of air pollution (including SPM and other gases), employment benefits, efficient utilization of resources etc.
 - Associated impacts on environment/people
 - Contribution to social/economic upliftment
- f. Seeking comments from the stakeholders
 - Open round for seeking comments/suggestions
 - Each query/comment to be noted along with the details of the stakeholder asking the question (e.g. name of the stakeholder, representative of which section/village)
- g. Providing clarifications/response to the comments raised by the stakeholders



- h. Preparing minutes of the proceedings providing a summary of concerns raised and clarifications provided thereof.
- i. Proof of attendance should include the following:
 - Attendance sheets to be prepared seeking names and signatures of individual stakeholders
 - Photographs/Video recording of the proceedings

F.2. Summary of comments received

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The comments received during the stakeholder consultation will be properly documented in the minutes of meeting and a summary of the same will be provided under relevant sections in the CPA-DD.

F.3. Report on consideration of comments received

>>

A summary of responses to stakeholder comments provided during the meeting will also be presented in the individual CPA-DD.

**SECTION G. Approval and authorization**

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The Party involved in the PoA is India and it is involved indirectly. The Letter of Approval from the Designated National Authority for India i.e. National CDM Authority is provided below.



भारत सरकार
पर्यावरण एवं वन मंत्रालय
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT & FORESTS

No: 4/13/2012-CCC

11 October 2012.

To,
Ms Sindoor Mittal
Welspun Renewables Energy Limited
Welspun House, 7th Floor
Kamala city, Senapati Bapat Marg,
Lower Parel (W)
Mumbai-400013
Maharashtra

Sub: Host Country Approval to the Programme of Activities (PoA) – **“Welspun Renewable Energy Program”** by M/s Welspun Renewables Energy Limited (Coordinating/ Managing entity- CME) – regarding CDM

Sir,

I am directed to state that the Project Design Document of the Programme of Activities (PoA) – **“Welspun Renewable Energy Program”** by M/s Welspun Renewables Energy Limited (Coordinating/ Managing entity- CME) was considered by the National CDM Authority in its meeting held on 24 August 2012. The Authority confirms that:

- (i) The Government of India has ratified the Kyoto Protocol in August 2002.
- (ii) This is approval of voluntary participation in the proposed CDM Programme of Activities (PoA).
- (iii) The Programme of Activities (PoA) contributes to Sustainable Development in India.

Yours faithfully,

(Rajiv Kumar)
Deputy Secretary (CC) and
Member Secretary (National CDM Authority)



जहाँ है हरियाली।
वहाँ है खुशहाली।

पर्यावरण भवन, सी.जी.ओ. कॉम्प्लेक्स, लोदी रोड, नई दिल्ली - 110 003
PARIVARAN BHAWAN, C.G.O. COMPLEX, LODHI ROAD, NEW DELHI - 110 003
Website : envfor.nic.in



No. 4/13/2012-CCC

To,
Mr. Sindoor Mittal
Welspun Renewables Energy Limited
Welspun House, 7th Floor
Kamala city, Senapati Bapat Marg,
Lower Parel (W)
Mumbai-400013
Maharashtra

भारत सरकार
पर्यावरण एवं वन मंत्रालय
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT & FORESTS

11 October 2012.

Sub: Host Country Approval to the Programme of Activities (PoA) – **“Welspun Renewable Energy Program”** by M/s Welspun Renewables Energy Limited (Coordinating/ Managing entity- CME) – regarding CDM

Sir,

Kindly refer to Ministry's letter No.: 4/13/2012-CCC dated 11 October 2012 conveying Host Country Approval to the Programme of Activities (PoA) - **“Welspun Renewable Energy Program”** by M/s Welspun Renewables Energy Limited (Coordinating/ Managing entity- CME)

Please note that the following conditions shall also be complied with:

- (i) The Managing /Coordinating Entity as well as individual proponent of CDM Programme Activity (CPAs) shall not sell the CERs to any agency/ company/ organization, which purchases the CERs using ODA Funds.
- (ii) The Managing /Coordinating Entity as well as individual proponent of CDM Programme Activity (CPAs) shall furnish expeditiously any information, during the lifetime of the project as requested by the National CDM Authority.
- (iii) The Managing /Coordinating Entity as well as individual proponent CDM Programme Activity (CPAs) shall obtain all statutory clearances and other approvals as required from the competent authorities for setting up of the project.
- (iv) The Managing /Coordinating Entity shall inform biannually the National Clean Development Mechanism Authority (NCDMA) of all CDM Programme Activity (CPAs) added into the PoA during the interim that do not require any clearance from competent authorities e.g distribution of Compact Fluorescent Lamp (CFLs) etc.
- (v) All activities relating to CDM project activity shall comply with the decisions taken by COP/MOP to the UNFCCC and CDM-Executive Board.
- (vi) The Managing /Coordinating Entity of the PoA shall ensure that all CDM Programme Activity (CPAs) are duly registered/incorporated by Indian Authorities prior to their joining the PoA.
- (vii) This approval is not transferable. The authority reserves the right to revoke this Host Country Approval if the conditions stipulated in this approval are not complied with to the satisfaction of the National CDM Authority.

Yours faithfully,

(Rajiv Kumar)
Deputy Secretary (CC) and
Member Secretary (National CDM Authority)



जहाँ है हरियाली/
वहाँ है खुशहाली।।

पर्यावरण भवन, सी.जी.ओ. कॉम्प्लेक्स, लोदी रोड, नई दिल्ली - 110 510
PARIVARAN BHAWAN, C.G.O. COMPLEX, LODHI ROAD, NEW DELHI - 110 510

PART II. Generic component project activity (CPA)**SECTION A. General description of a generic CPA****A.1. Purpose and general description of generic CPAs**

>>

The project activity is the installation of a new grid-connected “” MW “solar or wind” power plant/unit at a site where no renewable power plant was operating prior to the implementation of the project activity (green-field plant). The project is being implemented in “location (village, tehsil, district, state)” by “CPA implementing agency”.

The generated electricity would be exported to the “regional/national electricity grid” in India and would be a step towards ensuring energy security, grid diversification and sustainable growth of the electricity generation sector in India. The electricity exported by the project activity would displace an equivalent amount of electricity generated by the power plants already operational and proposed to be added in the “regional/national grid” which relies predominantly on fossil fuels. Thus the project activity would result in a reduction of GHG emissions from the baseline scenario.

The project activity is being pursued as a component of the PoA “Welspun Renewable Energy Program” with the CME as Welspun Renewables Energy Limited.

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 proposed project would lead to generation of business opportunities and employment in the region thereby contributing towards social upliftment through direct and indirect benefits.
- The project activity in its execution will lead to development of infrastructure in the region and at the same time promote business in the region through the improvement in electricity generation capacity of the grid.

Economic well-being:

- The project activity would lead to an investment in the region accompanied with business and employment benefits along with improvement of grid supply which otherwise would not have happened in the absence of project activity.
- The clean electricity generated through “solar or wind” technology by the project activity would be fed into the grid thereby improving the availability of electricity in the region. This would provide a better scenario for local industries and businesses to improve their production capacities thereby contributing towards the overall economic development of the region.

Environmental well being:

- The project activity employs “solar or wind” technology for generation of electricity thereby displacing fossil fuels which are being rapidly consumed to meet the growing demand of electricity in the country thus contributing towards reduction in GHG emissions.
- “Solar or wind” projects generate no end products in the form of solid waste (ash etc.) compared to alternative modes of power generation (e.g. coal based on which the Indian grid is primarily dependent). Hence the project activity is a cleaner source of power generation and is encouraging greener practice of power generation.

Technological well being:

- The project activity uses “solar or wind” power technology for power generation thereby demonstrating the viability of renewable energy generation to other project developers in the region.



- The project activity would generate electricity through a technology that is environmentally safe and sound.

For large scale CPAs, as per the mandate from the National CDM Authority, a minimum of 2% earning (net realization value) from the sale of CERs would be committed towards Sustainable Development activities including society and community development activities. This commitment would be realized based on the actual CER revenue that has accrued to the “*CPA implementing agency*” from selling CERs after meeting the statutory tax requirements and CER revenue sharing requirements with the utility as per the provisions of the Purchase Agreement (‘PPA’).

SECTION B. Application of a baseline and monitoring methodology**B.1. Reference of the approved baseline and monitoring methodology(ies) selected**

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❖ *In case of large scale CPAs, i.e. project activities with individual installed capacity > 15 MW:*

Title: Consolidated baseline methodology for grid-connected electricity generation from renewable sources

Reference: ACM0002, Version 12.3.0, Sectoral scope: 1

The approved methodology also draws upon:

- Version 06.1.0 (EB 69, Annex 20, 13th September 2012) of the “Tool for the demonstration and assessment of additionality”; and
- Version 02.2.1 (EB 63, Annex 19, 29th September 2011) of the “Tool to calculate the emission factor for an electricity system”
- Version 04.0.0 (EB 66, Annex 48, 02nd March 2012) of the “Combined tool to identify the baseline scenario and demonstrate additionality”
- Version 02 (EB 41, Annex 11, 02nd August 2008) of the “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion”

It has been referred from the list of approved methodologies for CDM project activities in the UNFCCC CDM website (<http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html>).

❖ *In case of small scale CPAs, i.e. project activities with individual installed capacity ≤ 15 MW:*

Title: Grid connected renewable electricity generation

Reference: AMS I.D, Version 17, Sectoral scope: 1

It has been referred from the list of approved methodologies for CDM project activities in the UNFCCC CDM website (<http://cdm.unfccc.int/methodologies/SSCmethodologies/approved>).

B.2. Application of methodology(ies)

>>

❖ *In case of large scale CPAs, i.e. project activities with individual installed capacity > 15 MW:*

Methodology applied: ACM0002 Version 12.3.0 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”

Justification of the choice of methodology

The project activity is a grid-connected renewable energy generation project and meets the applicability conditions of the chosen methodology.

This methodology is applicable to grid-connected renewable power generation project activities that

- (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant);*
- (b) involve a capacity addition;*
- (c) involve a retrofit of (an) existing plant(s); or*
- (d) involve a replacement of (an) existing plant(s).*

The project activity is the installation of a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant).

The methodology is applicable under the following conditions:

- *The project activity is the installation, or modification/retrofit of a, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a*

run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;

- The project activity is the installation of a new “solar power or wind power” plant. Hence, the applicability criterion is satisfied.
- *In the case of capacity additions, retrofits or replacements (except for capacity addition projects for which the electricity generation of the existing power plant(s) or unit(s) is not affected): the existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity addition or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity;*
- The project activity is not a capacity addition, retrofit or replacement of an existing power plant. Hence, the applicability criterion is not required to be satisfied.
- *In case of hydro power plants, at least one of the following conditions must apply:*
 - *The project activity is implemented in an existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or*
 - *The project activity is implemented in an existing single or multiple reservoirs, where the volume of any of reservoirs is increased and the power density of each reservoir, as per definitions given in the Project Emissions section, is greater than 4 W/m² after the implementation of the project activity; or*
 - *The project activity results in new single or multiple reservoirs and the power density of each reservoir, as per definitions given in the Project Emissions section, is greater than 4 W/m² after the implementation of the project activity.*
- The project activity is not a hydro power plant. Hence, the applicability criterion is not required to be satisfied.
- *In case of hydro power plants using multiple reservoirs where the power density of any of the reservoirs is lower than 4 W/m² after the implementation of the project activity all of the following conditions must apply:*
 - *The power density calculated for the entire project activity using equation 5 is greater than 4 W/m²;*
 - *All reservoirs and hydro power plants are located at the same river and where are designed together to function as an integrated project that collectively constitutes the generation capacity of the combined power plant;*
 - *The water flow between the multiple reservoirs is not used by any other hydropower unit which is not a part of the project activity;*
 - *The total installed capacity of the power units, which are driven using water from the reservoirs with a power density lower than 4 W/m², is lower than 15MW;*
 - *The total installed capacity of the power units, which are driven using water from reservoirs with a power density lower than 4 W/m², is less than 10% of the total installed capacity of the project activity from multiple reservoirs.*
- The project activity is not a hydro power plant. Hence, the applicability criterion is not required to be satisfied.

The methodology is not applicable to the following:

- *Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site;*
- The project activity does not involve switching from fossil fuels to renewable energy sources.
- *Biomass fired power plants;*
- The project activity is not a biomass fired power plant.
- *Hydro power plant that result in new single reservoir or in the increase in existing single reservoir where the power density of the reservoir is less than 4 W/m².*
- The project activity is not a hydro power plant.

Hence, the approved monitoring methodology ACM0002 "Consolidated monitoring methodology for grid-connected electricity generation from renewable sources" is applicable to the project activity.

❖ *In case of small scale CPAs, i.e. project activities with individual installed capacity ≤ 15 MW:*

Methodology applied: AMS I.D, Version 17 "Grid connected renewable electricity generation"

Justification of the choice of methodology

- *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.*
- The project activity is the installation of a new "solar power or wind power" plant supplying electricity to "national/regional" grid. It does not involve supply of electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling. Hence, the applicability criterion is satisfied.
- *Illustration of respective situations under which each of the methodology (i.e. AMS-I.D, AMS-I.F and AMS-I.A) applies is included in Table 2.*
- The project activity supplying electricity to a "national/regional" grid. Hence, the applicability criterion is satisfied.
- *This methodology is applicable to project activities that: (a) Install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) Involve a capacity addition; (c) Involve a retrofit of (an) existing plant(s); or (d) Involve a replacement of (an) existing plant(s).*
- The project activity is the installation of a new "solar power or wind power" plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (greenfield plant). Hence, the applicability criterion is satisfied.
- *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.*

- The project activity is not a hydro power plant. Hence, the applicability criterion is not required to be satisfied.
- *If the new unit 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 new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.*
- The project activity is the installation of a greenfield “solar power or wind power” within the eligibility limit of 15 MW and does not include any non-renewable components. Hence, the applicability criterion is satisfied.
- *Combined heat and power (co-generation) systems are not eligible under this category.*
- The project activity does not involve combined heat and power (co-generation) systems.
- *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 from the existing units.*
- The project activity is the installation of a new “solar power or wind power” plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (greenfield plant). Hence, the applicability criterion is not required to be satisfied.
- *In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.*
- The project activity is the installation of a new “solar power or wind power” plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (greenfield plant). Hence, the applicability criterion is not required to be satisfied.

B.3. Sources and GHGs

The methodologies ACM0002 Version 12.3.0 and AMS I.D Version 17 applicable for large and small scale CPAs respectively, specify that:

“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 proposed project activity would be feeding the electricity in the “national/regional” grid and would have marginal impact on all the generation facilities in the grid. Thus all the power generation facilities connected to this grid form the project boundary for the purpose of baseline estimation.

The project activity has a distinctive physical demarcated boundary. A diagram depicting the project boundary is shown below.

For CPAs that have independent electricity meters installed for measurement of net electricity exported to grid i.e. the meters installed at the grid inter-connection point measure the electricity generation from the CPA only, the project boundary would be as follows:

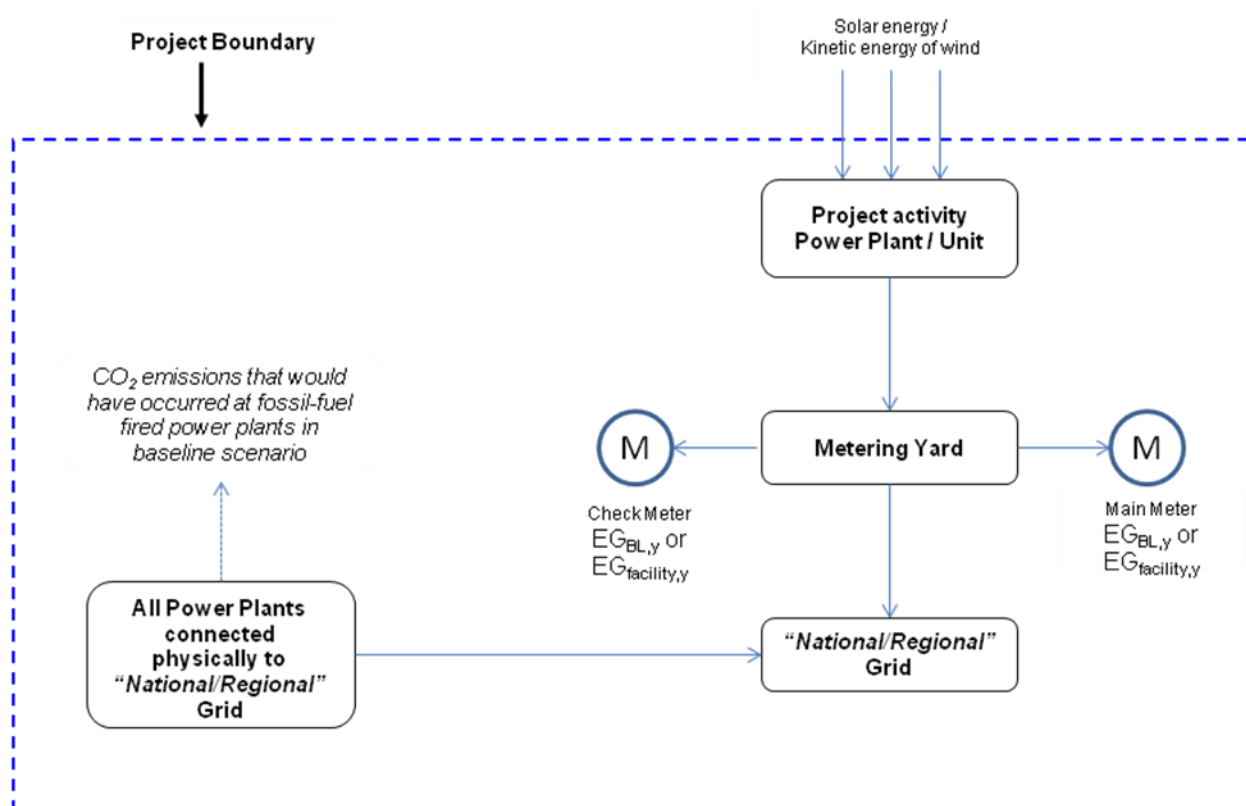


Fig. 2 (a): Project Boundary

For CPAs that do not have independent electricity meters installed for measurement of net electricity exported to grid i.e. the meters installed at the grid inter-connection point measure the combined electricity generation from the CPA as well as non-CPA project activities, apportioning procedures would be adopted for the calculating the net electricity generation attributable to the CPA. The project boundary in such a CPA would be as follows:

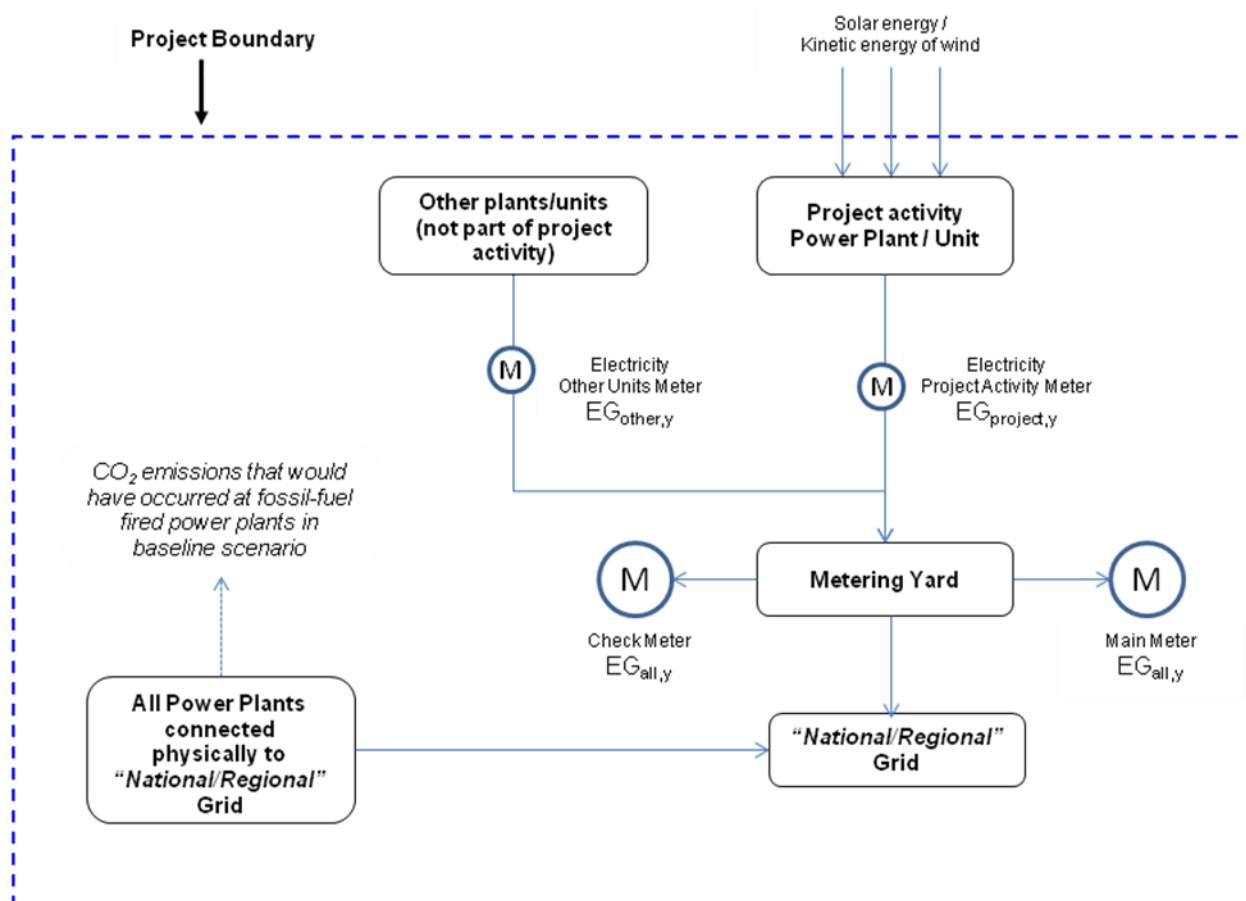


Fig. 2 (b): Project Boundary

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

Source		Gas	Included?	Justification / Explanation
Baseline scenario	CO ₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity.	CO ₂	Yes	This is the main emission source because the combustion of fossil fuels for electricity generation leads to emission of CO ₂ .
		CH ₄	No	This is a minor emission source because the emission of CH ₄ from the combustion of fossil fuels is low.
		N ₂ O	No	This is a minor emission source because the emission of N ₂ O from the combustion of fossil fuels is low.
Project scenario	For geothermal power plants, fugitive	CO ₂	No	The PoA does not include geothermal power plants. Thus these emission sources are not applicable.

	emissions of CH ₄ and CO ₂ from non-condensable gases contained in geothermal steam.	CH ₄	No	
		N ₂ O	No	
	For geothermal power plants, CO ₂ emissions from combustion of fossil fuels required to operate the geothermal power plant.	CO ₂	No	The PoA does not include geothermal power plants. Thus these emission sources are not applicable.
		CH ₄	No	
		N ₂ O	No	
	For hydro power plants, emissions of CH ₄ from the reservoir.	CO ₂	No	The PoA does not include hydro power plants. Thus these emission sources are not applicable.
		CH ₄	Yes	
		N ₂ O	No	

B.4. Description of baseline scenario

>>

❖ *In case of large scale CPAs, i.e. project activities with individual installed capacity > 15 MW:*

As the project activity is the installation of a new grid-connected “solar power or wind power” plant/unit, according to ACM0002 Version 12.3.0, the baseline scenario is the following:

Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system” described step wise under section B.6.1.

The Combined Margin has been calculated using the latest version of “Tool to calculate the emission factor for an electricity system”. The Operating Margin (OM) and Build margin (BM) emission factors have been considered from the information available in the CO₂ Baseline Database for the Indian Power Sector published by the Central Electricity Authority (CEA), Ministry of Power, Govt. of India¹². These factors have been computed according to the procedures prescribed in the latest version of “Tool to calculate the emission factor for an electricity system” and the steps have been explained under section B.6.1.

❖ *In case of small scale CPAs, i.e. project activities with individual installed capacity ≤ 15 MW:*

As the project activity is the installation of a new grid-connected “solar power or wind power” plant/unit, according to paragraph 10 of AMS I.D Version 17, the baseline scenario is the electricity

¹² http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

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.

Therefore as per AMS I.D Version 17 Para 11, the baseline emissions are the product of electrical energy baseline $EG_{BL,y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor.

$$BE_y = EG_{BL,y} \times EF_{CO_2,grid,y}$$

Where:

- BE_y = Baseline Emissions in year y (tCO₂)
- $EG_{BL,y}$ = Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)
- $EF_{CO_2,grid,y}$ = CO₂ Emission Factor in year y (tCO₂/MWh)

As per paragraph 12, the Emission Factor can be calculated in a transparent and conservative manner 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 tCO₂/MWh) of the current generation mix. The data of the year in which project generation occurs must be used.”

The approach proposed in the “Option (a)” i.e. “Combined Margin” has been used for ascertaining baseline emissions and corresponding emission reductions. The Operating Margin (OM) and Build margin (BM) emission factors have been considered from the information available in the CO₂ Baseline Database for the Indian Power Sector published by the Central Electricity Authority (CEA), Ministry of Power, Govt. of India¹³. These factors have been computed according to the procedures prescribed in the latest version of ‘Tool to calculate the emission factor for an electricity system’ and the steps have been explained under section B.6.1.

B.5. Demonstration of eligibility for a generic CPA

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The project activity is eligible to be included in the PoA because it fulfils the following criteria defined for inclusion of a CPA in the PoA:

1. General criteria

S. No.	Criteria	Response	Justification
1.1.	Does the proposed CPA comprise of only one type of new renewable energy technology - either solar PV or solar thermal or wind energy?	Yes	The project activity is a new renewable energy power plant based on “ <i>solar PV or solar thermal or wind energy</i> ”.
1.2.	Is the proposed CPA located at a site where there was no renewable energy power plant operating prior to the implementation of the proposed CPA (Greenfield plant)?	Yes	The project activity is located at a site where there was no renewable energy power plant operating prior to the implementation of the proposed project activity (Greenfield plant).
1.3.	Is the project activity located in the	Yes	The project activity is located in India.

¹³ http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm



	Republic of India?		
1.4.	Does the CPA supply electricity to the national/regional grid?	Yes	The project activity supplies electricity to the “national/regional” grid.
1.5.	Has the CPA owner entered into a contractual agreement with WREL at the CPA level?	Yes	The project proponent has entered into a contract with WREL
1.6.	Is the proposed CPA a voluntary initiative, not mandated by any policy and/or regulation in the host country?	Yes	<i>The Electricity Act came into effect on 10 June 2003 and covers major issues involving generation, distribution, transmission and trading of power¹⁴. This act does not favour or discourage any particular sources for power generation and this project activity is a voluntary initiative.</i>
1.7.	Is the CPA in conformance with mandatory laws and regulations?	Yes	<i>The Electricity Act covers major issues involving generation, distribution, transmission and trading of power¹⁵. The act does not favour or discourage any particular sources for power generation. Therefore, the project activity is in compliance with this act and is consistent with mandatory laws and regulations.</i>
1.8.	Is the proposed CPA already registered as a part of a PoA or as an individual CDM project?	No	The project activity is not registered as a part of any other PoA or as an individual CDM project.
1.9.	Is the start date of the proposed CPA prior to the commencement of the validation of the PoA, i.e. the date on which the PoA-DD is first published for global stakeholder consultation	No	The start date of the project activity is “DD/MM/YYYY” when “event description” happened. This is after the commencement of the validation of the PoA, i.e. “DD/MM/YYYY” when the PoA-DD was first published for global stakeholder consultation.
1.10.	Can the electricity generated from the individual CPA be accurately measured and recorded to calculate actual emission reductions according to the applied baseline and monitoring methodology?	Yes	The electricity generated from the project activity can be accurately measured and recorded to calculate actual emission reductions according to the applied baseline and monitoring methodology. Electricity meters are being installed in the plant/unit with continuous measurement and at least monthly recording of data.
1.11.	Has the CPA conducted an environmental impact assessment and achieved clearance/approval from the environmental agency, if required by host country regulations?	Yes if required by host country regulations, else not applicable	<i>Details about environmental impact assessment and clearance/approval from the environmental agency.</i>

¹⁴ http://www.powermin.nic.in/acts_notification/electricity_act2003/pdf/The%20Electricity%20Act_2003.pdf

¹⁵ http://www.powermin.nic.in/acts_notification/electricity_act2003/pdf/The%20Electricity%20Act_2003.pdf



1.12.	Has the CPA conducted a local stakeholder consultation?	Yes	The project proponent has conducted a local stakeholder consultation on DD/MM/YYYY to capture the stakeholders' views on the impact of the project activity.
1.13.	Does the CPA involve funding from Annex I parties that results in a diversion of official development assistance?	No	The project activity does not involve funding from Annex I parties that results in a diversion of official development assistance. An undertaking to this effect has been submitted to WREL.
1.14.	Does the CPA have a Plant Load Factor available as per the “Guidelines for the reporting and validation of plant load factors”?	Yes	<i>Details about how the Plant Load Factor has been determined as either of the following: Application to banks and/or equity financiers for project financing, application to government for project activity implementation approval, study by a third party contracted by the project participants (e.g. an engineering company) or any other document as per latest version of guidance</i>
1.15.	Will the CPA conduct calibration of energy meters at least once every three years?	Yes	The monitoring plan of CPA considers calibration of energy meters at least once every three years.

2. Micro-scale CPA criteria

2.1.	Will the aggregate installed capacity of the CPA remain less than the 5 MW threshold throughout the crediting period of the CPA in accordance with the “Guidelines for demonstrating additionality of micro scale project activities”?	Yes	<i>Description of how throughout the crediting period of the CPA, the project activity has an aggregate installed capacity less than 5 MW</i>
2.2.	Does the CPA comply with the applicability conditions of AMS I.D Version 17?	Yes	<i>Description of how the CPA complies with the applicability conditions of AMS I.D Version 17</i>
2.3.	In order to determine the occurrence of de-bundling in accordance with the “Guidelines on assessment of debundling for SSC project activities” Version 03, does the CPA satisfy both of the following conditions? (a) There is another project activity by the same CPA implementing agency or has a CME which also manages a small scale PoA of the same technology/measure; and (b) The boundary of the other project activity is within 1 km of the boundary of the proposed micro-scale CPA, at the closest point	No	<i>Description of how there is no project activity by the same CPA implementing agency or has a CME which also manages a small scale PoA of the same technology / measure and its boundary is within 1 km of the boundary of the proposed micro-scale CPA at the closest point.</i>
2.4.	Does the CPA fulfill one of the following criteria: (a) employs a specific renewable energy	Yes	<i>Description of how proposed CPA fulfills one of the criterions.</i>

	<p>technology / measure recommended by the India's designated national authority (DNA) and approved by the Board to be additional in the host country in accordance with the "Guidelines for demonstrating additionality of microscale project activities"; or</p> <p>(b) forms part of positive list of grid-connected renewable electricity generation technologies in the "Guidelines on the demonstration of additionality of small-scale project activities"; or</p> <p>(c) faces investment barrier demonstrated as per the "Guidelines on the assessment of investment analysis"; or</p> <p>(d) faces barriers other than investment barrier that are demonstrated as per the "Guidelines for objective demonstration and assessment of barriers".</p>		
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3. Small-scale CPA criteria

3.1.	Will the aggregate installed capacity of the CPA remain less than the 15 MW threshold throughout the crediting period of the CPA in accordance with the "General Guidelines to SSC CDM methodologies"?	Yes	<i>Description of how throughout the crediting period of the CPA, the project activity has an aggregate installed capacity less than 15 MW in case of small-scale CPA.</i>
3.2.	Does the CPA comply with the applicability conditions of AMS I.D Version 17?	Yes	<i>Description of how the CPA complies with the applicability conditions of AMS I.D Version 17</i>
3.3.	<p>In order to determine the occurrence of de-bundling in accordance with the "Guidelines on assessment of de-bundling for SSC project activities" Version 03, does the CPA satisfy both of the following conditions?</p> <p>(a) There is another project activity by the same CPA implementing agency or has a CME which also manages a large scale PoA of the same technology/measure; and</p> <p>(b) The boundary of the other project activity is within 1 km of the boundary of the proposed small-scale CPA, at the closest point</p>	No	<i>Description of how there is no project activity by the same CPA implementing agency or has a CME which also manages a small scale PoA of the same technology / measure and its boundary is within 1 km of the boundary of the proposed small-scale CPA at the closest point.</i>
3.4.	Is the CPA additional as per the "Guidelines on the demonstration of additionality of small-scale project activities" by fulfilling one of the	Yes	<i>Description of how the proposed CPA fulfills one of the criteria.</i>

	<p>following criteria:</p> <p>(a) forms part of positive list of grid-connected renewable electricity generation technologies; or</p> <p>(b) faces investment barrier demonstrated as per the “Guidelines on the assessment of investment analysis”; or</p> <p>(c) faces barriers other than investment barrier that are demonstrated as per the “Guidelines for objective demonstration and assessment of barriers”.</p>		
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4. Large-scale CPA criteria

4.1.	Does the CPA comply with the applicability conditions of ACM0002 Version 12.3.0?	Yes	<i>Description of how the CPA complies with the applicability conditions of ACM0002 Version 12.3.0</i>
4.2.	Is the CPA additional in accordance with the “Tool for the demonstration and assessment of additionality” Version 06.1.0?	Yes	<i>Description of how the proposed CPA complies with the “Tool for the demonstration and assessment of additionality” Version 06.1.0.</i>

If required by the eligibility criteria provided above for inclusion of a proposed CPA in PoA, the Benchmark Analysis would be conducted as follows:

“A suitable financial indicator (project IRR or equity IRR)” has been chosen for the proposed CPA. Justification for selection of the financial indicator is provided.

Benchmark

A benchmark is adopted which is comparable with the chosen financial indicator. The applied benchmark needs to be appropriate to the type of IRR calculated and could be chosen as either of the following:

Indicator chosen	Benchmark (any one of the below)
Equity IRR	<p>a. Default value for the expected return on equity for India as per the “Guidelines on the assessment of investment analysis”</p> <p>b. Cost of equity determined using best financial practices (such as Capital Asset Pricing Model) using data sources which can be clearly validated while properly justifying all underlying factors in accordance with the “Guidelines on the assessment of investment analysis”</p> <p>c. Government/official approved benchmark¹⁶ where such benchmarks are used for investment decisions</p>
Project IRR	<p>a. Local commercial lending rates applicable in the country (pre-tax rate used in case of pre-tax IRR)</p> <p>b. Weighted Average Costs of Capital (WACC) calculated as: $WACC = \{D/(D+E)\} * \{1-T/100\} * \text{Cost of Debt} + \{E/(D+E)\} * \text{Cost of Equity (tax-rate not applied in case of pre-tax IRR)}$ Where, Cost of Debt is determined as local commercial lending rate applicable in the country and Cost of Equity is determined from any of</p>

¹⁶ According to EB 40 meeting report, paragraph 40, a benchmark based on tariff orders published in accordance with the Central Electricity Regulation Commission is not a suitable benchmark.

	<p>the options listed above under Equity IRR.</p> <p>c. Government/official approved benchmark where such benchmarks are used for investment decisions</p>
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The benchmark calculation is in accordance with the latest versions of “Tool for the demonstration and assessment of additionality” and the “Guidelines on the assessment of investment analysis”.

Financial indicator analysis

“Financial indicator” calculations have been done in accordance with the latest versions of “Tool for the demonstration and assessment of additionality” and the “Guidelines on the assessment of investment analysis”. The assumptions used in the financial model are as follows:

Parameter	Unit	Source/Comment
Technical lifetime	Year	Will be determined based on “Tool to determine the remaining lifetime of equipment” as: (a) Manufacturer’s information on the technical lifetime of equipment; or (b) Expert evaluation; or (c) Default values
Investment decision date	DD/MM/YYYY	
Construction start date	DD/MM/YYYY	
Date project starts operating	DD/MM/YYYY	
Annual electricity generation	MWh/year	As per the “Guidelines for the reporting and validation of plant load factors”: (a) The plant load factor provided to banks and/or equity financiers while applying the project activity for project financing, or to the government while applying the project activity for implementation approval; or (b) The plant load factor determined by a third party contracted by the project participants (e.g. an engineering company)
Annual degradation	% per annum	Pre-feasibility assessment / Detailed Project Report prepared by third party/ Manufacturer specifications / Tariff order of the state electricity regulatory commission / CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations / Technical expert opinion
Electricity tariff	INR/kWh	Will be determined on a case-by-case basis in accordance with either of the following (as applicable on the date of investment decision):
Escalation in electricity tariff	% per year or INR/kWh/year	<ul style="list-style-type: none"> • Power Purchase Agreement • Tariff order of the state electricity regulatory commission • State specific power policy applicable for wind / solar technologies
Exchange rate	Foreign/local currency	If some costs/revenues are provided in foreign currency the exchange rate in public domain as per date of investment decision shall be used to convert to local currency



Cost of Project	INR	Pre-feasibility assessment report/Detailed Project Report prepared by third party / Quotations from suppliers
Total investment	INR	If the construction is expected to last several years, a yearly breakdown of investments can be provided
Subsidy	INR	National or state-specific policy applicable for wind / solar technologies
Other revenues	INR	To be included in the calculation only if applicable to CPA and not covered under tariff. This could be Generation Based Incentive from Indian Renewable Energy Development Agency Ltd. (IREDA) or any other revenue as per state/national regulatory policies applicable on the date of investment decision.
Operation & Maintenance cost (including escalation)	% project cost or INR/ year	Pre-feasibility assessment/ Detailed Project Report prepared by third party / Tariff order of the state electricity regulatory commission / CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations / Technical expert opinion
Insurance	% project cost p.a.	Pre-feasibility assessment report/Detailed Project Report prepared by third party / Quotations from suppliers/ Tariff order of the state electricity regulatory commission / CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations / Technical expert opinion
Tax Rate	%	As per rates in the Income Tax Act, 1961 and/or any other future legislation applicable on the date of investment decision. Tax shield (if applicable) shall also be considered in accordance with the act/legislation.
Depreciation Rate (Based on WDV method for tax calculation)	%	As per rates in the Income Tax Act, 1961 and/or any other future legislation applicable on the date of investment decision
Depreciation Rate (Based on SLM method for P&L statement)	%	As per rates in the Companies Act, 1956 Schedule XIV and/or any other future legislation applicable on the date of investment decision
Percentage of debt sourcing	% of total investment	Pre-feasibility assessment/ Detailed Project Report prepared by third party /typical debt:equity finance structure observed in the power sector of India / Tariff order of the state electricity regulatory commission / CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations
Interest on term loan	% per annum	Pre-feasibility assessment/ Detailed Project Report prepared by third party / Commercial Lending Rate prevailing at the time of investment decision / Tariff order of the state electricity regulatory commission / CERC (Terms and Conditions for Tariff determination from Renewable Energy

		Sources) Regulations
Loan Moratorium	months	Pre-feasibility assessment/ Detailed Project Report prepared by third party / typical loan repayment period observed in the power sector of India / Tariff order of the state electricity regulatory commission / CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations
Loan Repayment Period	years	Pre-feasibility assessment/ Detailed Project Report prepared by third party / typical loan repayment period observed in the power sector of India / Tariff order of the state electricity regulatory commission / CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations
Working Capital components	Provision for: <ul style="list-style-type: none"> • Receivables • O&M expenses Maintenance and spares	Pre-feasibility assessment/ Detailed Project Report prepared by third party / Tariff order of the state electricity regulatory commission / CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations
Working Capital Interest rate	% per annum	Pre-feasibility assessment/ Detailed Project Report prepared by third party / Commercial Lending Rate prevailing at the time of investment decision / Tariff order of the state electricity regulatory commission / CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations
Salvage value	% of project cost	Pre-feasibility assessment/ Detailed Project Report prepared by third party / Tariff order of the state electricity regulatory commission / CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations / Technical expert opinion

The “*financial indicator*” for the project activity works out to “”%. Hence it can be clearly observed that the returns from the project do not exceed the benchmark of “”%. Thus the project activity on its own is clearly not a financially viable option and hence the revenue from CDM is essential to make the project activity a financially viable venture.

Sensitivity Analysis

The “*financial indicator*” is subjected to a sensitivity analysis ($\pm 10\%$) by varying critical parameters in the financial model to assess the robustness of the result. The results of the sensitivity analysis are detailed below:

Variable Parameter	-10%	0%	+10%	Justification
Energy Generation	“”%	“”%	“”%	In cases where a scenario will result in the project activity passing the benchmark, an assessment of the probability of the occurrence of this scenario shall be provided.
Project Cost	“”%	“”%	“”%	
Tariff	“”%	“”%	“”%	
O&M Cost	“”%	“”%	“”%	

Since the “*financial indicator*” remains lower than the benchmark in spite of favourable variations, it can be concluded that the CPA is unlikely to be financially attractive and would not have been implemented without CDM revenues.

For large scale CPAs, as required by the eligibility criteria provided above for inclusion of a proposed CPA in PoA, the common practice analysis would be conducted in accordance with the “Tool for the demonstration and assessment of additionality” Version 06.1.0. Since the CPAs are measures involving use of renewable energy, the steps provided in paragraph 47 of the tool would be followed for common practice analysis. The parameters N_{all} and N_{diff} shall be referred from publically available information such as:

- *Related government ministries/departments*
- *Solar / Wind / Renewable Energy Industry associations*
- *Solar / Wind / Renewable Energy International associations*
- *Sectoral publications on Solar / Wind / Renewable energy installations*
- *Market penetration of different renewable energy technologies*

Project activities that are registered under CDM or undergoing validation shall be checked from the CDM website.

Therefore, the project activity meets all the criteria for inclusion as a CPA in the PoA.

B.6. Estimation of emission reductions of a generic CPA

B.6.1. Explanation of methodological choices

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The project activity constitutes a new grid connected renewable energy based power generation plant / unit.

Baseline Emissions

- ❖ *For large scale CPAs, i.e. project activities with individual installed capacity > 15 MW, the methodology ACM0002 Version 12.3.0 is being applied.*

As per the methodology, baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows:

$$BE_y = EG_{PJ,y} \cdot EF_{grid,CM,y}$$

Where:

- | | | |
|------------------|---|--|
| BE_y | = | Baseline emissions in year y (tCO ₂) |
| $EG_{PJ,y}$ | = | Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh) |
| $EF_{grid,CM,y}$ | = | Combined margin CO ₂ emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system” |

Calculation of $EG_{PJ,y}$

Since the project activity is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity (Greenfield power plant), therefore:

$$EG_{PJ,y} = EG_{facility,y}$$

Where:

- $EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)
- $EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh)

❖ *For small scale CPAs, i.e. project activities with individual installed capacity ≤ 15 MW, the methodology AMS I.D Version 17 is being applied.*

As per the paragraph 11 of the methodology, the calculations of baseline emissions are as follows:

$$BE_y = EG_{BL,y} * EF_{CO_2,grid,y}$$

Where:

- BE_y = Baseline Emissions in year y (tCO₂)
- $EG_{BL,y}$ = Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)
- $EF_{CO_2,grid,y}$ = CO₂ Emission Factor in year y (tCO₂/MWh)

In accordance with the latest “Tool to calculate the emission factor for an electricity system”, combined margin CO₂ emission factor for large and small scale CPAs is calculated stepwise as below:

Calculation of $EF_{CO_2,grid,y}$ and $EF_{grid,CM,y}$

In accordance with the latest version of the “Tool to calculate the emission factor for an electricity system”, combined margin CO₂ emission factor for grid connected power generation is calculated stepwise as below:

The data used for the calculation of the baseline emission factor was obtained from the baseline calculations published by the CEA, *CO₂ Baseline Database for the Indian Power Sector*¹⁷, which uses ACM0002. A complete explanation of the assumptions employed by the CEA can be obtained from the *CO₂ Baseline Database for the Indian Power Sector*.

Step 1: Identify the relevant electricity systems

For the purpose of determining the electricity emission factors, a **project electricity system** and **connected electricity systems** are to be defined. The Indian power system is “divided into two regional grids, namely NEWNE and Southern grid”.

Since the project activity would be supplying electricity to the “national/regional grid”, it is preferable to take this grid as the project boundary. Considering free flow of electricity among the member states and the union territory, the entire “national/regional grid” is considered as a single entity for estimation of baseline.

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

Project participants may choose between the following two options to calculate the operating margin and build margin emission factor:

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

The project participant has chosen Option I for the calculation of the operating and build margin emission factor i.e. off-grid power plants are not being included in the calculation.

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

¹⁷ http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

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

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

For the proposed project activity, simple OM method (option a) has been chosen to calculate the operating margin emission factor ($EF_{grid,OM,y}$). However, the simple OM method can only be used if low-cost/must-run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production. The low-cost/must-run resources are defined as power plants with low marginal generation costs or power plants that are dispatched independently of the daily or seasonal load of the grid. They typically include hydro, geothermal, wind, low-cost biomass, nuclear and solar generation.

Table: Share of Low Cost / Must-Run (% of Net Generation)

	2006-07	2007-08	2008-09	2009-10	2010-11
NEWNE	18.5%	19.0%	17.4%	15.9%	17.6%
South	28.3%	27.1%	22.8%	20.6%	21.0%
India	20.9%	21.0%	18.7%	17.1%	18.4%

Ref: CO₂ Baseline Database for the Indian Power Sector – CEA, Version 07¹⁸

Percentage of total grid generation by low cost/must run plants (on the basis of average of five most recent years) for “NEWNE” grid = 17.7 %

Percentage of total grid generation by low cost/must run plants (on the basis of average of five most recent years) for “Southern” grid = 24.0 %

The calculation above shows that the generation from low-cost/must-run resources constitutes less than 50% of total grid generation, hence usage of the **Simple OM method** in the project case is justified.

The Simple OM emission factor can be calculated using either of the two following data vintages for years(s) y:

- 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. For grid power plants, use a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation. For off-grid power plants, use a single calendar year within the 5 most recent calendar years prior to the time of submission of the CDM-PDD for validation.
- 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. If the data required to calculate the emission factor for year y is usually only available later than six months after the end of year y, alternatively the emission factor of the previous year (y-1) may be used. If the data is usually only available 18 months after the end of year y, the emission factor of the year proceeding the previous year (y-2) may be used. The same data vintage (y, y-1 or y-2) should be used throughout all crediting periods.

The project proponent chooses the *Ex ante* option for estimating the simple OM emission factor wherein as described above a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period will be undertaken.

¹⁸ http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

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

The simple OM method has been selected as justified above. The simple OM emission factor is calculated based on the net electricity generation of each power unit and a CO₂ emission factor for each power unit, as follows:

$$EF_{grid,OM,simple,y} = \frac{\sum_{i,m} FC_{i,m,y} \cdot NCV_{i,y} \cdot EF_{CO2,i,y}}{\sum_m EG_{m,y}}$$

Where:

$EF_{grid,OM,simple,y}$	=	Simple operating margin CO ₂ emission factor of in year y (tCO ₂ /MWh)
$FC_{i,m,y}$	=	Amount of fossil fuel type i consumed by power unit m in year y (Mass or volume unit)
$NCV_{i,y}$	=	Net calorific value (energy content) of fossil fuel type i in year y (GJ / mass or volume unit)
$EF_{CO2,i,y}$	=	CO ₂ emission factor of fossil fuel type i in year y (tCO ₂ /GJ)
$EG_{m,y}$	=	Net electricity generated and delivered to the grid by power unit m in year y (MWh)
m	=	All power units serving the grid in year y except low-cost / must-run power units
I	=	All fossil fuel types combusted in power plant / unit m in year y
y	=	Either the three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation (ex-ante option) or the applicable year during monitoring (ex post option), following the guidance on data vintage in step 2

In India, the Central Electricity Authority (CEA) has estimated the baseline emission factor for the power sector. This data has also been endorsed by the DNA and is the most authentic information available in the public domain. The details of same can be found on CEA website at http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm.

Step 5: Calculate the build margin (BM) emission factor

In terms of vintage of data, project proponents can choose between one of the following two options:

Option 1: For the first crediting period, calculate the build margin emission factor ex-ante based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

Option 2: For the first crediting period, the build margin emission factor shall be updated annually, ex-post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated ex-ante, as described in option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

The project proponent wishes to choose option 1.

Capacity additions from retrofits of power plants should not be included in the calculation of the build margin emission factor.

The sample group of power units m used to calculate the build margin should be determined as per the following procedure, consistent with the data vintage selected above:

- Identify the set of five power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently ($SET_{5-units}$) and determine their annual electricity generation ($AEG_{SET-5-units}$, in MWh);
- Determine the annual electricity generation of the project electricity system, excluding power units registered as CDM project activities (AEG_{total} , in MWh). Identify the set of power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently and that comprise 20% of AEG_{total} (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) ($SET_{\geq 20\%}$) and determine their annual electricity generation ($AEG_{SET-\geq 20\%}$, in MWh);
- From $SET_{5-units}$ and $SET_{\geq 20\%}$ select the set of power units that comprises the larger annual electricity generation (SET_{sample});

Identify the date when the power units in SET_{sample} started to supply electricity to the grid. If none of the power units in SET_{sample} started to supply electricity to the grid more than 10 years ago, then use SET_{sample} to calculate the build margin.

In India, the installed capacity and corresponding annual generation from power plants is quite high. The Central Electricity Authority (CEA) has estimated the annual electricity generation from $SET_{\geq 20\%}$ to be larger than the generation from $SET_{5-units}$. The details of same can be found on CEA website at http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm. Further, none of the power units in $SET_{\geq 20\%}$ started to supply electricity to the grid more than 10 years ago.

Therefore, SET_{sample} is selected as $SET_{\geq 20\%}$ for the estimation of build margin.

The build margin emissions factor is the generation-weighted average emission factor (tCO_2/MWh) of all power units m during the most recent year y for which power generation data is available, calculated as follows:

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \cdot EF_{EL,m,y}}{\sum_m EG_{m,y}}$$

Where:

- $EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year y (tCO_2 / MWh)
 $EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
 $EF_{EL,m,y}$ = CO_2 emission factor of power unit m in year y (tCO_2 / MWh)
 M = Power units included in the build margin
 Y = Most recent historical year for which electricity generation data is available

Calculations for the Build Margin emission factor $EF_{grid,BM,y}$ is based on the most recent information available on the plants already built for sample group m at the time of PDD submission. The sample group m consists of the power plant capacity additions in the electricity system that comprise 20 % of the system generation and that have been built most recently ($SET_{\geq 20\%}$).

Step 6: Calculate the combined margin emissions factor

The calculation of the combined margin (CM) emission factor ($EF_{grid,CM,y}$) is based on one of the following methods:

- Weighted average CM; or
- Simplified CM.

The weighted average CM method (option A) should be used as the preferred option.

The combined margin emissions factor is calculated as follows:

$$EF_{CO_2} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$$

Where:

$EF_{grid,BM,y}$	=	Build margin CO ₂ emission factor in year y (tCO ₂ /MWh)
$EF_{grid,OM,y}$	=	Operating margin CO ₂ emission factor in year y (tCO ₂ /MWh)
w_{OM}	=	Weighting of operating margin emissions factor (%)
w_{BM}	=	Weighting of build margin emissions factor (%)

The following default values should be used for w_{OM} and w_{BM} :

- Wind and solar power generation project activities: $w_{OM} = 0.75$ and $w_{BM} = 0.25$ (owing to their intermittent and non-dispatchable nature) for the first crediting period and for subsequent crediting periods.
- All other projects: $w_{OM} = 0.5$ and $w_{BM} = 0.5$ for the first crediting period, and $w_{OM} = 0.25$ and $w_{BM} = 0.75$ for the second and third crediting period, unless otherwise specified in the approved methodology which refers to this tool.

As mentioned before, the CEA has calculated the baseline emission factors for various regional grids in India according to the formulas specified above. As this is the most authentic information available in the public domain. The baseline emission factor used in the calculation of baseline emissions for the proposed project activity is being referred from the same for transparency and conservativeness¹⁹.

Project activity emissions

For large and small scale CPAs, project emissions are accounted for as follows:

$$PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y}$$

Where:

PE_y	=	Project emissions in year y (tCO ₂ e)
$PE_{FF,y}$	=	Project emissions from fossil fuel consumption in year y (tCO ₂)
$PE_{GP,y}$	=	Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y (tCO ₂ e)
$PE_{HP,y}$	=	Project emissions from reservoirs of hydro power plants in year y (tCO ₂ e)

The CPA does not consist of geothermal or hydro power plants. Hence, there are no project emissions from release of non-condensable gases or reservoirs of hydro power plants.

Fossil Fuel Combustion ($PE_{FF,y}$)

For solar thermal projects, which also use fossil fuels for electricity generation, CO₂ emissions from the combustion of fossil fuels shall be accounted for as project emissions ($PE_{FF,y}$).

$PE_{FF,y}$ shall be calculated as per the latest version of the “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion”.

Leakage

According to ACM0002 Version 12.3.0 and AMS I.D Version 17, no leakage emissions are considered for large or small scale CPAs. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and

¹⁹ http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm



upstream emissions from fossil fuel use (e.g. extraction, processing, transport). These emissions sources are neglected.

Emission Reductions

- ❖ For large scale CPAs, according to ACM0002 Version 12.3.0, emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

Where:

ER_y	=	Emission reductions in year y (t CO ₂ e)
BE_y	=	Baseline emissions in year y (t CO ₂)
PE_y	=	Project emissions in year y (t CO ₂ e)

- ❖ For small scale CPAs, according to AMs I.D Version 17, emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y	=	Emission reductions in year y (t CO ₂ e)
BE_y	=	Baseline emissions in year y (t CO ₂)
PE_y	=	Project emissions in year y (t CO ₂ e)
LE_y	=	Leakage emissions in year y (t CO ₂ e)

B.6.2. Data and parameters that are to be reported ex-ante

Data / Parameter	EF _{grid,OM,y}																																				
Unit	tCO ₂ e/MWh																																				
Description	Operating Margin emission factor for “NEWNE/Southern” grid																																				
Source of data	Referred from CO ₂ Baseline Database for the Indian Power Sector prepared by Central Electricity Authority <i>Version 07</i>																																				
Value(s) applied	“0.9842” tCO ₂ /MWh for “NEWNE” grid “0.9515” tCO ₂ /MWh for “Southern” grid																																				
Choice of data or Measurement methods and procedures	<div>Calculated from latest 3 years vintage data available with option of ex ante calculation based on Simple Operating Margin Method as per the latest version of “Tool to calculate the emission factor for an electricity system”.</div> <table><tr><th colspan="3">Operating Margin Estimation for “NEWNE” Grid (tCO₂/ MWh)</th></tr><tr><th>Year</th><th>Operating Margin (tCO₂e/MWh)</th><th>Net Generation (GWh)</th></tr><tr><td>2008-09</td><td>1.0066</td><td>421,803</td></tr><tr><td>2009-10</td><td>0.9777</td><td>462,327</td></tr><tr><td>2010-11</td><td>0.9707</td><td>476,987</td></tr><tr><td>Generation Weighted Average OM</td><td colspan="2">0.9842 tCO₂e / MWh</td></tr></table> <table><tr><th colspan="3">Operating Margin Estimation for “Southern” Grid (tCO₂/ MWh)</th></tr><tr><th>Year</th><th>Operating Margin (tCO₂e/MWh)</th><th>Net Generation (GWh)</th></tr><tr><td>2008-09</td><td>0.9729</td><td>127,797</td></tr><tr><td>2009-10</td><td>0.9415</td><td>135,774</td></tr><tr><td>2010-11</td><td>0.9419</td><td>145,076</td></tr><tr><td>Generation Weighted Average OM</td><td colspan="2">0.9515 tCO₂e / MWh</td></tr></table>	Operating Margin Estimation for “NEWNE” Grid (tCO ₂ / MWh)			Year	Operating Margin (tCO ₂ e/MWh)	Net Generation (GWh)	2008-09	1.0066	421,803	2009-10	0.9777	462,327	2010-11	0.9707	476,987	Generation Weighted Average OM	0.9842 tCO ₂ e / MWh		Operating Margin Estimation for “Southern” Grid (tCO ₂ / MWh)			Year	Operating Margin (tCO ₂ e/MWh)	Net Generation (GWh)	2008-09	0.9729	127,797	2009-10	0.9415	135,774	2010-11	0.9419	145,076	Generation Weighted Average OM	0.9515 tCO ₂ e / MWh	
Operating Margin Estimation for “NEWNE” Grid (tCO ₂ / MWh)																																					
Year	Operating Margin (tCO ₂ e/MWh)	Net Generation (GWh)																																			
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2010-11	0.9419	145,076																																			
Generation Weighted Average OM	0.9515 tCO ₂ e / MWh																																				
Purpose of data	Calculation of baseline emissions																																				
Additional comment	This value is determined and fixed ex-ante for the first crediting period.																																				

Data / Parameter	EF _{grid,BM,y}
Unit	tCO ₂ e/MWh
Description	Build Margin emission factor for “say NEWNE/Southern” grid
Source of data	Referred from CO ₂ Baseline Database for the Indian Power Sector prepared by Central Electricity Authority <i>Version 07</i>
Value(s) applied	“0.8588” tCO ₂ /MWh for “NEWNE” grid “0.7339” tCO ₂ /MWh for “Southern” grid
Choice of data or Measurement methods and procedures	Calculated from the latest year data available as per the most recent version of “Tool to calculate the emission factor for an electricity system”.
Purpose of data	Calculation of baseline emissions
Additional comment	This value is determined and fixed ex-ante for the first crediting period.

Data / Parameter	EF _{grid,CM,y} or EF _{CO2,grid,y}	
Unit	tCO ₂ e/MWh	
Description	Combined Margin emission factor for “say <i>NEWNE/Southern</i> ” grid	
Source of data	Based on calculation of OM and BM emission factors	
Value(s) applied	“0.9528” tCO ₂ /MWh for “ <i>NEWNE</i> ” grid “0.8971” tCO ₂ /MWh for “ <i>Southern</i> ” grid	
Choice of data or Measurement methods and procedures	Calculated based on “75%” weight provided to OM and “25%” BM according to the “Tool to calculate the emission factor for an electricity system” for “ <i>solar power</i> ” project activity.	
	Combined Margin Estimation for “<i>NEWNE</i>” Grid (tCO₂e/ MWh)	
	OM (EF _{grid, OM,y})	0.9842
	BM (EF _{grid, BM, y})	0.8588
	Combined Margin (EF _{grid, CM,y})	0.9528
	Combined Margin Estimation for “<i>Southern</i>” Grid (tCO₂e/ MWh)	
	OM (EF _{grid, OM,y})	0.9515
	BM (EF _{grid, BM, y})	0.7339
	Combined Margin (EF _{grid, CM,y})	0.8971
	Purpose of data	Calculation of baseline emissions
Additional comment	This value is determined and fixed ex-ante for the first crediting period.	

B.6.3. Ex-ante calculations of emission reductions

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Project activity emissions

For large and small scale CPAs, project emissions are accounted for as follows:

$$PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y}$$

Where:

PE_y = Project emissions in year y (tCO₂e)

PE_{FF,y} = Project emissions from fossil fuel consumption in year y (tCO₂)

PE_{GP,y} = Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y (tCO₂e)

PE_{HP,y} = Project emissions from water reservoirs of hydro power plants in year y (tCO₂e)

Since, the project activity is a “*solar or wind power*” project, there are no project emissions from fossil fuel consumption, release of non-condensable gases or water reservoirs.

Hence, PE_y = 0

Baseline Emissions

❖ For a large scale CPA, the baseline emissions are to be calculated as follows:

$$BE_y = EG_{PJ,y} \cdot EF_{grid,CM,y}$$

Where:

BE_y = Baseline emissions in year y (tCO₂)

EG_{PJ,y} = Quantity of net electricity generation that is produced and fed into the grid as a result

$EF_{grid,CM,y}$ = of the implementation of the CDM project activity in year y (MWh)
 Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system”

Calculation of baseline emissions (BE_y) for “say 25 MW solar PV project connected to NEWNE grid”:

Description	Value	Units	Source
Gross Energy Generation Capacity	25	MW	Detailed Project Report / Technical Specifications
Plant Load Factor	20	%	As per latest version of the “Guidelines for the reporting and validation of plant load factors”
Annual degradation	0.5	%	Pre-feasibility assessment / Detailed Project Report / Manufacturer specifications / Tariff order of the state electricity regulatory commission / CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations / Technical expert opinion
Net electricity generation (EG _{facility,y}) (in 1 st year)	43,800	MWh/yr	Calculated
Baseline Emission factor for NEWNE Grid (EF _{grid,CM,y}):	0.9528	tCO ₂ /MWh	CO ₂ Baseline Database for the Indian Power Sector, Central Electricity Authority (CEA) Version 7.0

For first year of operation,

$$BE_y = EG_{PJ,y} \cdot EF_{grid,CM,y} = 43,800 \cdot 0.9528 = 41,732 \text{ tCO}_2\text{e/year}$$

Baseline emissions would decrease by 0.5% per annum thereafter.

❖ For a small scale CPA, the baseline emissions are to be calculated as follows:

$$BE_y = EG_{BL,y} \cdot EF_{CO_2,grid,y}$$

Where:

BE_y = Baseline Emissions in year y (tCO₂)
 $EG_{BL,y}$ = Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)
 $EF_{CO_2,grid,y}$ = CO₂ Emission Factor in year y (tCO₂/MWh)

Calculation of baseline emissions (BE_y) for “say 5 MW solar PV project connected to NEWNE grid”:

Description	Value	Units	Source
Gross Energy Generation Capacity	5	MW	Detailed Project Report / Technical Specifications
Plant Load Factor	20	%	As per latest version of the “Guidelines for the reporting and

			<i>validation of plant load factors”</i>
Annual degradation	0.5	%	<i>Pre-feasibility assessment / Detailed Project Report / Manufacturer specifications / Tariff order of the state electricity regulatory commission / CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations / Technical expert opinion</i>
Net electricity generation ($EG_{\text{facility},y}$) (in 1 st year)	8,760	MWh/yr	Calculated
Baseline Emission factor for NEWNE Grid ($EF_{\text{grid},\text{CM},y}$):	0.9528	tCO ₂ /MWh	CO ₂ Baseline Database for the Indian Power Sector, Central Electricity Authority (CEA) Version 7.0

For first year of operation,

$$BE_y = EG_{\text{BL},y} \cdot EF_{\text{CO}_2,\text{grid},y} = 8,760 \cdot 0.9528 = 8,346 \text{ tCO}_2\text{e/year}$$

Baseline emissions would decrease by 0.5% per annum thereafter.

Leakage

According to ACM0002 Version 12.3.0 and AMS I.D Version 17, no leakage emissions are considered for large or small scale CPAs.

Emission Reductions

❖ Calculation of emission reductions (ER_y) for “say 25 MW solar PV project”:

$$ER_y = BE_y - PE_y$$

Where:

$$\begin{aligned} ER_y &= \text{Emission reductions in year } y \text{ (t CO}_2\text{e)} \\ BE_y &= \text{Baseline emissions in year } y \text{ (t CO}_2\text{)} \\ PE_y &= \text{Project emissions in year } y \text{ (t CO}_2\text{e)} \end{aligned}$$

$$ER_y = BE_y - PE_y = 41,732 - 0 = 41,732 \text{ tCO}_2\text{/year}$$

❖ Calculation of emission reductions (ER_y) for “5 MW solar PV project”:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

$$\begin{aligned} ER_y &= \text{Emission reductions in year } y \text{ (t CO}_2\text{e)} \\ BE_y &= \text{Baseline emissions in year } y \text{ (t CO}_2\text{)} \\ PE_y &= \text{Project emissions in year } y \text{ (t CO}_2\text{e)} \\ LE_y &= \text{Leakage emissions in year } y \text{ (t CO}_2\text{e)} \end{aligned}$$

$$ER_y = BE_y - PE_y - LE_y = 8,346 - 0 - 0 = 8,346 \text{ tCO}_2\text{/year}$$

B.7. Application of the monitoring methodology and description of the monitoring plan**B.7.1. Data and parameters to be monitored by each generic CPA**

For CPAs that have independent electricity meters installed for measurement of net electricity exported to grid i.e. the meters installed at the grid inter-connection point measure the electricity generation from the CPA only, the monitoring parameters would be as follows:

Data / Parameter	EG _{facility,y} (for large scale CPAs) or EG _{BL,y} (for small scale CPAs)
Unit	MWh
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y
Source of data	Joint Meter Reading Sheets
Value(s) applied	<i>Specific to CPA (each CPA will specify this value in accordance with project parameters)</i>
Measurement methods and procedures	Electricity Meters would be used with continuous measurement and at least monthly recording of data done jointly by the grid utility and “CPA implementing agency” as per the PPA/state or national electricity metering regulations. It would be measured as the difference of: 1 The quantity of electricity supplied by the project plant/unit to the grid; and 2 The quantity of electricity delivered to the project plant/unit from the grid
Monitoring frequency	Measured continuously and recorded monthly
QA/QC procedures	Calibration and testing of the energy meters will be undertaken by the grid utility or an authorized third party in accordance with the terms of the Power Purchase Agreement / state or national electricity metering regulations / Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006 ²⁰ but at least once every three years. The faulty meters will be duly repaired / replaced in case any error is observed in testing.
Purpose of data	Calculation of baseline emissions
Additional comments	The data will be kept for two years after the end of the crediting period or the last issuance of CERs for the CPA, whichever occurs later.

For CPAs that do not have independent electricity meters installed for measurement of net electricity exported to grid i.e. the meters installed at the grid inter-connection point measure the combined electricity generation from the CPA as well as non-CPA project activities, apportioning procedures would be adopted for the calculating the net electricity generation attributable to the CPA. The monitoring parameters in such a CPA would be as follows:

²⁰ Section 18.1 (b) Page 12 states all interface meters shall be tested at least once in five years.
(http://www.cea.nic.in/reports/regulation/meter_reg.pdf)



Data / Parameter	EG _{project,y}
Unit	MWh
Description	Quantity of net electricity generation supplied by the project activity measured at the <i>plant unit end</i> in year <i>y</i>
Source of data	Plant records
Value(s) applied	Will be monitored ex-post
Measurement methods and procedures	Electricity Meters would be used with continuous measurement and at least monthly recording of data done by the “CPA implementing agency”. It would be measured as the difference of: (i) The quantity of electricity supplied by the project activity to the grid; and (ii) The quantity of electricity delivered to the project activity from the grid
Monitoring frequency	Measured continuously and recorded monthly
QA/QC procedures	Calibration and testing of the energy meters will be undertaken by the grid utility or an authorized third party in accordance with the terms of the Power Purchase Agreement / state or national electricity metering regulations / Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006 ²¹ but at least once every three years. The faulty meters will be duly repaired / replaced in case any error is observed in testing.
Purpose of data	Calculation of baseline emissions
Additional comments	The data will be kept for two years after the end of the crediting period or the last issuance of CERs for the CPA, whichever occurs later.

²¹ Section 18.1 (b) Page 12 states all interface meters shall be tested at least once in five years.
(http://www.cea.nic.in/reports/regulation/meter_reg.pdf)



Data / Parameter	EG _{other,y}
Unit	MWh
Description	Quantity of net electricity generation supplied by other units in the region measured at the <i>plant unit end</i> in year <i>y</i>
Source of data	Plant records
Value(s) applied	Will be monitored ex-post
Measurement methods and procedures	Electricity Meters would be used with continuous measurement and at least monthly recording of data done by the “CPA implementing agency”. It would be measured as the difference of: (i) The quantity of electricity supplied by the other units to the grid; and (ii) The quantity of electricity delivered to the other units from the grid
Monitoring frequency	Measured continuously and recorded monthly
QA/QC procedures	Calibration and testing of the energy meters will be undertaken by the grid utility or an authorized third party in accordance with the terms of the Power Purchase Agreement / <i>state or national electricity metering regulations</i> / Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006 ²² but at least once every three years. The faulty meters will be duly repaired / replaced in case any error is observed in testing.
Purpose of data	Calculation of baseline emissions
Additional comments	The data will be kept for two years after the end of the crediting period or the last issuance of CERs for the CPA, whichever occurs later.

²² Section 18.1 (b) Page 12 states all interface meters shall be tested at least once in five years.
(http://www.cea.nic.in/reports/regulation/meter_reg.pdf)



Data / Parameter	EG _{all,y}
Unit	MWh
Description	Quantity of net electricity generation supplied by all the power units in the region (including the project activity) to the grid in year y
Source of data	Joint Meter Reading Sheets
Value(s) applied	Will be monitored ex-post
Measurement methods and procedures	Electricity Meters would be used with continuous measurement and at least monthly recording of data done jointly by the grid utility and “CPA implementing agency” as per the PPA/state or national electricity metering regulations. It would be measured as the difference of: (i) The quantity of electricity supplied by the project units to the grid; and (ii) The quantity of electricity delivered to the project units from the grid
Monitoring frequency	Measured continuously and recorded monthly
QA/QC procedures	Calibration and testing of the energy meters will be undertaken by the grid utility or an authorized third party in accordance with the terms of the Power Purchase Agreement / state or national electricity metering regulations / Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006 ²³ but at least once every three years. The faulty meters will be duly repaired / replaced in case any error is observed in testing.
Purpose of data	Calculation of baseline emissions
Additional comments	The data will be kept for two years after the end of the crediting period or the last issuance of CERs for the CPA, whichever occurs later.

²³ Section 18.1 (b) Page 12 states all interface meters shall be tested at least once in five years.
(http://www.cea.nic.in/reports/regulation/meter_reg.pdf)

Data / Parameter	EG _{facility,y} (for large scale CPAs) or EG _{BL,y} (for small scale CPAs)
Unit	MWh
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y
Source of data	Plant records
Value(s) applied	<i>Specific to CPA (each CPA will specify this value in accordance with project parameters)</i>
Measurement methods and procedures	<p>The quantity of net electricity generation supplied by the project plant/unit to the grid in year y shall be calculated by apportioning the combined net electricity exported to the grid that is metered at the <i>grid-interconnection point</i> based on the generation data recorded for the project activity and other power units by individual meters at the respective <i>plant unit ends</i>.</p> $EG_{facility,y} \text{ or } EG_{BL,y} = \frac{EG_{project,y}}{EG_{project,y} + EG_{other,y}} \times EG_{all,y}$
Monitoring frequency	Measured continuously and recorded monthly
QA/QC procedures	The parameter is a calculated value.
Purpose of data	Calculation of baseline emissions
Additional comments	The data will be kept for two years after the end of the crediting period or the last issuance of CERs for the CPA, whichever occurs later.

B.7.2. Description of the monitoring plan for a generic CPA

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The authority and responsibility of project management as well as registration, monitoring, measurement and reporting will rest with the individual CPA owner. At the CPA level, a Project Team will be formulated to ensure proper and continuous monitoring of the performance of the power plant. The operation and management structure that will be implemented by the CPA owners for the purpose of monitoring the CPA is illustrated below:

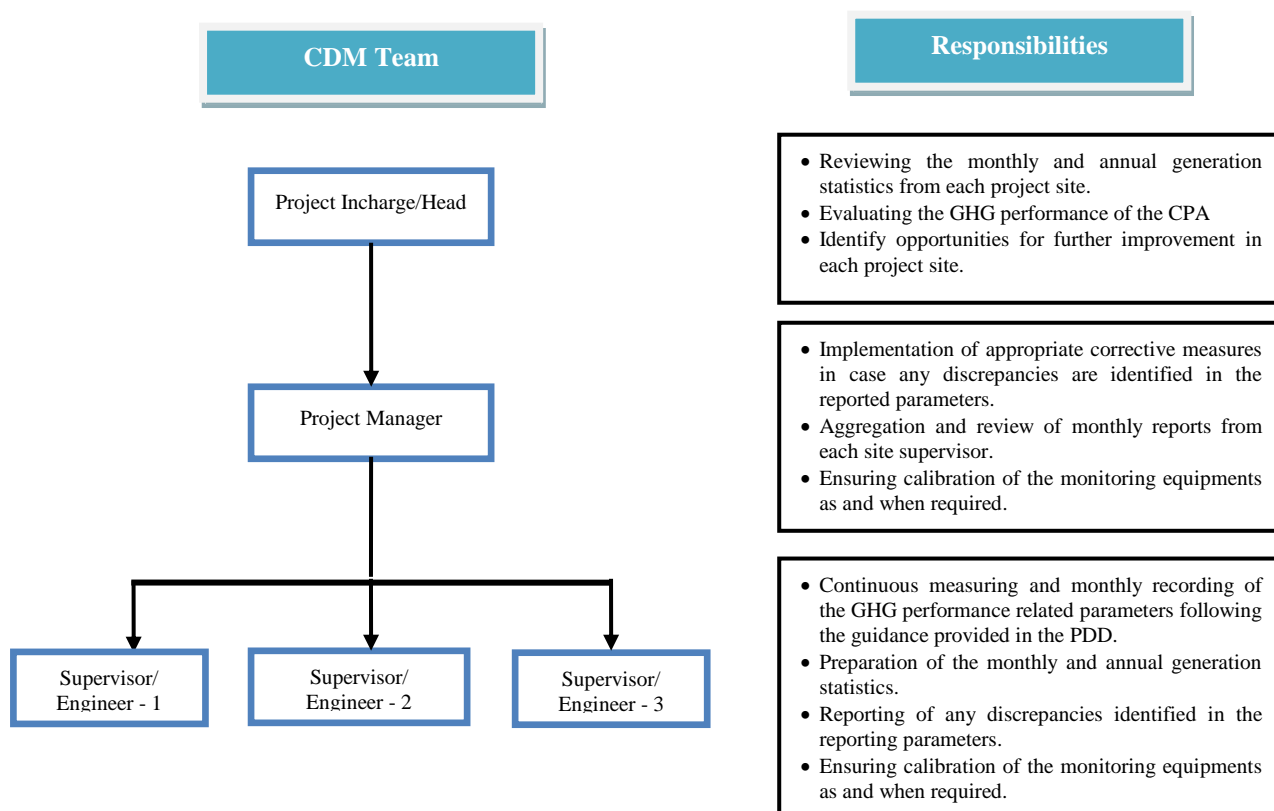


Fig. 3: Operation and management structure

Monitoring Plan Objective and Organisation

The purpose of the monitoring plan is to measure the net electricity delivered to the “national/regional” electricity grid by the CPA. Within the CDM team, a supervisor will be designated for each power plant/unit covered under the CPA, who will be responsible for compiling, monitoring and reporting of GHG performance related parameters (Process Parameters, Procedures, Calibration) of its allotted power plant/unit.

This data collated from each power plant/unit will be aggregated by the next superior CDM team member. The data and documents received from each site supervisor will be compiled in a format called the CDM format / report. Quality checks will also be undertaken at this level to ensure all discrepancies are addressed. The net electricity attributable to the CPA will be calculated by subtracting the total electricity imported from the total electricity exported to the grid. The onus of reviewing, storing and archiving of all CDM related information relevant to the CPA in a suitable manner would rest with this team member.

The Project Manager will aggregate and review all the data received from site supervisors. The review will be conducted to ensure compliance to the requirements of the monitoring plan and other CDM modalities and procedures including calibration frequency. Corrective measures will be applied in case any discrepancy is observed. The Project Manager will further submit a consolidated report to the Project Incharge who will finally review and sign the monthly performance from each CPA. This would in turn be forwarded to the CDM PoA Team of WREL.

To ensure that the data is reliable and transparent, the project entity will 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.

Monitoring and Archiving of Data

The net electricity delivered to the local regional grid by the project needs to be monitored. For this purpose, main and check meters would be installed at the grid inter-connection point. The meters would be bi-directional with an accuracy class of 0.5s or better. The monitoring data is derived from periodic electricity meter records kept by the project owners and/or the grid company, which can be cross-checked with actual invoices sent by project owners to the grid company.

In case the dates of a particular monitoring period do not match with the dates of billing cycle (when Joint Meter Readings are taken), the following apportioning formula would be used to estimate the electricity generation from a CPA for calculating emission reductions:

X = is the electricity generation by the CPA between start/end date of monitoring period and date of billing cycle as measured at the generation end and recorded in Daily Generation Reports (DGRs)

Y = is the electricity generation by the CPA during the particular billing cycle as measured at the generation end and recorded in Daily Generation Reports (DGRs)

Z = is the net electricity exported by the CPA to the grid in the particular billing cycle as measured at the grid inter-connection point

Net electricity exported by the CPA to the grid in the particular month of the monitoring period = $\frac{X}{Y} \times Z$

The CDM team within the operator of the power plant/unit will be responsible for collecting the monitoring data and will provide the coordinating entity with meter readings for electricity delivered and if available calibration certificates. Further, for cross checking purposes, the project proponent will also carry out measurements of gross electricity generation and auxiliary electricity consumption at each power plant/unit within the CPA, which will be recorded in site log books.

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

Quality Assurance and Quality Control

The installation location of the meters will be detailed in each CPA. The project entity will implement QA&QC measures to calibrate and guarantee the accuracy of metering and safety of the project operation. The metering devices will be calibrated and inspected properly and periodically as per standard industry norms / Power Purchase Agreement / National or State Electricity Grid Code. Calibration of the energy meters will be undertaken by the grid utility or an authorized third party, at least once every three years, in accordance with Indicative simplified baseline and monitoring methodologies for selected small scale CDM project activity categories²⁴. In case the main meter is not in service, the check meters shall be used. The faulty meters will be duly repaired / replaced in case any error is observed in testing.

The CDM team will meet periodically to review project parameters, check data collected, emissions reduced etc. The following will be the procedure for taking corrective action and addressing any non-conformances discovered:

- All the mismatching data along with the name of the respective site manager and in-charge of logbooks name will be recorded in a Note Book.
- The respective site supervisors in the CDM team will send FAR (Forward Action Request) or CAR (Corrective Action Request) to the concerned CDM Member.
- After receipt of the communication, within one week, the concerned site in-charge will correct the data and will reply to the site supervisor in the CDM team.
- The corrected data will then be compiled by the respective site supervisors

²⁴ http://cdm.unfccc.int/EB/023/eb23_repan33.pdf



**Appendix 1: Contact information on entity/individual responsible for the PoA****Primary authorised signatory**

Organization	Welspun Renewables Energy Limited
Street/P.O. Box	Welspun House, 7 th Floor
Building	Kamala city, Senapati Bapat Marg, Lower Parel (W)
City	Mumbai
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Postcode	400013
Country	India
Telephone	+91-22-6613600
Fax	+91-22-24908020
E-mail	welspun@bom2.vsnl.net.in
Website	www.welspun.com
Contact person	
Title	
salutation	Ms.
Last name	Mittal
Middle name	
First name	Sindoor
Department	
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Direct fax	
Direct tel.	+91-11-66034603
Personal e-mail	sindoor@welspun.com

**Alternate authorised signatory**

Organization	Welspun Renewables Energy Limited
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Fax	+91-22-24908020
E-mail	welspun@bom2.vsnl.net.in
Website	www.welspun.com
Contact person	
Title	
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Middle name	Lal
First name	Shivdarshan
Department	
Mobile	+91-9560999256
Direct fax	
Direct tel.	+91-120-6757032
Personal e-mail	sl_kapur@welspun.com



Appendix 2: Affirmation regarding public funding

WREL would ensure that there would be no divergence of Official Development Assistance (ODA) in any of the CPAs under PoA. This would be confirmed through undertaking / declaration from the CPA owner submitted to WREL.



Appendix 3: Application of methodology(ies)

The applicability of the selected methodology(ies) has been provided in section B.2. The documentation that can be used as the basis for demonstrating a CPA's compliance with each applicability condition of the methodology could be as follows:

- Pre-feasibility assessment / Detailed Project Report prepared by third party
- Power Purchase Agreement with grid utility for project activity
- Purchase Orders / Contracts signed for major equipment involved in the project activity
- Land documents executed for project activity



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

Background information on ex ante calculation of emission reductions has been provided under section B.6.3.



Appendix 5: Further background information on the monitoring plan

The monitoring plan has been explained in section B.7.2.
