



**Project design document form for
small-scale CDM project activities**

(Version 05.0)

Complete this form in accordance with the Attachment "Instructions for filling out the project design document form for small-scale CDM project activities" at the end of this form.

PROJECT DESIGN DOCUMENT (PDD)

Title of the project activity	2.2 MW hydropower plant in Birsinghpur, Madhya Pradesh of Ascent Hydro Projects Limited (AHPL).
Version number of the PDD	06.2
Completion date of the PDD	10/01/2015
Project participant(s)	Ascent Hydro Projects Ltd (AHPL)
Host Party	India
Sectoral scope and selected methodology(ies), and where applicable, selected standardized baseline(s)	1, Energy Industries AMS-I.D. - Grid connected renewable electricity generation, version 18; 28 th Nov 2014;
Estimated amount of annual average GHG emission reductions	14,255 metric tonnes CO ₂ equivalent per annum

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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The project activity has been registered with UNFCCC on 25/11/2007 and the project registration number is 1280. The project opted for the renewable crediting period valid and the duration of the first crediting period is from 25/11/2007 – 25/11/2014. A total of 66,692 CERs have been issued for the project activity against electricity exported to the grid between the period 25/11/2007 to 31/12/2012. The project participant intends to renew the crediting period in line with the procedure for renewal and the PDD has been updated accordingly¹.

AHPL is a subsidiary of Dodson–Lindblom International Inc. (DLI), an USA-based water resources company involved in developing and operation of hydro electric plants. AHPL is operating a 2.2 MW small hydroelectric project at Birsinghpur in Madhya Pradesh on Build, Own, Operate and Maintain (BOOM) basis for thirty years.

The Unit 1 of the project activity has started commercial operation from 24/10/2006 whereas the Unit II of the project activity has started commercial operation from 06/02/2007. The plant has synchronized with the grid in July 2006.

The project activity, “Birsinghpur hydroelectric project” is located within the premises of Sanjay Gandhi Thermal Power Station (SGTPS) owned and operated by Madhya Pradesh Power Generating Company Ltd (MPPGCL), formerly Madhya Pradesh State Electricity Board (MPSEB). SGTPS has four operating units of 210 MW each. SGTPS operates on the lake cooling system in which, the water is conveyed in a canal to the circulating water pump house. The water is then circulated through the cooling condensers of the steam generating units by the circulating water pumps. After cooling the steam in the condensers, the water is discharged to the seal pit. The water then flows back to the reservoir by gravity through the return canal. About 30,000 cubic metres per hour (m³/hr) of water is required for cooling the condensers. Three (3) pumps each having a discharging capacity of 10,000 m³/hr at 25 metres head are employed to draw water from the lake.

The warmed circulating water is not discharged at atmospheric pressure to avoid vapour formation within the thermal unit's condenser. A water seal is achieved by providing a concrete chamber at each pipe outlet to maintain the desired minimum pressure head of 2.5m water column (WC). The energy of the falling water is dissipated before it enters the return canal.

The difference of elevation between the water level in the seal pit and the water level in the return canal provides the head for the Birsinghpur mini hydro project. The quantity of water discharging from the seal pit provides the flow. The power potential offered by this head and flow will be harnessed by the mini hydro project. The available head and flow for the project activity are relatively constant, with the head being about 8.7 M and the available flow for each unit of about 8.3 cubic meters/sec for a total flow of about 33 cubic meters/sec. The project activity involves the construction of a Forebay consisting of concrete retaining walls connected to the seal pit structure. The water intake and power house are connected to the Forebay, with a by-pass structure involving a spillway that allows the release of water to the return canal in the event that the small hydropower plant is shut down for any reason. Water from the Forebay is led through Intake gates to 2 units of horizontal Kaplan turbines located in the adjacent power house building. This water rotates the Kaplan turbines, which in turn rotates the synchronous generator coupled to the turbine. A generator of 1.5 MVA (@0.8 pf) i.e 1.2 MW is coupled to each turbine to generate electricity. Electricity shall be generated at 3.3 KV and stepped up to 33 KV and connected to Madhya

¹ The first intimation to UNFCCC on renewal of the crediting period was sent on April 29, 2014. Later on PP has re-intimated to UNFCCC with updated PDD & DOE conformation on 18/12/2014, and received confirmation from UNFCCC on 05/01/2015. The copy of these intimation mails are made available to DOE.

Pradesh Power Transmission Company Ltd (MPPTCL). The construction and erection of the plant is completed and the trial operations are in process. The plant has synchronised with the grid in June 2006. **This project is amongst the first of its kind in the country utilising condenser cooling water for power generation.**

PP has entered into the Power Purchase Agreement (PPA) with Madhya Pradesh Electricity Board for the sale of entire net electricity output, on 26th July 1999. However, section 3.3 of the PPA allows net electricity sale to either third party/ies (which are HT consumer of the board), on payment of wheeling charges or to the electricity board. Thus, PP signed short term PPAs for the sale of power with Nicholas Piramal India Ltd². & IPCA Laboratories on 29th April 2006 and 4th August 2006 respectively, both the parties are HT consumers of the Board. However, the PPAs for the sale of power with respective third parties (Piramal Enterprises Limited & IPCA) have got amended on 26th April 2014 & 4th August 2011 valid as on date.

Contribution of the project activity to sustainable development

The Designated National Authority for India has identified the following attributes to measure the contribution of the project activity for sustainable development:

- i) Social well being
- ii) Economical well being
- iii) Environmental well being
- iv) Technological well being

i) Social well being

The social well being is assessed by contribution to improvement in living standards of the local community. Birsinghpur is a remote village in an industrially backward area. The implementation of the project activity has provided job opportunities to the local community, contribute in poverty alleviation of the local community and development of basic amenities to community leading to improvement in living standards of the community. During construction of the project activity, job opportunities were given to several local people. Since the project activity is in a rural area, project activity caused the improvement of basic amenities. Thus the project activity has contributed to social well being.

ii) Economic well being

Economic well being refers to additional investment consistent with the needs of the local community. The project activity has created direct and indirect job opportunities to the local community during construction and shall provide permanent job opportunities during operation. During operation of the project activity, persons would be employed directly, apart from indirect employment. These activities have contributed to the economic well being of the local community.

iii) Environmental well being

The project activity produces electricity without any greenhouse gas (GHG) emissions. Additionally, the project activity generates electricity from “renewable energy source”, a source of energy that gets replenished naturally and does not suffer permanent depletion due to use. The project activity is an environment friendly electricity generation project with no significant impact on the environment. This is a very important contribution of the project activity for environmental well being. Electricity generation in the western grid is predominantly thermal where more than 70 % of installed capacity is thermal generation. Moreover, the project activity generates electricity from a renewable source of energy where the source gets replenished and is available for use. This is another important contribution of the project activity to the environmental well being.

Therefore, the following environmental benefits are derived from the project activity:

- Produces electricity without GHG emissions.
- Hydro power plant with no increase in volume of reservoir and no land inundation

² Name changed to “Piramal Enterprises Limited” pursuant to the resolution dated 2nd April 2012 adopted by their respective board. Refer amendment page 3 para “b” of PPA dated 26th April 2014.

- Produces electricity from a renewable energy source.
- Rural development as the project activity location is in rural area.

Environmental impacts due to the project activity are discussed in the Section F of this document.

iv) Technological well being

The project activity uses a unique and creative mechanism to utilize water circulated in a thermal power plant to generate electricity. This project is one of its kind in the country and provides a sustainable means to maximize the utilization of scarce available resources in a region that typically sees severe water shortages on a routine basis.

The project activity improves the supply of electricity with clean, renewable hydroelectric power while contributing to the regional/local economic development. Small-scale hydropower run-of-river plants provide local distributed generation, these small scale projects provide site-specific reliability and transmission and distribution benefits including:

- increased reliability, shorter and less extensive outages;
- lower reserve margin requirements;
- improved power quality;
- reduced lines losses;
- reactive power control;
- mitigation of transmission and distribution congestion, and;
- increased system capacity with reduced T&D investment.

In light of the above, the project participant believes that the project activity has contributed on all sustainable development attributes.

A.2. Location of project activity

A.2.1. Host Party

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India

A.2.2. Region/State/Province etc.

>>
Madhya Pradesh state

A.2.3. City/Town/Community etc.

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Mangthar near Birsinghpur, Pali Taluk, Umaria district.

A.2.4. Physical/Geographical location

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Birsinghpur hydroelectric project is located within the premises of Sanjay Gandhi Thermal Power Station (SGTPS). The latitude and longitude coordinates of the plant are 23.36 and 81.03 respectively. The plant is located in the Khasra numbers 409, 410/1, 415/2 and 414/2 of the Mangthar village, Pali Taluk, Umaria District, Madhya Pradesh. The plant is about 8 kilometres from Birsinghpur railway station, which is on Bhopal –Bilaspur railway route. The district headquarters is at Umaria, which is about 40 kilometers from the plant.

The location of project activity is shown in following figures – Fig 1:

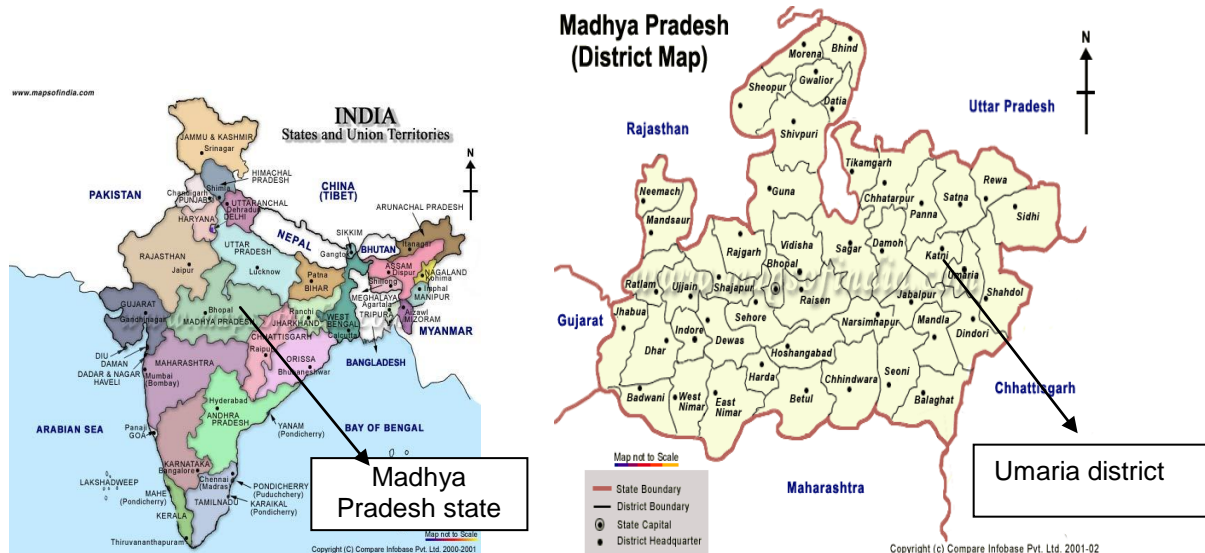
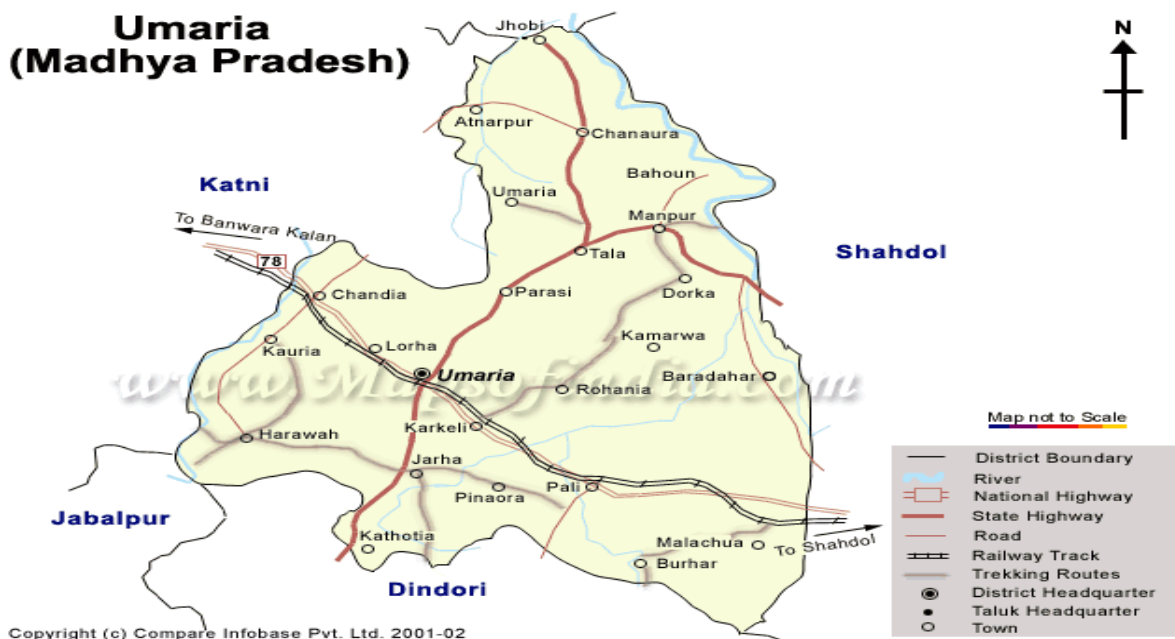


Fig - 1 Showing Madhya Pradesh state in Indian map

Fig- 2- showing Umaria district in Madhya Pradesh state



A.3. Technologies and/or measures

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Technology

2 units of Horizontal Kaplan turbines each of 1.179 MW are installed in Birsinghpur project.

Specification of Kaplan turbines

The Kaplan turbines are horizontal type with adjustable guide vanes and runner blades and tubular casing. The turbine runner blades are made of aluminium alloy since the water is drawn from the upper surface of the reservoir and is less erosive than canal or river water. The runner blades are fixed on a cast steel runner hub, which is rigidly fixed to the turbine shaft. The turbine shaft is forged carbon steel adequately designed to sustain the weight and withstand the run-away speed at its coupling with the runner hub. The guide vanes are of steel casting with integral body and stem. The guide vane profile shall be ground smooth so that leakage through it is negligible when fully closed. The casting of the draft tube shall be "S" type tubular, fabricated from steel plates.

Salient features of turbine:

Type	Full horizontal Kaplan
Number	2
Rated output @ rated head of 8.1 m @ rated discharge of 16.5 m ³ /s @ best efficiency i.e 92.3%	1208 kW
Rated output @ rated head of 8.1 m @ rated discharge of 16.075 m ³ /s @best efficiency i.e 92.3%	1179 kW
Rated head	8.1 m
Minimum operating head	8.10 m
Maximum operating head ³	8.92 m
Rated discharge for each unit	16.52 m ³ /sec
Minimum discharge	7.99 m ³ /sec
Maximum discharge	16.50 m ³ /sec
Runner diameter	1860mm
Specific Speed	665.88RPM
Rated Speed	265RPM
Turbine Setting	(-) 0.46 m
Make	Boving Fouress Limited
Minimum discharge	7.99 m ³ /sec
Maximum discharge	16.50 m ³ /sec

³ In order to avoid flooding, the plant is designed in a manner that safety gates open when head of 8.1 m is reached. Thus, maximum head that can be achieved is 8.1 m.

Specification of generators at Birsingpur

Type	Synchronous
Number	2
Rated Output	1.5 MVA, 3 phase, 50 Hz i.e 1.2 MW or 1200 kW
Net Output ⁴ (termed as plant Output)	1102KW
Voltage	3.3 kV
Power Factor	0.8 (lag)
Insulation	Class F
Excitation system	Brush-less
Make	Crompton Greaves Limited

Specification of Transformer

Transformer capacity	3.3/33 kV, 2.25 MVA Ynd11, 3 phase, ONAN
Connection on 3.3kV side	6.6 kV grade 185 square mm single core XLPE cable
Connection on 33 kV side	33 kV bus bar
Connection point	Plant switchyard
Protection System	50/51 (GT) over current and E/F relays and Buchholz relay, WTI, OT
Control & monitoring	Computer based c/w interface for remote operation
Circuit Breakers	SF6

Protection arrangements

⁴ This is the electrical power at generator terminals when turbine output is 1179 kW and applying 98% efficiency of gear box & 95.4% generator efficiency, as per the contract agreement.

- 64 G –restricted E/F relay
- 50 (ABC) over current relay
- 59 –over voltage relay
- 40G-loss of excitation relay
- Temperature monitoring system
- Speed monitoring system
- Master trip relay

The technology is well established and is available in the country and hence there is no transfer of technology.

The project activity produces electricity without any impact on the environment. There is no significant impact on air, water, and land due to the project activity. A brief impact on the environment due to project activity is discussed in section F. Thus, an environmentally safe technology is being employed in the project activity.

A.4. Parties and project participants

Party involved (host) indicates 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 Party)	Ascent Hydro Projects Ltd (AHPL)	No

A.5. Public funding of project activity

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There is no public funding for the project activity from Annex 1 Parties.

A.6. Debundling for project activity

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In line with the para 95 & 96 of Project Standard ver 7 “GUIDELINES ON ASSESSMENT OF DEBUNDLING FOR SSC PROJECT ACTIVITIES” has been followed - Debundling is defined as the fragmentation of a large project activity into smaller parts. A small-scale project activity that is part of a large project activity is not eligible to use the simplified modalities and procedures for small-scale CDM project activities. The full project activity or any component of the full project activity shall follow the regular CDM modalities and procedures. The following results into debundling of large CDM project:

The small-scale project activity is not a debundled component of a large project activity since there is no registered small-scale CDM project activity or an application to register another small-scale CDM project activity:

- With the same project participants;
- In the same project category or technology; and
- Registered within the previous two years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point

SECTION B. Application of selected approved baseline and monitoring methodology and standardized baseline

B.1. Reference of methodology and standardized baseline

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Title of approved baseline and monitoring methodology:

Renewable electricity generation for a grid in accordance with approved small scale methodology AMS I.D.

Type I : Renewable energy project
 Sectoral Scope : 1, Energy Industries
 Category I.D : Grid connected renewable electricity generation, version 18; 28th Nov 2014.
 Reference : Reference has been taken from the list of the small-scale CDM project activity categories contained in 'Appendix B of the simplified M&P for small-scale CDM project activities.'

The following tools and guidelines are used in this document:

1. Tool to calculate the emission factor for an electricity system – Version 04.0.0
2. Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period." Ver 03.0.1
3. Tool to Calculate project or leakage CO2 emissions from fossil fuel combustion, Version 02".

B.2. Project activity eligibility

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As per the approved small scale methodology AMS ID, version 18 this category comprises renewable energy generation units, such as photovoltaics, hydro, tidal/wave, wind, geothermal and renewable biomass, that supply electricity to and/or displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit.

The identified project is a hydro power project of 2.2 MW (< 15 MW) capacity and there is no non-renewable components linked with it. The project will displace electricity in the western regional grid which is mostly thermal intensive.

Justification of the category

SI No	Technology /Measure as per AMS-I.D, version 18	Measure of project activity
1.	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 a renewable energy generation unit based on hydro source. The generated energy is supplied to Third party/ MPPTCL grid, which is a part of NEWNE regional grid which is dominated by fossil fuel based power generating sources. The project activity therefore meets this applicability requirement (b) & (a) both.
2.	As per Appendix table 1 of AMS.I D version 18 is applicable for following project types: 1. Project supplies electricity to a national/regional grid 3. Project supplies electricity to an identified	The project activity is a renewable energy generation unit based on hydro source. The generated energy is supplied to Third party/ MPPTCL grid, which is a part of NEWNE regional grid

SI No	Technology /Measure as per AMS-I.D, version 18	Measure of project activity
	consumer facility via national/regional grid (through a contractual arrangement such as wheeling)	which is dominated by fossil fuel based power generating sources. The project activity therefore meets this applicability requirement (b) & (a) both.
4.	This methodology is applicable to project activities that (a) install a Greenfield plant); (b) involve a capacity addition in (an) existing plant(s); (c) involve a retrofit of (an) existing plant(s); or (d) Involve a rehabilitation of (an) existing plants(s)/unit(s); or (e) involve a replacement of (an) existing plant (s).	This project activity is a green field project. There was no power plant operating at the site prior to implementation of this project activity. Thus, the project activity therefore meets this applicability requirement (a).
5.	Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: <ul style="list-style-type: none"> • 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 amongst the first of its kind in the country utilizing condenser-cooling water for power generation. Hence, the project activity meets this applicability criterion as there is no change in the volume of the reservoir.
6.	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.	There is no non-renewable component in this project activity and the total installed capacity of the project activity is 2.2 MW which is less than the eligibility limit of 15 MW for a small scale CDM project activity. Hence, the project activity meets this applicability criterion.
7.	Combined heat and power (co-generation) systems are not eligible under this category.	The project activity is a small hydro power project and not a co-generation system. Hence, this applicability requirement is not relevant.
8.	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 ⁵ from the existing units.	This is not relevant to the project activity as it does not involve any addition of renewable energy generation units at existing renewable energy power generation facility.
9.	In the case of retrofit, rehabilitation or replacement, to qualify as a small-scale project, the total output of the retrofitted, rehabilitated or replacement unit shall not exceed the limit of 15 MW.	This is not relevant to the project activity since the project activity does not involve any retrofitting or modification of an existing facility for renewable energy generation.
10.	In the case of landfill gas, waste gas, wastewater	This is not relevant to the project activity

⁵ Physically distinct units are those that are capable of generating electricity without the operation of existing units, and that do not directly affect the mechanical, thermal, or electrical characteristics of the existing facility. For example, the addition of a steam turbine to an existing combustion turbine to create a combined cycle unit would not be considered "physically distinct".

SI No	Technology /Measure as per AMS-I.D, version 18	Measure of project activity
	treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as “AMS-I.C.: Thermal energy production with or without electricity” shall be explored.	since the project activity a small hydro power project.
11.	In case biomass is sourced from dedicated plantations, the applicability criteria in the tool “Project emissions from cultivation of biomass” shall apply.	This is not relevant to the project activity since the project activity a small hydro power project.

From the above table, it is evident that the project activity meets all the applicability conditions of the approved small scale methodology AMS-I.D. (version 18) - Grid connected renewable electricity generation

B.3. Project boundary

As per Paragraph 9 of the small-scale baseline methodology AMS-I.D., version 18: Grid connected renewable electricity generation “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.”

	Source	Gas	Included	Justification/Explanation
Baseline	Grid Electricity Generation	CO ₂	Yes	Main Emission Source
		CH ₄	No	Excluded for simplification. This is Conservative
		N ₂ O	No	Excluded for simplification. This is Conservative
Project Activity	On site fossil fuel consumption due to the project activity	CO ₂	No	Maybe an important emission source
		CH ₄	No	Excluded for simplification.
		N ₂ O	No	Excluded for simplification.
	Combustion of waste gas for electricity generation	CO ₂	No	Not applicable
		CH ₄	No	Excluded for simplification.
		N ₂ O	No	Excluded for simplification.

B.4. Establishment and description of baseline scenario

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Updated baseline for the second crediting period in line with the “**Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period.**” Ver 03.0.1.

This tool provides a stepwise procedure to assess the continued validity of the baseline and to update the baseline at the renewal of a crediting period, as required by paragraph 292 of Project Standard & 49 (a) of the modalities and procedures of the clean development mechanism.

The tool stipulates the following steps to be carried out.

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

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

The baseline scenario remains unchanged and is in compliance with all the relevant mandatory national and/or sectoral policies.

Step 1.2: Assess the impact of circumstances

The baseline scenario identified at the validation of the project activity was the 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 into the grid. Thus this project activity was a voluntary investment which intends to replace equivalent amount of electricity at grid from renewable source. PP was not bound to incur this investment; hence absence of project activity (i.e. the investment) does not lead to any continued baseline practice for PP within their scope whereas the continued operation of the project activity would continue to replace equivalent amount of electricity at grid. Hence, the same baseline as identified in the previous crediting period is still valid for the project. Therefore, the assessment of the changes in market characteristics is not required for the renewal of the project's crediting period under CDM.

Nevertheless, there is an impressive growth attained by the Indian Power Sector within the recent years, the installed capacity has grown from mere 1,713 MW in 1950 to 223,343.60 MW as on 31.03.2013, consisting of 151530.49 MW Thermal, 39491.40 MW Hydro and 4,780 MW Nuclear. Sector-wise details of installed capacity are shown in Table 1. However, It is evident from Table 1 that the installed capacity is predominantly coal based and therefore, is a major source of carbon dioxide emissions in India. Hence, there exists scope for reducing the CO₂ emissions in the country by increased use of renewable energy sources. Furthermore, project participant has considered the latest available CO₂ Baseline Database (CEA database, version 9⁶) at the time of requesting renewal of the crediting period for establishing the baseline emission factor, which itself considered all the new circumstances. Hence, the new circumstances do not have an impact on the baseline emission.

Table 1: Sector- wise installed capacity (MW) as on 31.03.2009 (CEA Database version 9)

Table 1: Sector- wise installed capacity (MW) as on 31.03.2013.

Sector	Hydro	Thermal				Nuclear	Renew.	Total
		Coal	Gas	Diesel	Total			
State	27437.0	51660.50	5676.32	602.61	57939.43	0.00	3748.19	89124.62
Central	9459.40	44055.01	7065.53	0.00	51120.54	4780.00	0.00	65359.94
Private	2595.00	34505.38	7368.00	597.14	42470.52	0.00	23793.52	68859.04
All India	39491.40	130220.89	20109.85	1199.75	151530.49	4780.00	27541.71	223343.60

Note: These capacities are not identical with those listed in the Excel database, because the database excludes renewable, few small diesel and steam units.

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

As explained in step 1.2, the baseline scenario was the electricity import/generation from the power plants connected to the electricity grid. Therefore this condition is not applicable to the project activity.

⁶ http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

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

This step stipulates that *“Where emission factors, values or emission benchmarks are used and determined only once for the crediting period, they should be updated, except if the emission factors, values or emission benchmarks are based on the historical situation at the site of the project activity prior to the implementation of the project and cannot be updated because the historical situation does not exist anymore as a result of the CDM project activity.”*

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

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

As evident from the explanation provided above the baseline scenario remains unchanged. Only the approach used to calculate the baseline emission factor is updated as per the latest version available at the time of PDD submission for renewal.

In line with the paragraph 13.9.1 of the project standard version 7, the impact of new relevant national and/or sectoral policies and circumstances on the baseline taking into account relevant EB guidance with regard to renewal of the crediting period at the time of requesting renewal of crediting period; and the correctness of the application of an approved baseline methodology for the determination of the continued validity of the baseline or its update, and the estimation of emission reductions for the applicable crediting period

Impact of the national and/or sectoral policies and circumstances upon the baseline scenario of the project activity

The Government of India enacted the Electricity Act in the year 2003⁷ to harmonize and rationalize the provisions in the then existing laws. The Act consolidated the laws relating to generation, transmission, distribution, trading and use of electricity. With the Enactment of the act, the then existing laws viz, The Indian Electricity Act 1910, The Electricity Supply Act, 1948 and The Electricity Regulatory Commissions Act, 1998 were repealed. The Electricity Act 2003 was in force at the time of the completion of the baseline study for the registered PDD.

Section 3 of the said act required the Central Government to prepare the national electricity policy and tariff policy, in consultation with the State Governments and the Authority for development of the power system based on optimal utilization of resources such as coal, natural gas, nuclear substances or materials, hydro and renewable sources of energy. In accordance with the section 3 of the Electricity Act 2003, the Central Government notified the National Electricity Policy⁸ on 12th February 2005 which was in force at the time of completion of the baseline study as stated in the registered PDD of the project activity. This policy has not been revised since then and is currently in force as well.

In addition to the above policies, State Electricity Regulatory Commissions (SERCs) have announced preferential tariffs and Indian Renewable Energy Development Agency (IREDA) provides term loan assistance towards establishing biomass power projects. All these fiscal and financial incentives were in force at the time of completion of the baseline study for the registered PDD of the project activity and still continue to exist.

However, in spite of the financial incentives given by the government to renewable power projects in India the generation from the low cost must run resources connected to the NEWNE Regional Grid has not increased to such an extent that this would lead to more than 50% contribution from the low cost must run resources towards the total generation from the NEWNE Regional Grid.

The approved consolidated baseline methodology, AMS-I.D., (Version 18), has been used to determine the baseline and the estimation of emission reductions for the applicable crediting

⁷ http://www.powermin.nic.in/acts_notification/electricity_act2003/pdf/The%20Electricity%20Act_2003.pdf

⁸ http://powermin.nic.in/indian_electricity_scenario/national_electricity_policy.htm

period. As referred in the methodology “Tool to calculate the emission factor for an electricity system” (version 04.0) has been used to determine continued validity of the baseline based on combined margin (CM) calculations.

In light of the above discussion it is to be concluded that in accordance with relevant guidelines stipulated in the *Project Standard para 13.9.1*, national and/or sectoral policies and circumstances had been considered towards formulating the OM & BM baseline scenario. Hence the baseline scenario as applied for the present project activity remains justified.

As per AMS-I.D., (Version 18), paragraph 22, Baseline emissions include only CO₂ emissions from electricity generation in 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:

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

Where:

BE_y : Baseline Emissions in year y; t CO₂

$EG_{PJ, y}$: 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)

$EF_{grid, y}$: 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” (t CO₂/MWh)

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 Emission Reductions. The operating margin and the build margin emission factor have been considered from the information (Baseline Carbon Dioxide Emission Database -Version 9, Dated: January 2014)⁹ published by the Central Electricity Authority (CEA), Ministry of Power, Govt. of India which have been computed according to the procedures prescribed in ‘Tool to calculate the emission factor for an electricity system’ version 04.0.

The baseline scenario has been identified as per the combined margin (CM) approaches which consists of operating margin (OM) and build margin (BM) factors as described in this section.

STEP 1. Identify the relevant electricity System:

⁹ Reference: http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

The Indian power system is divided into two independent grids, namely new Integrated Northern, Eastern, Western, and North-Eastern regional grid (NEWNE) and the Southern Grid. This proposed project activity is located at Mangthar near Birsinghpur, Pali Taluk, Umaria district, Madhya Pradesh which comes under NEWNE Grid. In the proposed baseline, NEWNE Grid has been used as the reference grid system for estimating the baseline emission.

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

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

Project participant has chosen option I to include only grid power plants in the calculation.

STEP 3. Select a method to Determine the Operating Margin (OM)

As per the “tool to calculate the emission factor for an electricity system”, version 04.0.0, “the operating margin refers to a cohort of power plants that reflect the existing power plants whose electricity generation would be affected by the proposed CDM project activity.”

Further, the OM is to be determined based upon the following methods

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

The simple OM method (option a) can only be used if low cost/must run resources¹⁰ 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.

In the context of the present project activity simple OM has been considered since the contribution of low cost must run resources in the southern regional grid mix amongst the five most recent years generation of the southern regional grid mix is less than 50% of total grid generation. This fact remains justified from the statistics provided below¹¹.

¹⁰ 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. If coal is obviously used as must-run, it should also be included in this list, i.e. excluded from the set of plants.

¹¹ Central Electricity Authority : CO₂ Baseline Database Version 09

Year	2008-09	2009-10	2010-11	2011-12	2012-13
Gross Generation Total (GWh)	548,956	586,311	622,447	667,244	703,824
Net Generation Total (GWh)	510,693	544,915	579,181	621,462	653,066
Share of Must-Run (Hydro/Nuclear) (% of Net Generation)	17.4%	15.9%	17.6%	19.2%	17.4%
Average % low cost generation out of total grid generation – Average of the five most recent years					17.5%

Hence, the statistics provided in the table above quite evidently demonstrate the fact that power generation from the low cost must run resources within the southern regional grid is less than 50 % of the total generation. Hence, the use of simple operating margin method towards formulation the baseline scenario remains justified.

Further as per Step 3, the emission factor can be calculated using either of the two data vintages:

- **Ex-ante option:** If the ex ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. 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 five most recent calendar years prior to the time of submission of the CDM-PDD for validation.
- **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.

For the project activity, the Ex-ante option is chosen for emission factor estimation.

The Simple OM factor is calculated as under in Step 4.

Step 4: Calculate the Operating Margin Emission Factor According to the Selected Method

As per Step 3 of the 'tool to determine the emission factor of an electricity system', the simple OM emission factor can be calculated using the ex-ante option which states that for calculation of OM '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'.

In this regard, the simple OM emission factor has been sourced from the most recent data available at the time of submission of the PDD for renewal and has **therefore been fixed for this second crediting period** (see Appendix 3 & 4 for data related to operating margin in NEWNE grid).

Calculation of Baseline Emission Factor for NEWNE Grid			
Source: http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm			
Net Generation in Operating Margin (GWh)			
	2010-11	2011-12	2012-13
NEWNE	476,987	502,300	539,385
Simple Operating Margin (tCO ₂ /MWh) (incl. Imports) (1) (2)			
	2010-11	2011-12	2012-13
NEWNE	0.97	0.97	0.99
Generation-Weighted Average			
tCO ₂	463160542	486780009	534751482
MWh	476986721	502300381	539385372
Operating Margin (tCO₂/MWh)¹²	0.9776		

Step 5: Calculate the Build Margin (BM) Emission Factor

In terms of vintage of data, project participants 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 participant has chosen Option 1 for vintage of the data

As per the CEA CO₂ Baseline Database version 9, the BM for the 2012-13 has been calculated to be $EF_{grid, BM, y} = 0.9673 \text{ tCO}_2\text{e/MWh}^{13}$.

Step 6: Calculate the Combined Margin Emissions Factor

Combined Margin has been used for ascertaining Baseline Emission Reductions. The combined margin emission factor consists of two components i.e. the operating margin and the build margin. The Central Electricity Authority (CEA) under the Ministry of Power, Government of India, has estimated the simple operating margin and build margin emission factor for the southern regional grid. According to 'Tool to calculate the emission factor an electricity system' ver-04, the combined margin emission factor is calculated as follows:

The weighted average CM method (option A) is preferred for calculation of combined margin emission factor.

¹² Operating margin calculation is provided transparently in the excel sheet.

¹³ Refer ER sheet for detailed calculation.

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times W_{OM} + EF_{grid,BM,y} \times W_{BM}$$

Where:

$EF_{grid,OM,y}$: Operating Margin CO₂ emission factor in the year y (tCO₂/MWh)
 W_{OM} : Weighting of operating margin emission factor (%)
 $EF_{grid,BM,y}$: Build Margin CO₂ emission factor in the year y (tCO₂/MWh)
 W_{BM} : Weighting of build margin emission factor (%)

The combined margin emission factor has been derived from the simple operating margin and build margin emission factors after considering/ factoring the weights of 0.25 and 0.75 for operating margin (OM) and build margin (BM) emission factors respectively relevant to the hydro power generation project activities as per the 'Tool to calculate the emission factor for an electricity system (Version 04)

Combined Margin (CM) in tCO₂/MWh for Southern regional grid is

$$\begin{aligned} EF_{CO_2,grid,y} &= 0.25 \times \text{Average of OM for last 3 years} + 0.75 \times \text{BM} \\ &= 0.25 \times 0.9776 + 0.75 \times 0.9673 \\ &= 0.9699 \end{aligned}$$

Hence combined margin emission factor for the NEWNE grid ($EF_{CO_2,grid,y}$) is 0.9699 tCO₂/MWh.

B.5. Demonstration of additionality

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As per the decision 17/cp.7 Para 43, a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.

As per the attachment A to Appendix B of the simplified M&P for small-scale CDM project activities of the UNFCCC CDM website, to prove that the project is an additional, explanation regarding the project activity would not have occurred anyway due to at least one of the following barriers is required:

- (a) Investment barrier
- (b) Technological barrier
- (c) Barrier due to prevailing practice
- (d) Other barriers

The barriers are discussed in detail below:

Barrier analysis

The implementation of the hydel power based project activity is a voluntary step undertaken by AHPL with no direct or indirect mandate by law. The main driving forces to this 'Climate change initiative' have been:

- GHG reduction and subsequent carbon financing against sale consideration of carbon credits.
- Rural Development of the region by creating job opportunities for the local people.
- Demonstration of developing such projects to the other entrepreneurs.

However, the project participant was aware of the various barriers associated to project implementation. But it was felt that the availability of carbon financing against a sale consideration of carbon credits generated due to project activity would help to overcome these barriers.

The barriers faced by the project activity are discussed below:

Sectoral and national policies for hydropower project

Hydropower is recognized as a renewable source of energy, which is non-polluting and environmentally benign. The history of hydropower generation in India is more than 100 years old. The first hydropower station in India was a small hydro power station of 130 KW commissioned in 1897 at Sidrapong near Darjeeling in West Bengal. With the advancement in technologies and increasing requirement of electricity, emphasis was shifted to large sized hydro power stations. In 1963, the hydropower had attained a share of 50.62% in the total installed capacity of power generation in India.

While there has been a continuous increase in the installed capacity of hydropower stations, which now stands at 25963.05 MW¹⁴ as against the total installed capacity of 123,667.81 MW as on 31.12.2005. The share of hydropower has been reduced to 21% currently as focus had been development of thermal fossil fuel based power plants. Ministry of Power in the Government of India is responsible for the development of large hydro power projects in India. In order to maintain the balance between hydro power and thermal power, Ministry of Power has announced a Policy for accelerated development of hydro power in the country. Ministry of Non-conventional Energy Sources (MNES) is responsible for development of small and mini hydro projects of 3-25 MW station capacity. Ministry of Non-conventional Energy Sources has created a database of potential sites of small hydro based on information from various States and on studies conducted by Central Electricity Authority. An estimated potential of about 15,000 MW of small hydropower projects exists in India. Small and mini hydro projects have the potential to provide energy in remote and hilly areas where extension of grid system is un-economical. These projects although are not economically very attractive like large power plants, they are environmentally friendly and still are viable. 4,096 potential sites with an aggregate capacity of 10,071 MW for projects up to 25 MW capacity have been identified. India has 420 small hydro power projects up to 25 MW station capacity with an aggregate capacity of over 1423¹⁵ MW out of total national installed capacity of generation mix of 123,667.81MW. Many projects for a total installed capacity of about 521 MW are under construction.

The small hydropower projects are developed in the potential regions identified by the State Electricity Boards/ State Agencies responsible for SHP development. Most of the SHP projects are grid connected. However, there are some projects, which are decentralized and are managed by local community/NGOs. Many states in India have announced policies for development of small hydropower projects with various incentives like wheeling of power produced, banking, attractive buy-back rate, facility for third party sale, etc. But still the capacity additions have not been very high. Still the share of small hydro power projects upto 25 MW is only 1.5% including the projects under construction.

In Madhya Pradesh, hydropower projects are implemented by MPSEB and now MPPGCL. There are 8 hydro power stations in Madhya Pradesh with an installed capacity of 835MW. Madhya Pradesh government had formed a separate department MP Urja Vikas Nigam to develop and harness renewable energy projects.

While each of these states including Madhya Pradesh have established specific agencies to promote the development of renewable small hydropower projects, the results have been dismal. There is a significant gap between policy formation and policy implementation. Often the policy formulation is based on assessments that do not adequately account for or are tailored to the financing, technical, hydrological and overall viability of such projects in the regions where there are meant to be promoted. Small hydropower projects in the state of Madhya Pradesh, including the Birsinghpur hydroelectric project have been impacted, by these factors.

¹⁴ Source : Ministry of Power, Government of India.

¹⁵ Source :Ministry of Non-conventional Energy Sources, Government of India

The Birsinghpur hydroelectric project has faced numerous barriers, several of which are detailed in the discussion that follows. It should be noted that while an attempt has been made to describe the barriers by category, many of the barriers universally apply across several categories.

Technological barriers

As mentioned earlier, the project activity is amongst the first of its kind in the country utilizing condenser-cooling water for power generation. The project activity utilises the return cooling water discharged by the SGTPS. Generally thermal power stations use huge quantities of water for cooling the condenser lines. After cooling the condensers, the water is sent to a cooling tower where it is cooled and re-circulated. In SGTPS, the system operates on lake storage cooling system. A huge reservoir is available near the thermal power station.

Cooling water for condensers is drawn from the reservoir on River Johilla through the intake canal to the cooling water pump house. Three (3) pumps are provided in the pump house to meet the cooling system requirement of each thermal unit of 210 MW. Each pump has a pumping capacity of 10,000 Cum/hr.

Thus, the total quantity of circulating cooling water for each thermal unit is of the order of 30,000 Cum/hr. After cooling of the condensers this water is returned back to the reservoir by a return canal through the seal pit. Water pumped for cooling of auxiliaries is also discharged through the same seal pit. This discharge is of the order of 3,000 Cum/hr for each thermal unit. The total quantity of water available at the seal pit after considering losses of about 10% will be about 29,700 Cum/hr (8.25 Cumecs). The crest level of seal pit is about 9 metres high from the canal bed. This 'head' is being harnessed to produce electricity in the project activity. A forebay is provided near the seal pit by constructing side walls to the top of the seal pit to have a constant head for the generating units. The turbines are so placed that a head of at least 8.1 metres is available.

As the project is located within the thermal power plant complex, the construction of the project activity had to be carried out within significant space limitations associated with the thermal complex. The project activity is constructed between the intake channel and the return canal of the thermal power plant. Technical requirements mandated by equipment characteristics were difficult to accommodate within the available construction space. In addition, delays caused by actions imposed by MPEB at various times resulting inordinate delays to the implementation of the project forced the company to make significant changes to the project implementation methodology. During the early development stages of the project, shortly after the initial memorandum of understanding was signed in 1996 with MPEB, AHPL completed a unique design concept using imported submersible turbine generator units ideally suited to the severely restricted environment at the project location.

Delays caused by MPEB in executing agreements, project withdrawal and re-instatement and transfer of land resulted in the technology no longer being available for use at the Birsinghpur hydroelectric project. Engineering modifications were required to the technical arrangement finally adopted for the project, which resulted in significantly increased cost, not initially envisioned for the project. In addition, consideration had to be provided to working within an existing facility where there could be no activity undertaken that could disrupt the operations of the thermal plant. This barrier has resulted in adjustments to project design and construction methodologies and incorporation of alternative measures requiring significant time and additional costs. In addition, the project activity represents a unique system with very limited experience available in implementation of similar projects, resulting in extended schedules and increased costs.

Investment barriers

Investment barriers are typically faced prior to start of construction and result from a climate that is not conducive to investment. Enormous delays in the allotment of the land by the government of MP, executing the PPA and other project approvals did not provide confidence to investors and financiers. MPEB also cancelled the allotment of the project after its award and after significant development effort involving investment of funds had already taken place and the project activity

had progressed to an advanced stage including completion basic designs, availability of construction drawings, identification of equipment suppliers with unique submersible turbine-generator technology. These issues were resolved after many deliberations, which took significant, time resulting in increased cost of the project. The project financing structure had to be significantly modified, as the investors and lenders, who had initially expressed significant interest in financial participation in the project activity, withdrew their interest.

Capital cost increase

The project was awarded by MPSEB to AHPL and subsequently the allotment of the project was withdrawn. However, after a prolonged debate, the project was again awarded to AHPL. The land for the project was part of SGTPS and owned by MPSEB. Post AHPL's request of transferring the land, it took MPSEB more than 30 Months to allot the land to AHPL. The delay in allotment resulted in a huge increase in capital cost. Designs previously completed had to be redone, with the incorporation of more readily available technology. Due to the various delays associated with the project outside of AHPL's control resulting in a cascading adverse financial impact to the project, the capital cost has risen from INR 114.4 Million (US \$ 2.54 Million) to INR 170.4 Million (US \$ 3.78 Million), which is about 33%. This has resulted in a huge financial burden to AHPL, which could be offset with the CDM funds, if made available.

Construction cost increase

Debt financing for the project activity was finally obtained from IREDA under a World Bank line of funding for renewable energy projects. This required compliance with World Bank procedures for the preparation of tender documents, bidding, bid evaluation, selection of bidders and final award for all construction and equipment supply contracts for the project upon approval by IREDA on behalf of World Bank. Bids were invited, after receiving the debt commitment letter from IREDA, from the approved list of vendors of IREDA on Limited International Competitive Bidding basis for Electro-mechanical package and through press notification for the civil works on domestic competitive basis by keeping suitable time cushion for the bidding and approval process as per the World Bank procedures.

In order to avoid any delays in the project execution, the bidding process was initiated early i.e. in Q-4 2001 to ensure that it would be completed by the time the loan documentation and security creation process was completed. Based on the bids and various queries raised by IREDA, the bid evaluation report recommending award of Electro-mechanical equipment package to Alstom (Lowest Bidder) was resubmitted to IREDA for approval in July 2002. Simultaneously, the civil works contract was approved by IREDA and the contract was awarded in August 2002 and the civil works were initiated in October 2002. However, after prolonged discussions with AHPL, IREDA rejected the contract award of Electromechanical package to the lowest Bidder i.e. Alstom, as it did not meet IREDA's requirements. This situation necessitated a re-bidding of the Electro-mechanical equipment package, which was reinitiated in November 2002 after obtaining World Bank/ IREDA approval and the contract was finally awarded to Boving Fouress Limited in March 2003. The total process of bidding and supplier selection for the E& M package thus got delayed by over 12 months resulting in significant delays to the commencement of the project work which had further cascading effect on the construction process.

Based on the information obtained from Alstom, the plant layout was established and major excavation had commenced in the October 2002. However, in addition to the delays the new E&M contractor modified the project layout, which resulted in major modifications and further delays in the detailed engineering and thereby the commencement of the civil construction activity. This necessitated a premature de-mobilization by the civil contractor. By the time the construction activity got reorganised, the steel prices increased by 55% and the cement prices increased by about 20%. These price increases placed significant pressures on the contractor to meet the scheduled obligations.

The civil works contractor expressed inability to complete the project at the agreed cost and abandoned the project requiring the project participants to find another experienced contractor to complete the works at an increased price than agreed with the earlier contractor. The civil

contractor also requested for an escalation of the contract value and the project promoters had to agree for the escalation due to steep increase in basic inputs of the projects. The cost of civil works during planning stage was about INR 43 Million (US\$0.955 Million), which has finally escalated to INR 65 Million (US\$1.44 Million), which is about 51% and similarly the cost of electromechanical and hydro mechanical works increased by INR 10 Million (US\$0.222 Million). This had a negative effect on the bottom line reducing the return on investment. The project promoters had to arrange for extra investment, which was a big barrier for the project activity.

Institutional barriers

MPEB had advertised for setting up Mini Hydel Power plants and allotted projects based on the incentive policy as per Government of MP Notification dated 26/09/1994. The project was allotted by MPEB to AHPL and then was abruptly withdrawn as MPEB unilaterally decided to implement the project activity by itself, without regard to agreements signed. However, the project was re-allotted after prolonged discussions and deliberations. The Government of MP declared vide its notification dated 26/09/1994, scheme of incentives for power generation through non-conventional energy source which included provision of buy back by MPEB in respect of electricity generated through non-conventional sources at a rate of INR 2.25 per kWh and also provision of sales tax exemption on the eligible investment. AHPL had carried out their financial analysis of the project with the tariff of INR 2.25 per kWh and the benefit of sales tax exemption of INR 1.25 per unit. However, in June 2000, the Government of MP issued another notification whereby they notified that the projects, which do not get commissioned before December 2001, will not be eligible for this benefit. It is noteworthy that the delays in implementation of the project were primarily related to delays and ad hoc actions by the MP government actions, however, the project activity suffered, because, the provisions that established its early financial viability were no longer fully available to the project. This inconsistent implementation of government policies, which are a significant barrier for the private sector investments in the power sector in the MP state, constituted a significant institutional barrier for the project activity.

Hydrological risks

Water discharge

The project activity is dependent totally on the discharge from the thermal power plant. Any shutdown in the thermal power plant generating units would also result in the shut down/curtailment of generation of the Mini Hydel plant. The project hydrology is thus linked to the operation of the thermal plant and is affected by all the risks that could impact the operation of the thermal plant. This is a huge barrier for AHPL as its operations are linked to the smooth operation of the old thermal power plant generating units.

Prevailing practice

The common prevailing practice in Indian power investment scene is investing in only medium or large scale conventional power projects, as several projects that are coming up are mostly large scale fossil fuel based power generation stations. This is mainly due to the assured return on investment, economies of scale and easy availability of finances.

The total installed capacity of small hydropower plants in India is 1423 MW¹⁶ and another 187 small hydropower plants are under construction with an installed capacity of 521 MW totaling 1944 MW. The total installed capacity of power generation in India is 123,671.81MW as on 31 December, 2005 excluding small hydro, biomass and wind energy; the share of small hydropower projects is only 1.57 %. This shows that investing in small hydropower plants is not a common prevailing practice in India.

Prevailing practice in Madhya Pradesh

¹⁶ www.mnes.nic.in

The total installed capacity of small hydro project in Madhya Pradesh is 5.455 MW¹⁷ as against installed capacity of 3112.955 MW constituting a share of 0.17 % only, which is very minimal. Although few projects have been allotted for private investment, no project has come up so far in the state. This shows that investment in small hydropower project is not a common prevailing practice in Madhya Pradesh.

In the light of above barriers, the project activity is additional and not a baseline scenario.

B.6. Emission reductions

B.6.1. Explanation of methodological choices

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According to the para 23 of AMS-I.D. (version 18), the Emission Reductions for the project activity will be calculated using the following formula:

$$ER_y = BE_y - PE_y - LE_y \dots \dots \dots (2)$$

Where,

ER_y = Emission Reductions during the year y in tCO_{2e}

BE_y = Baseline Emissions during the year y in tCO_{2e}

PE_y = Project Emissions during the year y in tCO_{2e}

LE_y = Leakage Emissions during the year y in tCO_{2e}

Calculation of Baseline Emissions

As per para 22 of AMS-I.D. (version 18), baseline emissions (BE_y in tCO_{2e}) 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 ($EF_{CO2, grid, y}$).

$$BE_y = EG_{PJ, y} * EF_{grid, y} \dots \dots \dots (3)$$

Where,

BE_y = Baseline Emissions in year y (tCO₂)

As per para 26 of AMS-I D ver 18, $EG_{PJ, y} = EG_{PJ, facility, y}$ = Quantity of net electricity supplied by the project plant/unit to the grid in year y (MWh).

(The net electricity export to the grid is the difference between the quantities of the grid electricity export and the import.)

$EF_{grid, y}$ = CO₂ emission factor of the grid in year y (t CO₂/MWh)

(Baseline emission factor for the grid (considering Combined Margin approach). NEWNE regional grid has been considered for this project activity.)

Calculation of Project Emissions

According to para 39 of AMS-I.D. (version 18), *for most renewable energy project activities, $PE_y = 0$. However, for the following categories of project activities, project emissions have to be considered following the procedure described in the most recent version of ACM0002.*

- *Emissions related to the operation of geothermal power plants (e.g. non-condensable gases, electricity/fossil fuel consumption)*
- *Emissions from water reservoirs of hydro power plants"*

¹⁷ Source website of MP Power Generating Company Ltd.

The project activity is not a biomass project, neither a geothermal application and nor it is a water reservoir based hydro power project. This is a first of its kind small hydro project; therefore no project emissions are applicable to the proposed project activity.

However, as per paragraph 40 of AMS-I.D. (version 18), CO₂ emissions from on-site consumption of fossil fuels due to the project activity shall be calculated using the latest version of the "Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion"¹⁸.

As there is a small capacity DG set available at the site as backup arrangement during start up or as a failsafe option. Therefore, the emission due to on-site consumption of fossil fuel shall be calculated as per the "Tool to Calculate project or leakage CO₂ emissions from fossil fuel combustion, Version 02" a project emission; (calculated in the section B.6.3 of the PDD),

Thus,

$$PE_{FC,j,y} = \sum_i FC_{i,j,y} \times COEF_{i,y}$$

Where:

- $PE_{FC,j,y}$ - Are the CO₂ emissions from fossil fuel combustion in process j during the year y (tCO₂/yr);
- $FC_{i,j,y}$ - Is the quantity of fuel type i combusted in process j during the year y (mass or volume unit/yr);
- $COEF_{i,y}$ - Is the CO₂ emission coefficient of fuel type i in year y (tCO₂/mass or volume unit)
- I - Are the fuel types combusted in process j during the year y

The CO₂ emission coefficient $COEF_{i,y}$ will be calculated based on net calorific value and CO₂ emission factor of fuel type i, as mentioned in option B (equation 4) of 'Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion' (version 2).

Leakage

According to the AMS-I.D, para 42, guidance on leakage is provided for biomass project only but the project activity is first of its kind small hydro project. Hence, no leakage emission from this project activity has been considered.

Emission Reductions:

According to equation no 2, the Emission Reduction is calculated by subtracting the project emissions from the baseline emissions

Thus $ER_y = BE_y - PE_y - LE_y$

According to the methodology, leakage emissions have not been considered for the project activity.

Therefore, $ER_y = BE_y - PE_y$

B.6.2. Data and parameters fixed ex ante

Data / Parameter	EF
Unit	tCO ₂ /MWh
Description	Combined Margin CO ₂ emission factor of the NEWNE regional grid
Source of data	CO ₂ baseline database for the Indian Power Sector, version 9 , Dated 27 January 2014 – Central Electricity Authority (CEA), Ministry of Power

¹⁸ <http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-03-v2.pdf>

Value(s) applied	0.9699
Choice of data or Measurement methods and procedures	CEA has estimated the simple operating margin and build margin emission factor for the NEWNE regional grid. For calculating the CO ₂ emission factor as per combined margin method for the renewable power generation project activities in the first and subsequent crediting periods, the weights of 0.25 for operating margin and 0.75 for build margin have been considered as 'Tool to calculate the emission factor for an electricity system' (Version 04)
Purpose of data	Calculation of baseline emission.
Additional comment	Details given in Appendix- 4. The emission factor has been fixed for the second crediting period.

B.6.3. Ex ante calculation of emission reductions

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Formula used to determine Emission Reduction

CO₂ emission reduction due to project activity = BE_y – PE_y – LE_y

Calculation of Baseline Emissions

$$BE_y = EG_{PJ,y} * EF_{grid,y}$$

For the second crediting period, the total net electricity delivered to the grid would be monitored & calculated as per the monitoring plan provided in section B.7.3. However, for the estimation of total net electricity delivered by the project activity per annum, verified data from the 1st crediting period for the issued emission reduction period (i.e. from 25 Nov 2007 to 31 Dec 2012) has been considered below:

Quantity of net electricity supplied to the grid (EG_{BL,y}) - 14697 **MWh**

Thus, the Baseline Emissions are

$$BE_y = EG_{PJ,y} * EF_{grid,y}$$

$$= 14697 * 0.9699$$

$$= 14255 \text{ tCO}_2\text{/annum}$$

Hence, the expected baseline emissions for the project activity will be 14255 tCO₂/annum.

Calculation of Project Emissions:

Average Diesel Consumption per year	= 62	Lit/annum
EF CO ₂ _diesel	= 0.0726	tCO ₂ /GJ
NCV _{diesel}	= 41.76	GJ/Ton
Density of diesel (IPCC 2006 default value)	= 0.00086	ton/liter
Project Emission (Less than 1% of total ER. Hence, considered zero for estimation. However, will be considered during the IInd crediting period on actual.	= (62*0.0726*41.76*0.00086) = 0.16	tCO ₂ /annum

Leakage:

According to the AMS-I.D, para 42, guidance on leakage is provided for biomass project only but the project activity is first of its kind small hydro project. Hence, no leakage emission from this project activity has been considered.

Hence, LE_y = 0

Emission Reductions:

The Emission Reduction is calculated by subtracting the project emissions from the baseline emissions

Thus,

$$ER_y = BE_y - PE_y - LE_y$$

$$= 14,255 - 0 - 0 \text{ tCO}_2$$

$$= 14,255 \text{ tCO}_2$$

B.6.4. Summary of ex ante estimates of emission reductions

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
Year 1 ¹⁹	14,255	0	0	14,255
Year 2	14,255	0	0	14,255
Year 3	14,255	0	0	14,255
Year 4	14,255	0	0	14,255
Year 5	14,255	0	0	14,255
Year 6	14,255	0	0	14,255
Year 7	14,255	0	0	14,255
Total	99785	0	0	99,785
Total number of crediting years	7			
Annual average over the crediting period	14,255	0	0	14,255

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

(Copy this table for each piece of data and parameter.)

Data / Parameter	EG _{BL,y}
Unit	MWh
Description	Quantity of net electricity supplied to the grid in year y
Source of data	Monthly Joint Visual Meter Reading
Value(s) applied	14,697
Measurement methods and procedures	<ol style="list-style-type: none"> 1) The total electricity generated at two generators is supplied to the grid through bay 1 and bay 2 2) There is main meter and check meter, at the interconnection point, at each bay. 3) The accuracy class of each meter is 0.2. 4) The export and import readings are recorded at main and check meters at both the bays by the representative appointed by MPPKVVCL²⁰ in the presence of representative of AHPL. 5) All the meters are owned by AHPL and controlled by MPPKVVCL. 6) The calculated value of total net electricity exported to the grid will be used for emission reduction calculation.
Monitoring frequency	Continuous monitoring, hourly measurement and at least monthly recording

¹⁹ Here 'Year 1' would be started from the date of start of the renewal crediting period.

²⁰ The entity or the name of the entity under grid authority is subject to change. The change, which is not under PP's control, will be transparently described in Monitoring Report.

QA/QC procedures	Main and check meters are tested once in a year by the representative appointed by MPPKVVCL or third party authorised by the grid authority. The data will be cross checked with the invoice and bank statement.
Purpose of data	Calculation of baseline emission
Additional comment	The data would be archived upto two years after the end of crediting period.

Data / Parameter	NCV _{diesel}
Unit	GJ/Ton
Description	Net calorific value of diesel used on standby DG set
Source of data	CO ₂ baseline database for the Indian Power Sector, version 9, January 2014 – Central Electricity Authority (CEA), Ministry of Power (http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm)
Value(s) applied	41.76
Measurement methods and procedures	Regional or National default values
Monitoring frequency	Annually
QA/QC procedures	Calorific value will be sourced from the central electricity database once in a year
Purpose of data	Calculation of project emission
Additional comment	CO ₂ baseline database gives Gross Calorific Value (GCV) which is converted to NCV by deducting 5% on account of latent heat of vaporisation of water, as per IPCC guidelines 2006.

Data / Parameter	EF _{CO2_diesel}
Unit	tCO ₂ e / GJ
Description	CO ₂ emission factor of diesel
Source of data	CO ₂ baseline database for the Indian Power Sector, version 9, January 2014 – Central Electricity Authority (CEA), Ministry of Power (http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm)
Value(s) applied	0.0726
Measurement methods and procedures	Regional or National default values
Monitoring frequency	Review appropriateness of the values annually
QA/QC procedures	Emission factor will be sourced from the database once in a year.
Purpose of data	Calculation of project emission
Additional comment	The emission factor in CO ₂ baseline database by CEA is sourced from IPCC guidelines 2006.

Data / Parameter	DCy
Unit	Litres
Description	Diesel consumption by the standby DG set
Source of data	Log Book
Value(s) applied	0
Measurement methods and procedures	1) The diesel quantity available in diesel storage tank is measured using a scale and recorded on daily basis in log book by AHPL. 2) The diesel consumption would be recorded in the logbook in liters. The values will be converted to tons using a factor 0.86 kg/liters (density of diesel), IPCC 2006 default values, for the purpose of calculation. 3) The diesel will be consumed only in the rare situation only when the power plant is not operational. 4) This value is used for project emission calculation.
Monitoring frequency	Continuously
QA/QC procedures	The measured data will be cross checked with diesel procurement.
Purpose of data	Calculation of project emission

Additional comment	<p>Project emissions due to diesel consumption will be calculated as below:</p> $PE_{DC,y} = DC_y \times NCV_{diesel} \times EF_{CO2_diesel}$ <p>The data would be archived upto two years after the end of crediting period.</p>
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B.7.2. Sampling plan

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Not Applicable.

B.7.3. Other elements of monitoring plan

>>

Metering system

As per the PPA, the electricity generated is to be evacuated at the 33kV Grid sub-station. However, as per the provisional permission granted by MPEB, the electricity generated is currently evacuated at interconnection point of MPPKVVCL's existing 33 kV line which delivers the electricity to the substation. The metering system in current²¹ scenario is described below:

Current Scenario:

The electricity is generated at 3.3 kV which is stepped up to 33 kV and further the electricity is supplied to the grid through two bays i.e bay 1 and bay 2. For measuring the net energy supplied to the grid, one main meter and one check meter is connected at interconnection point at each bay.

Monthly Joint Visual Meter Reading (JMR) of main and check meters are recorded and signed by authorised officials of AHPL and MPPKVVCL once in a month. The JMR indicates readings recorded at meters connected to each bay and further JMR also indicates the calculated total net electricity supplied to the grid by the project plant.

The total net electricity exported to the grid, as per the JMR, will form the basis of emission reduction calculation.

Also, the main and check meters are capable of recording daily readings which is retrieved by AHPL staff in the presence of MPPKVVCL on the monthly basis and archived in electronic form. The readings will be used in case of apportioning of data when the JMR dates are not coinciding with the verification date.

Billing and Cross-checking:

The electricity generated from the project activity is sold to third parties through a wheeling arrangement with the MPPKVVCL. Further the Project Participant has retained the option of selling the electricity generated from the project activity to the MPSEB. The billing and cross-checking in either case is as below:

Sale to third party:

Based on the total net electricity supplied to the grid indicated in JMR, a 'statement of net energy delivered in the grid system' is raised by MPPKVVCL which indicates the value of net electricity delivered in the grid system. The value of net energy delivered in the grid system is calculated as total net electricity supplied to the grid minus wheeling charges. Accordingly, the electricity is distributed to the third party. The same is indicated in the monthly electricity bill issued by the concerned grid authority. Based on the electricity bill, AHPL raises an invoice to the third party subsequent to which third party releases the payment. The bank statement will form the basis of crosscheck of receipt of payment. There will be difference between total net electricity supplied to the grid indicated in the JMR and electricity consumption against which the payment is released due to deduction of wheeling charges.

²¹ Project has been permitted to retain the existing Metering arrangement (as per the approval received from the competent authority, ED-MPPTCL-Jabalpur). As such PP will not require to shift their Billing Meters (check and main) from the existing position. Hence existing scenario remains valid.

Sale to Madhya Pradesh Electricity Board (MPEB):

Based on the total net electricity supplied to the grid indicated in JMR, AHPL will raise an invoice to MPPKVVCL, subsequent to which payment will be released. The bank statement will form the basis of crosscheck of receipt of payment.

Testing/ Calibration:

The main and check meters are tested for accuracy once in a year by the representative appointed by MPPKVVCL or third party authorised by the grid authority.

The meters are jointly inspected, tested and sealed and are not be interfered with, by either AHPL or MPPKVVCL, except in presence of the other party.

Differentiation between testing and calibration

All the meters are tested for accuracy once in a year by the representative appointed by MPPKVVCL or third party authorised by the grid authority at the site itself. The portable calibrated standard meters are used for the purpose of testing whether the meters are within the permissible limits. Calibration is conducted by the MPPKVVCL only if during the testing the meter is found to be exceeding the permissible limit of error. The meter exceeding the permissible limit is removed from the site and replaced with the calibrated meter. The removed meter is then taken to the laboratory for calibration.

Procedure for handling data uncertainty:

The main and check meters would be tested once in every year and sealed by the MPPKVVCL in presence of PP. Both main and check meters have separate set of CT/PT units to avoid chances of both going out of order simultaneously.

a) If during yearly testing, main meter is found to be beyond permissible limits of error, the error identified would be applied to all the measured data recorded on the main meter and used for the purpose of billing, from the date of previous testing/calibration. The MPPKVVCL will be informed for further action.

In case the check meter readings have been used for few of the months for the purpose of billing, the error would not be applied to those months as long as check meter readings are within the permissible limit of error.

b) If during yearly testing, the check meter is found to be beyond permissible limits of error, the identified error would be applied all the measure data recorded, only if the check meter readings have been used for the purpose billing during the period from previous testing/calibration.

However, the MPPKVVCL authority will be informed for their action.

c) If during yearly testing, the main meter and check meter are both found to be beyond permissible limits of error, the identified error would be applied to all the measured data, from the previous date of testing/calibration, and corrected values would be used for the purpose of emission reduction calculation.

d) If both, main and check meters fails to display or record the reading which is very unlikely, the MPPKVVCL authority will be informed for their further immediate action. The emission reduction will be based on the JMR raised during that month.

Procedure for data apportioning:***In the event when verification period dates and billing cycle dates in the project activity, do not coincide:***

In the event when the verification period dates and billing cycle dates (JMR dates) do not coincide, daily export and import reading from main and check meter would form the source of emission reduction calculation for that period. The daily export and import readings are retrieved from the main and check meter on the monthly basis in the presence of representative of MPPKVVCL. The method of calculation is as explained below:

For example, if the JMR date is 30th of a month whereas the crediting period starts on 25th of that month. The net energy supplied to the grid will be calculated as below:

Export reading on 30 th	X
Export reading on 25 th	Y
Total export between 25 th to 30 th	$Z = X - Y$
Import reading on 30 th	A
Import reading on 25 th	B
Total import between 25 th to 30 th	$C = A - B$
Net electricity supplied between 25 th to 30 th	$E = Z - C$

All the monitored data will be archived for at least two years after end of the crediting period.

Interruption

Number of trippings / shutdowns / interruptions in generation during the shifts shall be recorded in the log books at the plant.

B.7.4. Date of completion of application of methodology and standardized baseline and contact information of responsible persons/ entities

>>

08/12/2014

Ascent Hydro Pvt. Ltd. and their associated consultants.

SECTION C. Duration and crediting period**C.1. Duration of project activity****C.1.1. Start date of project activity**

>>

01/09/2002

C.1.2. Expected operational lifetime of project activity

>>

30 y-0m

C.2. Crediting period of project activity**C.2.1. Type of crediting period**

>>

The project activity will use a renewable crediting period.

C.2.2. Start date of crediting period

>>

Starting date of second crediting period: 25/11/2014 or the date of acceptance of the renewal crediting period by UNFCCC, whichever is later.

C.2.3. Length of crediting period

>>

7 y-0 m

SECTION D. Environmental impacts

D.1. Analysis of environmental impacts

>>

Ministry of Environment and Forests (MoEF), Government of India (MoEF) has exempted small hydro power projects with project cost less than Rs.1000 million (US\$22.22 Million)) from environmental clearance and carrying out environmental impact assessment (EIA) studies.

However, AHPL has carried out an Environmental Review Summary (ERS) of the project activity. A brief of the same applicable for the project activity is discussed below ;

The following potential environment, health and safety and social aspects of the project were analyzed:

- land acquisition, compensation and physical and/or economic resettlement;
- national and local government permitting requirements;
- potential impacts on downstream users; and
- provision of housing, hygiene facilities, water, and power (including fuel storage) during construction and operation;
- Impact on air, water and ecology due to project activity
- Social and economy issues

Land acquisition, compensation and physical and/or economic resettlement.

There has been no separate land acquisition due to the project activity. Birsinghpur project is located within the premises of SGTPS. Hence, there is no physical and/or economic resettlement. Since the project activity does not increase the reservoir size and does not cause any land inundation, there are no land submerging issues and hence no resettlement and rehabilitation was involved.

National and local government permitting requirements

All required clearances have been obtained for Birsinghpur project by AHPL.

Potential impacts on downstream users

The water discharged from Birsinghpur plant flows to the lake from where the water is recycled back to the SGTPS. Hence, there are no downstream users of this water.

Impact on Air, water and ecology

There is no impact on the air quality due to the project activity. No effluents are produced from the project activity and hence no impact on water. Hence, there are no significant impacts on the ecology due to the project activity.

Social and economy issues

The installation of the project activity has given job opportunities to the local community during construction and operation of the project activity. The project activity has contributed for improving the standard of living of the local community.

The environmental impacts of the project are not significant. The fact that the host Party (Government of India's Ministry of Environment and Forests) had exempted the project activity from an environment impact assessment studies is an evidence of insignificant impacts on the environment due to the project activity.

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

>>

As part of CDM project, an environmental review summary (ERS) was prepared by AHPL and by its consultants and this ERS was given for public scrutiny.

An advertisement was given in local newspapers in vernacular languages as follows;

- in Navbharath, Shadol edition in Hindi language on 20/06/2005 and

The advertisements informed about the project activity and about the availability of ERS report and inviting public and local stakeholders to avail a copy of the document and offer their comments. ERS was kept for public inspection at the project sites

A register was maintained to make the entries of the issue of ERS. The English translation of the newspaper advertisements and a scanned version of the same is attached herewith.

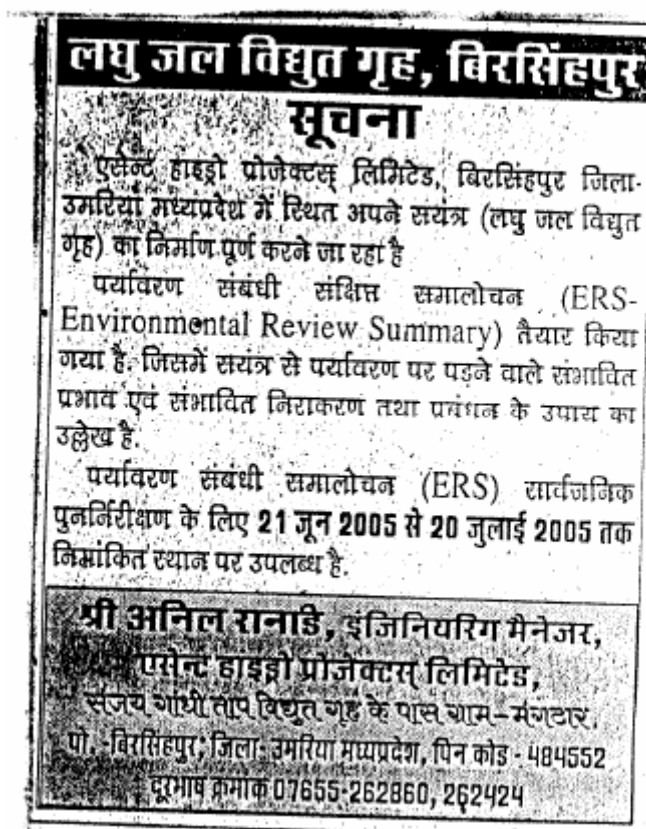
Translation of the newspaper advertisement

Ascent Hydro Projects Ltd proposes to complete construction of its plant in Madhya Pradesh. An Environmental Review Summary (ERS) has been prepared which discusses possible environmental impacts of the project as well as environmental mitigations and management measures.

The ERS is available for public inspection from 21st June 2005 to 20th July 2005 at the following address :

Mr. Anil Ranade (Engineering Manager)

Ascent Hydro Projects Limited,
Near SGTPS, Village Mangthar,
P.O.Birsinghpur,
District: Umaria
Madhya Pradesh – 484552
Phone : 07655 262860 / 262424



E.2. Summary of comments received

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There was no request from the stakeholders to review the environmental social review till the prescribed period of availability (20 July 2005) and there was no comment from anybody and nobody visited to collect the document.

E.3. Report on consideration of comments received

>>

Since there were no comments, no action taken report is available.

SECTION F. Approval and authorization

>>

The letter of approval from the host country for the project activity has already available at UNFCCC website.

Appendix 1. Contact information of project participants and responsible persons/ entities

Project participant and/or responsible person/ entity	<input checked="" type="checkbox"/> Project participant <input checked="" type="checkbox"/> Responsible person/ entity for application of the selected methodology (ies) and, where applicable, the selected standardized baselines to the project activity
Organization name	Ascent Hydro Projects Limited
Street/P.O. Box	Tejpal Scheme Road 5, Vile Parle
Building	6, Shiv Vastu,
City	Mumbai
State/Region	Maharashtra
Postcode	400 057
Country	India
Telephone	+91 Ph: 022 26826819
Fax	+91 20 25885234
E-mail	ascentpune@dlz.com
Website	
Contact person	
Title	Managing Director
Salutation	Mr.
Last name	Vaidya
Middle name	
First name	Shyam
Department	
Mobile	+91 94223 20270
Direct fax	
Direct tel.	
Personal e-mail	ascentpune@dlzcorp.com

Appendix 2. Affirmation regarding public funding

There is no public funding of the project activity from annex 1 parties.

Appendix 3. Applicability of methodology and standardized baseline

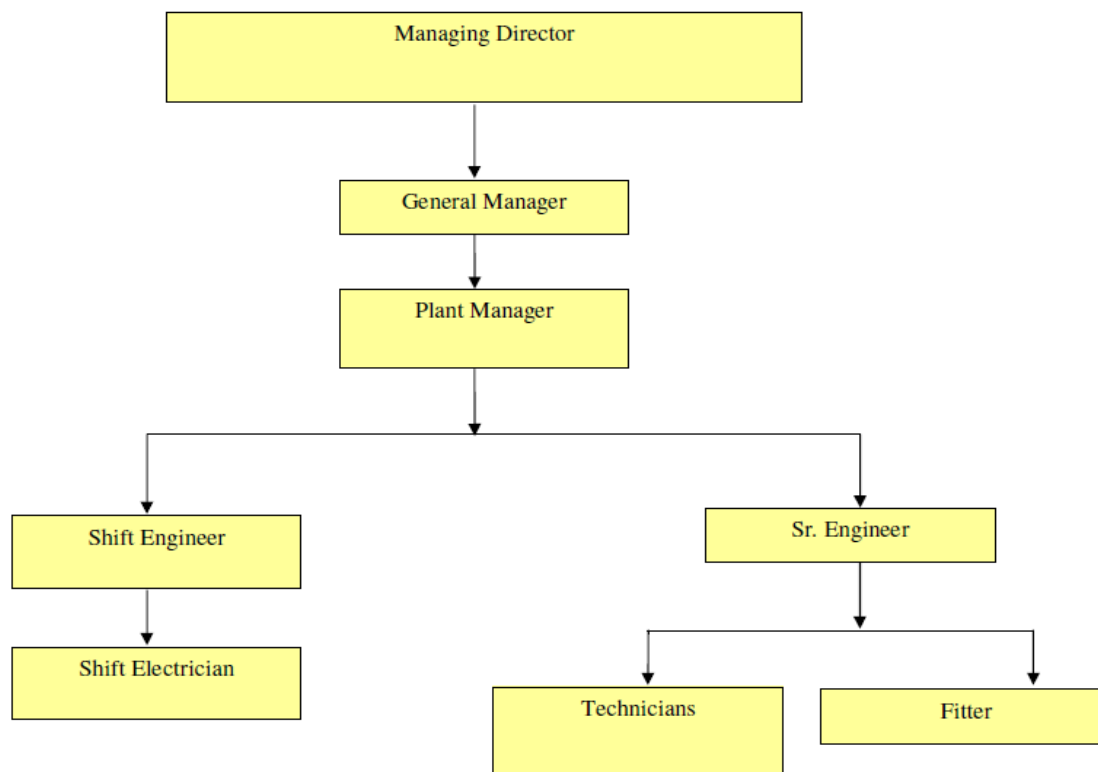
Refer Section B.2.

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

Refer Section B.6.3

Appendix 5. Further background information on monitoring plan

The operational and management structure and procedure to monitor the project activity is discussed below:



Managing Director of AHPL is based in head office in Pune and makes a periodical visit to the Birsinghpur plant. The Plant Manager is in charge of day to day operations of the plant. Shift engineers, assisted by a fitter and a technician would be responsible for on site maintenance of the equipment, preventive maintenance etc.,

The technicians will record the readings from main and check meters daily and these readings will be counter checked by the Plant Manager. Daily records at the storage tanks are maintained in the log book to derive the quantity of diesel consumed.

Daily reports are sent to head office electronically and Monthly reports are generated and maintained at the plant and head office. Plant managers would maintain records of joint meter reading.

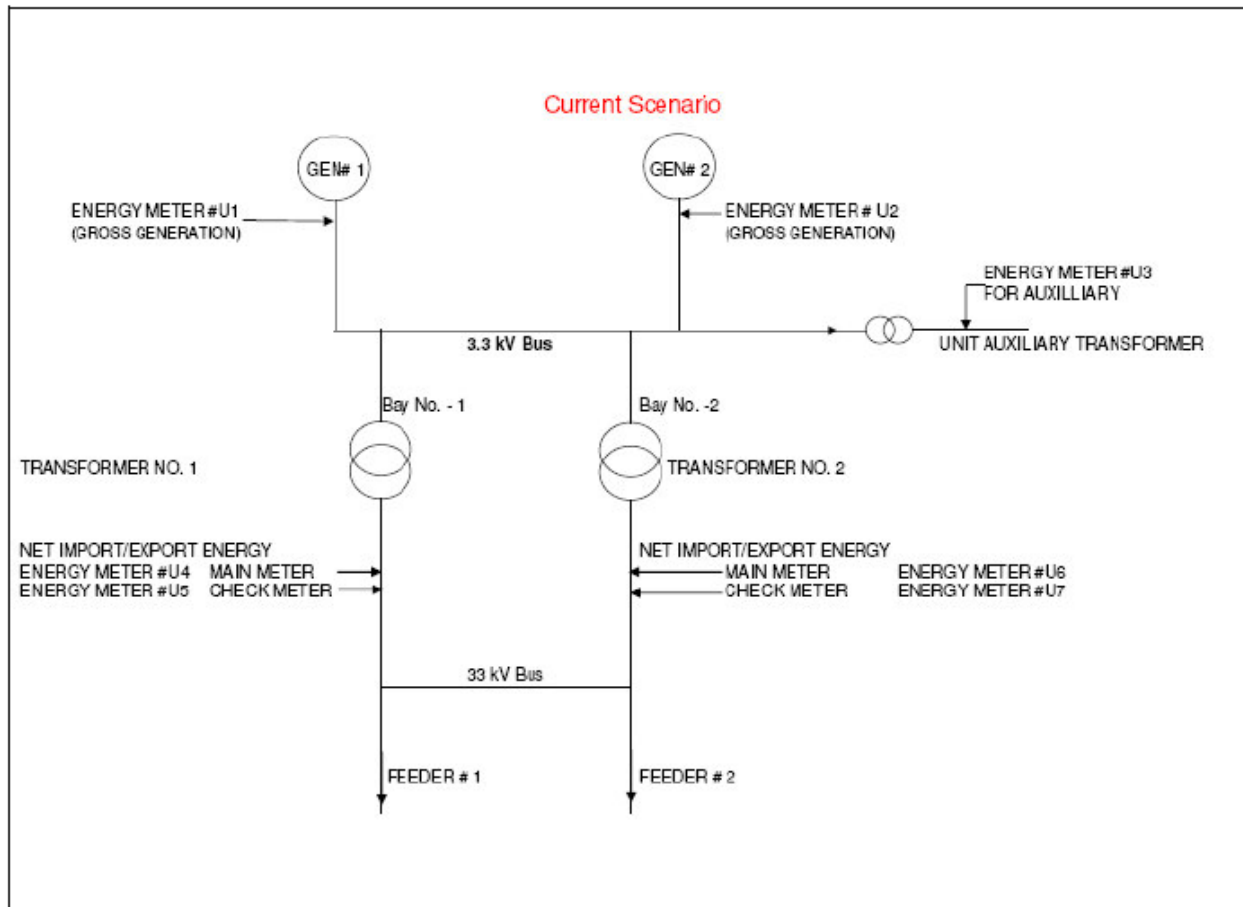
In house training will also be provided on need basis. The Plant Manager will be responsible for identifying the training needs and maintaining the undergone training records. The records of training undergone are kept at the site.

Calibration /testing records will be maintained by Plant Manager.

In order to ensure that the project emissions are being regularly monitored and to ensure the function of the monitoring system, the Managing Director or his representative would carry out an audit every six months and maintain necessary records of the same. Necessary corrective and

preventive action based on the audit findings would be carried out. All the internal audit records would be kept at the corporate office and a copy of the same would be maintained at the site

Monitoring system diagram of the existing scenario:



This current scenario will remain valid for the project throughout the time as project has been permitted to retain the existing Metering arrangement. A copy of approval received from the competent authority (ED -MPPTCL-Jabalpur) is attached for reference.

Appendix 6. Summary of post registration changes

Following are the reasons identified during the first verification period due to which post registration changes has happened:

1. There was change in implementation of project activity description in the registered PDD, as AHPL exercised its power to enter into a PPA with third parties i.e Nicholas Piramal Ltd and IPCA.
2. The technical specifications of the project activity equipments in the registered PDD were not in line with the specifications observed at site and through document review. However the project activity equipments has not been replaced or changed since their installation at site,
3. The verification team observed that the description of monitoring plan in the registered PDD was not in compliance with the actual monitoring practice at the project site.

Hence the verification team raised CARs based on which the Project Participant has revised the PDD and monitoring plan. The changes to the registered PDD and revision in the monitoring plan were submitted to the CDM EB as a single submission which was approved by CDM – EB on 31/05/2011.

- - - - -

Document information

Version	Date	Description
05.0	25 June 2014	<p>Revisions to:</p> <ul style="list-style-type: none"> • Include the Attachment: Instructions for filling out the project design document form for small-scale CDM project activities (these instructions supersede the "Guidelines for completing the project design document form for small-scale CDM project activities" (Version 01.1)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the project activity in B.7.4 and Error! Reference source not found.; • Change the reference number from <i>F-CDM-SSC-PDD</i> to <i>CDM-PDD-SSC-FORM</i>; • Editorial improvement.
04.1	11 April 2012	Editorial revision to change history box by adding EB meeting and annex numbers in the Date column.
04.0	13 March 2012	<p>EB 66, Annex 9</p> <p>Revision required to ensure consistency with the "Guidelines for completing the project design document form for small-scale CDM project activities"</p>
03.0	15 December 2006	<p>EB 28, Annex 34</p> <ul style="list-style-type: none"> • The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.
02.0	08 July 2005	<p>EB 20, Annex 14</p> <ul style="list-style-type: none"> • The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at http://cdm.unfccc.int/Reference/Documents.
01.0	21 January 2003	<p>EB 07, Annex 05</p> <p>Initial adoption.</p>
<p>Decision Class: Regulatory</p> <p>Document Type: Form</p> <p>Business Function: Registration</p> <p>Keywords: project design document, SSC project activities</p>		