CDM – Executive Board

CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• 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>.
03	22 December 2006	• 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.

SECTION A. General description of small-scale project activity

A.1 Title of the small-scale project activity:

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Title: 7 MW Bundled Hydro power project at Himachal Pradesh of Raajratna Energy Holdings Pvt. Ltd.
Version: 1
Date: 1st December, 2009

A.2. Description of the small-scale project activity:

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The project activity is generation of electricity by using the available hydro potential in the tributaries of the Ravi River and exporting the generated electricity to the Himachal Pradesh State Electricity Board (hereafter referred to as HPSEB). The details of the project activity are listed below:

The 7 MW bundled small hydropower project (hereafter referred to as the bundled project or project activity) is located at Himachal Pradesh, India. It consists of 5 MW small hydropower plant located at Belij, Chamba district, Himachal Pradesh, India (hereafter referred to as Belij project), 2 MW small hydropower plant located at Gehra, Chamba district, Himachal Pradesh, India (hereafter referred to as Gehra project. The total installed capacity of the bundled Project is therefore 7 MW.

Belij project:

Belij project is a run of the river scheme on Belij Nallah, which is a tributary of river Ravi. Belij Nallah joins river Ravi on right bank just downstream of Hibra village, Chamba district, Himachal Pradesh. The power house of the project can be approached through the Chamba-Bharmour state highway; this is about 32 km from Chamba and 161 km from Pathankot. The power house is situated on the right bank of Belij Nala at an elevation of 1217.00 m. It is proposed to divert the inflows from the Belij Nallah by constructing a trench weir. The diverted inflows will be carried through a conveyance channel to a surface de-silting tank. The silt free inflows will be carried through cut and cover channel of size 1.25 m x 1.60 m of length 95 m and 1.70 m D- shaped head race tunnel of length 2510 m up to fore bay. The inflows will be lead to surface power house through 1.10 m diameter penstock to feed 2 x 2.5 MW nos Pelton turbines driven generating units. A switchyard is proposed along the side of power house building. The power generated is evacuated to the grid after matching the voltage level at generation (6.6 kV) to that of the substation (33kV). The estimated annual gross electricity generation is 24.81 GWh, and the estimated electricity supplied to the grid will be 23.45 GWh annually, after taking auxiliary consumption and transmission losses into account. The power generated will be fed into a, proposed, HPSEB substation at Jarangal.

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Gehra project:

Gehra project is a run of the river scheme on Gehra Nala, a tributary of river Ravi. Belij Nala joins river Ravi on left bank near Gehra village in Chamba district, Himachal Pradesh. The project area is located at a distance of 36 km from Chamba and 475 km from Shimla (State Headquarter) by road. The alignment of the project is proposed on the right bank of Nallah. Alignment passes through a very hard and steep rock from weir to desiliting tank beyond which it passes through agriculture land. It is proposed to divert Gehra stream by constructing a trench weir. An underground penstock of 450 mm diameter and 790 m long is proposed. At tail point 5 m length of the penstock is bifurcated into two penstocks to feed two turbines each of 1 MW capacity. The power generated is evacuated to the grid after matching the voltage level at generation (6.6 kV) to that of the substation (33kV). The estimated annual gross electricity generation is 9.93 GWh, and the estimated electricity supplied to the grid will be 9.38 GWh annually, after taking auxiliary consumption and transmission losses into account. The power generated will be supplied to a, proposed, HPSEB substation at Jarangal.

GHG emission reduction:

Hydropower, by the nature of its fuel source (water), captures and converts the energy of falling water into electrical energy via water turbine and generator set, avoids emission of carbon dioxide during the production of electricity. For every KWh of electricity generated by fossil fuel power plant, 0.82 kg of $CO2$[1] will be emitted. Thus this project activity will achieve greenhouse gas (GHG) emission reductions by avoiding CO2 emissions.

Contribution of sustainable development

The Designated National Authority, The Ministry of Environment and Forests (MoEF) India, has stipulated four indicators to prove sustainable development. These are social, economical, environmental and technological well-being. The project activity fulfils the stipulated obligations as follows:

Ministry of Environment and Forests, Govt. of India has stipulated the following indicators for sustainable development in the interim approval guidelines for CDM projects.

Social well-being:	The CDM project activity should lead to alleviation of poverty by generating additional employment, removal of social disparities and contribution to provision of basic amenities to people leading to improvement in quality of life of people.
Economical well-being:	The CDM project activity should bring in additional investment consistent with the needs of the people.
Environmental well-being:	This should include a discussion of impact of the project activity on resource sustainability and resource degradation, if any, due to proposed activity; bio-diversity friendliness; impact on human health; reduction of levels of pollution in general.
Technological well-being:	The CDM project activity should lead to transfer of environmentally safe and sound technologies with a priority to the renewable sector or energy

[1] Ref: CEA website

efficiency project that are comparable to best practices in order to assist in upgradation of technological base

Social Well-Being

- The project activity involves no displacement of people living near the project area and hence presents no need for rehabilitation and resettlement.
- The project activity will be a source of direct and indirect employment opportunity during the period of construction and after its subsequent commissioning. This results in poverty alleviation in the region.
- As the project activity is set against a rural backdrop, it will contribute to the development of the region by giving the local populace access to electricity.

Economical Well-Being

- The project proponent has invested approximately Rs 500.0 Million in the project, which is a considerable additional investment in rural area, which would not have happened otherwise, in the absence of the project activity.
- As mentioned above the project activity will lead to alleviation of poverty by providing direct and indirect employment to the residents of the region.
- Generation of power from local renewable sources will reduce the load on the national grid and also help in reducing T&D losses.

Environmental Well-Being

- The project activity utilizes environmentally safe and sound technologies of small-scale hydroelectric power generation and demonstrates harnessing of hydro potential thus encouraging setting up of similar projects
- The project activity is part of the Northern regional grid of India, which is dominated by fossil fuel generation mix. Since the project activity uses a renewable resource, such as hydro, for power generation it would mitigate the emissions that would have otherwise occurred in its absence.
- The project activity helps the country take steps towards environmental sustainability by avoiding exploitation and depletion of natural, non-renewable resources such as coal/petroleum/gas while at the same providing a clean energy.

Technological Well-Being

- The project activity makes use of efficient and environmentally safe technology for power generation.
- The generation of electricity from the project activity leads to strengthening of the grid, increasing the energy availability and quality of power in the nearby rural areas thereby meeting the energy demand to a certain extent leading to technological well being.

In view of the facts stated above, it can be concluded that the project activity strongly contributes to sustainable development.

A.3. Project participants:

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Name of the party involved ((Host) indicates a host party)	Private and/or public entity (ies) project participants	Whether party involved wishes to be considered as project participant
India (host)	Private entity: M/s. Raajratna Energy Holdings Pvt. Ltd.	No.

A.4. Technical description of the small-scale project activity:

Belij project:

Belij mini hydel power projects is a run of scheme on Belij Nallah (of 5 MW capacity), which is a tributary of river Ravi, Belij nallah joins river Ravi on right bank just downstream of Hibra village in district Chamba, Himachal Pradesh. It is proposed to divert Belij nala inflows by constructing a trench weir. The diverted inflows will be carried through conveyance channel to a surface de silting tank, which will be designed to exclude all silt particles. The silt free inflows will be carried through cut and cover channel and D-shaped head race tunnel up to fore bay. The inflows will be lead to surface power house through penstock to feed 2 Nos. of Pelton turbines driven generating units of 2.50 MW each.

Gehra project:

Gehra mini hydel power project is a run of river scheme on Gehra Nallah (of 2 MW capacity), which is tributary of river Ravi. The project envisages utilisation of a gross head of 408.68 m between the Nallah take off point and the proposed powerhouse. A surface power house of overall size of 22.50 m x 9.0 m in framed structure is proposed to house two units of electro mechanical equipment (1MW each).

S. No	Particulars	Belij	Gehra
1	**Hydrology**		
a	Stream	Belij	Gehra
b	Tributary	Ravi River	Ravi river
c	Catchment area of stream	114 Sq.Km	13.88 Sq.Km
d	Catchment area at diversion site	113 Sq.Km	13.88 Sq.Km
e	Design discharge	3.325 cumecs (m^3/sec)	0.73 cumecs (m^3/sec)
2	**Penstock**		
a	Type	Circular, surface, steel	Circular, surface, steel
b	Diameter	1.10 m , thickness varying between 8 mm to 16 mm	450 mm, thickness varying between 8 mm to 14 mm
c	Length	360 m	790 m

3	**Power house**		
a	Type	Surface	Surface
b	Size	24.4 x 10.4 x 12 m	22.5 x 9 x 9 m
c	Centre line elevation of jet	1218.113 m	1248 m
d	Installed capacity	2 x 2.5 MW = 5 MW	2 x 1.0 MW = 2 MW
e	Gross head	225.087 m	408.68 m
f	Net head	221.25 m	369.42 m
g	Generating unit	Pelton turbine	Pelton turbine
h	Gross Energy Generated	24.81 GWh	9.93 GWh
i	Auxillary Usage, Transmission Losses, Outage etc.	1.365 GWh	.546 GWh
j	Net Energy Exported to HPSEB Grid	23.45 GWh	9.38 GWh

A.4.1. Location of the small-scale project activity:

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A.4.1.1. Host Party(ies):

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India

A.4.1.2. Region/State/Province etc.:

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Himachal Pradesh

A.4.1.3. City/Town/Community etc:

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Belij Project: Is located at Hibra Village in the Chamba District.
Gehra Project: Is located at Gehra Village in the Chamba District.

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity:

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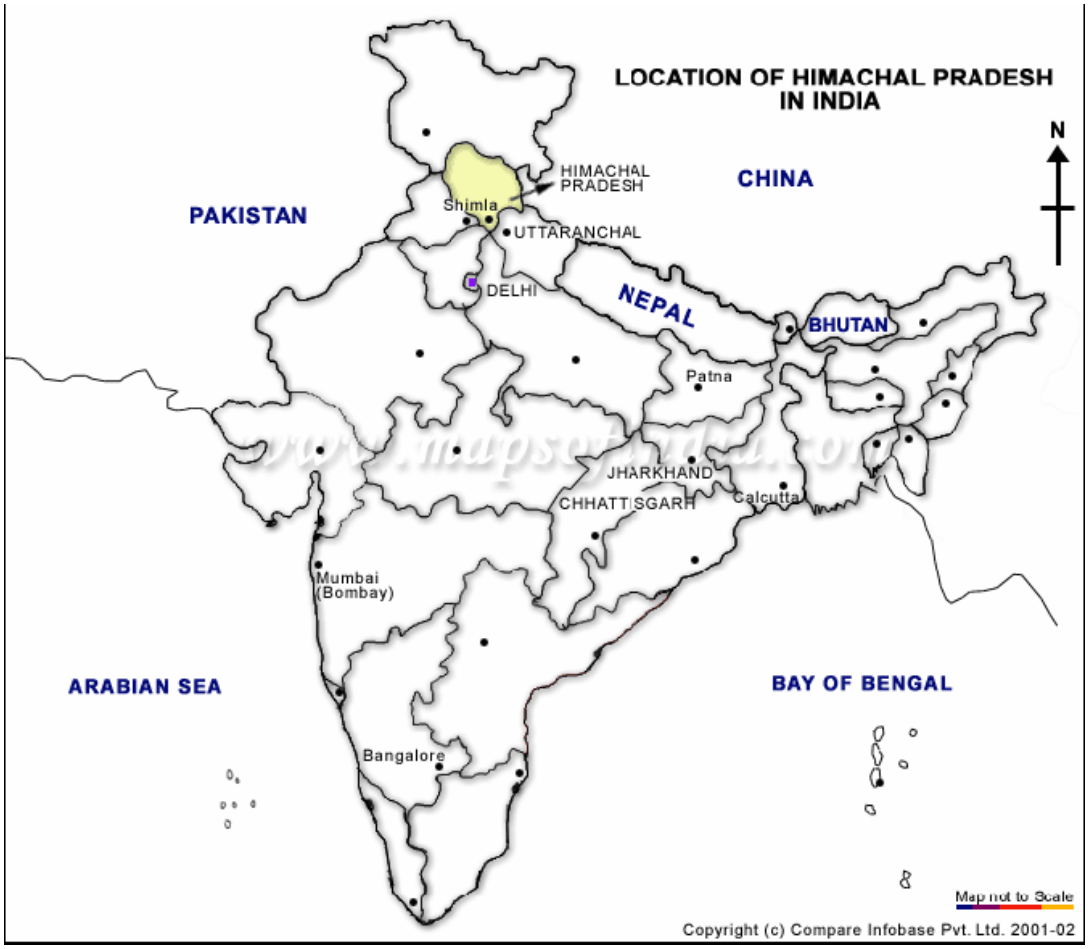

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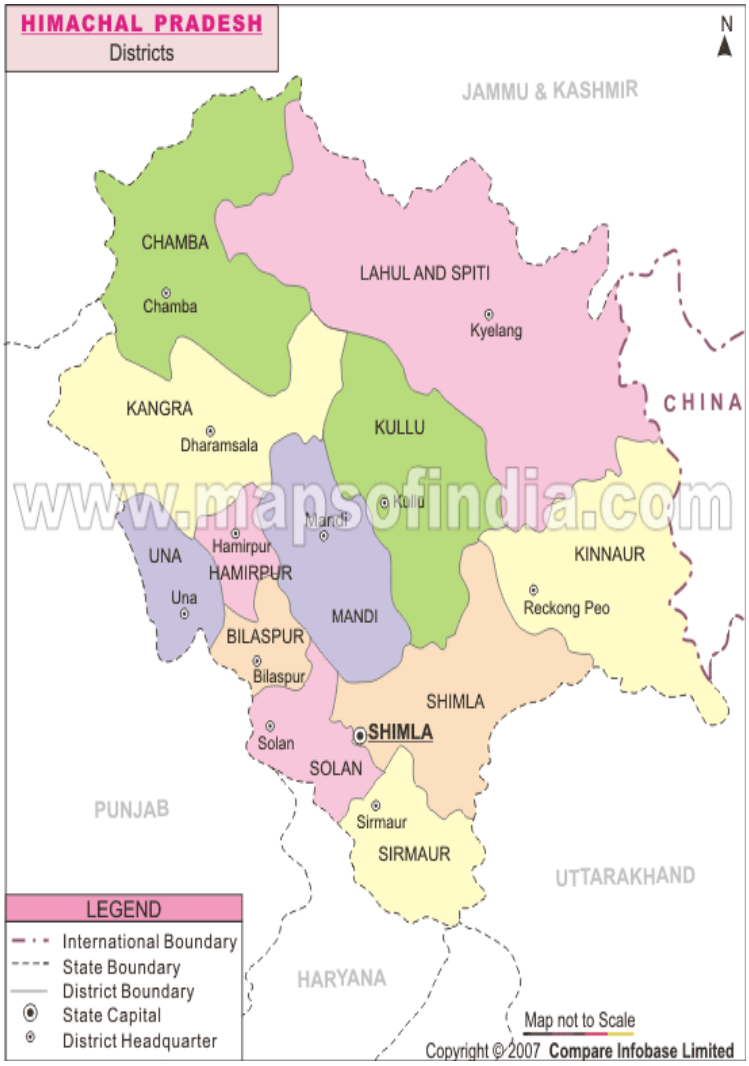

S. No	Particulars	Belij	Gehra
1	Longitude	76º20’ to 76 º 25’ East	76º18’ to 76 º 21’ East
2	Latitude	32º30’ to 32 º 35’ North	32º21’ to 32 º 26’ North

A.4.2. Type and category (ies) and technology/measure of the small-scale project activity:

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The project activity utilizes hydropower for electricity generation, which falls into the category of renewable energy. Since the capacity of the project is 7 MW, and will be constant during the Crediting Period i.e. with no capacity addition, not exceeding the threshold installed capacity of 15 MW; the project activity can be regarded as a small-scale CDM project activity. The power generated is exported to the HPSEB grid. Therefore, according to Appendix B of the simplified modalities and procedures for small scale CDM project activites, the project activity falls under:

Scale: Small Scale Project
Type I: Renewable Energy Project
Category I.D: Grid connected renewable electricity generation
Methodology: AMS I.D version 15 EB 50

Key parameters of the project

It is proposed to evacuate the power from Belij and Gehra mini Hydro electric project through the 33 KV line to HPSEB proposed substation at Jarangla. It is proposed that the electricity shall be generated at 6.6 KV level and evacuated at 33 KV level. One step-up transformer, 6.6 KV/33 KV for each machine shall be provided at switchyard near the power house. The switchyard shall be 33 KV outdoor types. It is proposed to construct common evacuation system for Belij and Gehra project some 15 km from Jarangla substation.

S. No	Particulars	Belij	Gehra
1	**Turbine**		
a	Manufacturer	Kunming Electrical Machinery Co. Ltd. (KEM)	To be decided
b	Type	Horizontal shaft, Pelton	"
c	Model no	CJA475-W—120/2x12.5	"
d	Rated efficiency	90%	"
e	Rated discharge	1.34 cumecs	"
f	Rated Head	221.5 m	"
g	Rated speed	500 rpm	"
2	**Generator**		
a	Manufacturer	Kunming Electrical Machinery Co. Ltd. (KEM)	"
b	Model no	SFW2500-12/2150	"
c	Shaft orientation	Horizontal	"
d	Speed	500 rpm	"
	Overall efficiency at rated voltage, PF, frequency	96.1 %	"
e	Normal voltage between phase	6.6 kV	"
f	Power factor	0.85	"
g	Frequency	50 Hz	"
3	**Transformer**		
a	Manufacture	Universal, Voltamp, KPRS	"
b	Application standard	IS 2026	"
c	Type of cooling	ONAN	"
d	Rated Capacity	3600 KVA	"
e	Rated voltage of HV	33 kV	"
f	Rated voltage of LV	6.6 kV	"

Application of environmentally safe and sound technology

Power generation using hydro resources is done through conversion of the energy available in the water, due to its flow down a gradient, into mechanical energy using hydro turbines and then to electrical energy using alternators. The generated power will be transformed to match the voltage of nearest grid substation for proper interconnection and smooth evacuation of power. In this process there would be no greenhouse gas emissions or burning of any fossil fuels. Thus, electricity would be generated through clean and sustainable means without causing any negative impact on the environment. Therefore, the technology is environmentally safe and sound.

Technology transfer

Since technology, knowledge and labor are already available in host country. Therefore there is no technology transfer from any other country for the project.

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

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Year	Estimation of annual emission reductions in tonnes of CO2 e		Estimation of annual emission reductions in tonnes of CO2 e
	Belij project	Gehra project	Bundled project
2010	19227		19227
2011	19227	7691	26918
2012	19227	7691	26918
2013	19227	7691	26918
2014	19227	7691	26918
2015	19227	7691	26918
2016	19227	7691	26918
2017	19227	7691	26918
2018	19227	7691	26918
2019	19227	7691	26918
Total emission reduction	192270	69219	261489
Total no of crediting years	10	10	10
Annual average of the estimated reductions over the crediting period	19227	6921	26148

A.4.4. Public funding of the small-scale project activity:

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No public funding from Annex I countries.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

According to Appendix C of the Simplified Modalities & Procedures for small scale CDM project activities, "Debundling" is defined as the fragmentation of a large project activity into smaller parts.

The Hydro based power plant is not a de-bundled project of a larger project activity as:

- The project activity consists of 2 bundled mini hydro power projects, amounting to 7 MW and it is confirmed that there are no other capacity additions, for the project activity, planned for the future by

the project proponents. Hence it is certain that the capacity of the project activity will remain below 15 MW throughout its operative time period.

- The project proponents have not taken up any other CDM activity within a 1 km boundary of the proposed project activity, with the same project category and technology measure within the last two years. As the project proponent has not registered any project, under CDM, so far and the proposed project activity is a first for them.

Hence it can be confirmed that the project activity is not a de-bundled component of a single large-scale activity; therefore it is eligible to use the simplified modalities and procedures for small scale CDM project activity.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the small-scale project activity:

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Title: Type I - Renewable Energy Project
Reference: AMS I.D. – Grid connected renewable electricity generation
Version: 15

B.2 Justification of the choice of the project category:

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AMS. I.D Grid connected renewable electricity generation	
Technology/measure	**Justification**
This category comprises renewable energy generation units, such as photovoltaic, 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 project activity is a renewable energy generation unit, using Hydro power. It supplies electricity to the electricity distribution system, the grid. Hence mitigating the need for combustion of fossil fuels, this would have otherwise occurred to feed the grid the commensurate amount of electricity.
Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: • The project activity is implemented in an existing reservoir with no change in the volume of reservoir; • The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the project Emissions section, is greater than 4 W/m^2; • The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section,	The project activity is a run of the river project and hence does not require a reservoir.

is greater than 4 W/m^2	
If the unit added has both renewable and non-renewable components (e.g., a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the unit added co-fires fossil fuel1, the capacity of the entire unit shall not exceed the limit of 15 MW.	Project activity has only renewable component and the capacity doesn't exceed 15 MW.
Combined heat and power (co-generation) systems are not eligible under this category.	The project activity is not combined heat and power systems
In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.	There is no addition of renewable energy generation units at an already existing unit, by the project activity. The project activity is a new installation.
Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category. To qualify as a small-scale project, the total output of the modified or retrofitted unit shall not exceed the limit of 15 MW.	The project activity is a new installation.

Moreover, project activity will remain within the limits of small-scale project activity during every year of the crediting period:

B.3. Description of the project boundary:

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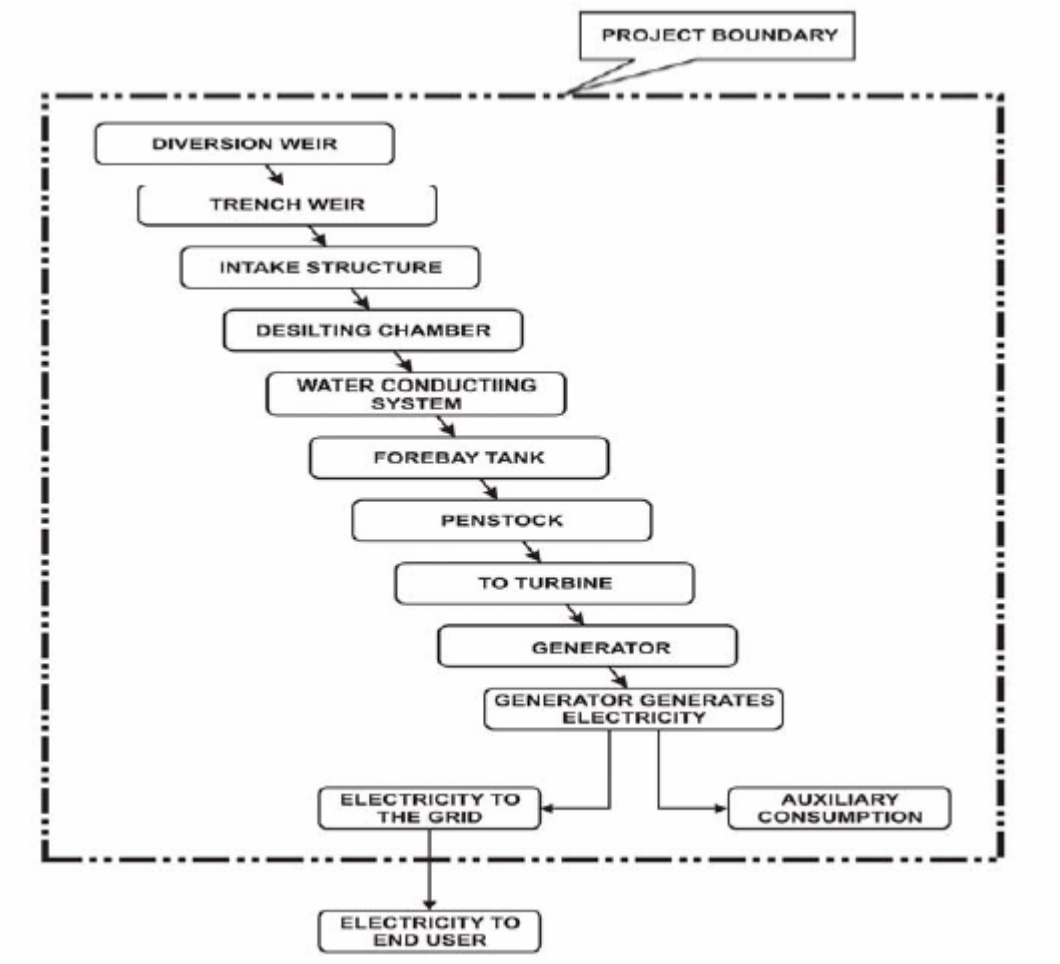
In accordance with AMS I.D, the project boundary encompasses the physical, geographical site of the renewable generation source.

The project boundary is therefore the physical boundary, which includes diversion weir, intake chamber, de-silting chamber, power channel, forebay, headrace tunnel, penstock, powerhouse, tailrace and the transmission system till the evacuation point. The power generated from the project would be metered and accurately quantified. The electricity would be exported to the Himachal Pradesh State Electricity Board (HPSEB) grid. Hence for the purpose of baseline calculations, Northern regional grid of India is also included in the project boundary.



B.4. Description of baseline and its development:

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Parameters	Data source	Explanation
Energy baseline ($EG_{BL, y}$)	As per methodological tool to calculate the emission factor for an electricity system, version 2; EB 50; Annex 14 Net electricity generation refers to the difference between the total quantity of electricity generated by the power plant/unit and the auxiliary electricity consumption (also known as parasitic load) of the power	$EG_{BL,y}$ = Net Energy sold to the grid = Energy generated -Auxiliary consumption = 34740 MWh – 1911 MWh (5.5% of generation) = 32830 MWh

	plant/unit (e.g. for pumps, fans, controlling, etc).	
CO2 Emission factor (EF_{CO2})	As per the methodology, 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 kg CO2e/kWh) of the current generation mix. The data of the year in which project generation occurs must be used.	Combined margin is taken for calculation of emission factor. Central Electricity Authority has published the operating margin, build margin and combined margin for the entire Indian electricity grid value which is calculated based on 'Tool to calculate the Emission Factor for an electricity system'[2]. The Indian electricity system is divided into two grids, the Integrated Northern, Eastern, Western, and North-Eastern regional grids (NEWNE) and the Southern Grid. The project activity is located in the northern region of the country hence it falls under the NEWNE regional grid. The combined margin can be obtained by taking the sum of the weighted average the operating margin and the build margin, the respective weights being 50% each. **Operating margin (OM):** The operating margin describes the average CO_2 intensity of existing stations in the grid, which are most likely to reduce their output if a CDM project supplies electricity to the grid (or reduces consumption of grid electricity). The operating margin is obtained by dividing the region's total CO_2 emissions by the net generation of the stations serving the region excluding low-cost/must-run sources. In other words, the total emissions are divided by the total net generation of all thermal power stations. Hydro and nuclear qualify as low-cost/must-run sources, and their net generation is therefore excluded from the denominator. Three Year Average of OM = 1.005 tCO2e/MWh **Build margin (BM):** The build margin reflects the average CO_2 intensity of newly built power stations that will be (partially) replaced by a CDM project. In accordance with ACM0002, the build margin is calculated in this database as the average emissions intensity of the 20% most recent capacity additions in the grid based on net generation. Depending on the region, the build margin covers units commissioned in the last five to ten years. Three Year Average of BM = 0.635 tCO2e/MWh

[2]CEA website
http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm

		Combined margin (CM): The combined margin is a weighted average of the simple operating margin and the build margin. By default, both margins have equal weights (50%). However, CDM project developers may chose to argue for different weights. In particular, for intermittent and non-dispatchable generation types such as wind and solar photovoltaic, ACM0002 allows to weigh the operating margin and build margin at 75% and 25%, respectively (see ACM0002, Version 10). However, the combined margins shown in the database are calculated based on equal weights i.e 0.5 for OM and 0.5 for BM. CM = 50% * OM + 50% * BM CM = 50% * 1.005 + 50% * 0.635 **CM = 0.82 tCO2e/MWh**
Baseline emission (BE_y)	As per the AMS.I.D methodology, the baseline is defined as follows The baseline emissions (BE_y) are the product of electrical energy baseline $EG_{BL, y}$ expressed in kWh of electricity produced by the renewable generating unit multiplied by an emission factor	**$BE_y = EG_{BL, y} \times EF_{CO2}$** Where: BE_y Baseline Emissions in year y; t CO_2 $EG_{BL, y}$ Energy baseline in year y; MWh EF_{CO2} CO_2 Emission Factor in year y; t CO_2e/MWh y Year **BE_y = 32830 x 0.82** **= 26918 tCO2 eq**

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

The project is a small-scale project activity. As such, the provisions of Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities will apply to this project. The 'indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories' require the project proponents to show that the project activity would not have occurred anyway due to at least one of the following barriers:

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

The barriers specified in Attachment A to Appendix B are:

a) **Investment barrier**: A financially more viable alternative to the project activity would have led to higher emissions.

b) **Technological barrier**: A less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions.

c) **Barrier due to prevailing practice:** Prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions.

d) **Other barriers**: Without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

The project proponent has considered proving the additionality using investment barrier, other barriers and barrier due to prevailing practice. The same is shown in the following sections:

a) Investment Barrier:

Low return on investment:

The project costs and PLF directly influence the project Internal Rate of Return. An IRR analysis has been prepared for the project activity to determine the project IRR, its attractiveness and the effect of GHG income using the information of the existing hydro projects in the state of Himachal Pradesh.

Tenure of Term Loan

The terms of the loan repayment was found to be another barrier to investment, by the project proponent. Initially while preparing the DPR (Detailed Project Report) and processing the viability of the project activity it was assumed that the number of years, within which the loan would repaid as 12 years. But when the project proponents approached lending agencies they were asked to fulfill the same within a period of 7 years. This, adversely, affected the financially viability of the project. Therefore it was reaffirmed that CDM Revenues would be a necessity for the project activity to be financially viable.

Appropriateness of choosing benchmark:

As per the guidance note issued by CDM EB at its 41st meeting “In case where a benchmark approach is used the applied benchmark shall be appropriate to the type of IRR calculated. Local commercial lending rates or weighted average cost of capital (WACC) are appropriate benchmarks for a project IRR” (annex 45, page No.3, item 11 Selection and Validation of Appropriate Benchmarks - EB 41).

Based on this the PP has taken into account the Weighted Average Cost of capital as the Benchmark Return. Project IRR is used to demonstrate the additionality of the project. Since the project is financed by both equity and loan, the appropriate benchmark is WACC, since WACC represents the weighted average of the costs of various sources of financing in the financing structure. In other words, WACC represents the minimum rate of return, which the project should earn to merit consideration, as failure to earn the minimum rate of return is indicative of unattractiveness of the investment.

The estimation of investment analysis is based on 56.65 % PLF, which is on the higher side. From HPERC data, it was found that most projects, with similar generating capacities and hydrologies in Himachal Pradesh, were found to have an average PLF of 51.5 %. The project proponent, however, decided to take a base PLF to be 10% higher. This will help prove inconclusively whether the project is viable with or without CDM. The PP has considered weighted average cost of capital as benchmark for the purpose of comparison with IRR. The benchmark is computed considering cost of debt and required rate of return on equity based on Capital Asset Pricing Model.

The benchmark and project IRR for both Belij and Gehra project is tabulated below.

S. No	Particulars	Belij project	Gehra project
1	WACC	14.58%	14.58%
2	IRR	12.35%	10.66%

Sensitivity analysis

Belij project:

Sensitivity Analysis				
Particulars	**Project IRR**			**To reach WACC**
	-10%	**0%**	**10%**	
O&M Expenses	12.62%	12.35%	12.09%	-88.0%
Generation	10.84%	12.35%	14.64%	12.5%

Gehra project:

Sensitivity Analysis						
Particulars	**% of project cost**	**% of first year revenue**	**Project IRR**			**To reach WACC**
			-10%	**0%**	**10%**	
Plant Civil Works	69.24%	433.27%	11.90%	10.66%	9.55%	-28.0%
Electro mechanical works	25.74%	161.07%	11.11%	10.66%	10.23%	-75.0%

Generation			8.92%	10.66%	12.33%	24.0%

Thus, it is established that the project IRR is lower than the WACC. The project IRR is therefore incapable of even servicing the debt and the project is clearly unviable in financial terms. However, revenues from the possible CER sale by CDM route provide some incentive for this environmental friendly project. This proves with no uncertainty that the project activity is not a business as- usual scenario. Hence, the project requires CDM benefits to make it financially attractive.

b) Other Barriers

i) Geological Risk

Himachal Pradesh is exposed to various geological risks. Frequent natural disasters of various intensity and their impact on society and land are one of such problems, which have hampered the development of the state. Earthquakes, landslides, cloudbursts, flashfloods, avalanches etc, have caused tremendous loss to the state. On the basis of the damage caused by the disasters and their wide spread nature, Himachal Pradesh can be called as one of the most unstable and disaster prone states of India[3]. Of the geological risk affecting the project activity, the most important are

a) Landslides
b) Earthquakes and
c) Flash Floods

a) Land Slides: Landslide is the most common disaster in Himachal Pradesh which causes immense loss of life and property. The fragile nature of the rocks forming the mountains along with climatic conditions and various anthropogenic activities had made the State vulnerable to the vagaries of nature. In the rainy season, due to heavy rain falls, which are common in the area[4], invariably causes land slides, which could damage the access to roads, transmission lines and project infrastructure such as RCC laggings, steel ribs etc. The resulting damages would result in not only loss of revenues as a result of reduced plant operation period, but also cause delays in the construction, repair of physical damages. The remote access is likely to add to the cost as the material has to travel by road for a long distance.

b) Earthquakes: The project area lies in a complicated geology with number of thrusts and faults. It is seen from the seismic zoning map of India that the project area lies within seismic zone V[5]

[3] Further evidence on the geological risks can be found from a Report prepared by Planning Commission, Government of India in "Himachal Pradesh Development Report" (http://www.planningcommission.gov.in/plans/stateplan/sdr_hp/sdr_hpch3.pdf).
[4] http://www.tribuneindia.com/2007/20070301/himachal.htm#1
[5] http://asc-india.org/maps/hazard/haz-himachal-pradesh.htm

which denotes high seismic intensity region in India. The project area lies in the zone where earthquakes of high intensity are expected. Large earthquakes have occurred in all parts of Himachal Pradesh, the biggest being the Kangra Earthquake of 1905. The 17 June 1962 - Chamba-Udhampur earthquake was one more. There were major earthquakes in the project area in the past[6] [7]. Hence, Suitable seismic coefficient commensurate may have to be adopted in the designing of the proposed project infrastructure to sustain in the seismic activity. The following maps show that the project lies in a highly hazardous seismic zone.

c) Flash Floods: Flashfloods - short lived extreme events - which usually occur under slowly moving or stationary thunder storms lasting less than 24 hours are a common disaster in the state. The high velocity of current can wash away all obstacles in its way. This phenomenon has resulted in enormous loss of life and property in various parts of the region of Himachal Pradesh in the past. The flood is due to various reasons: cloudburst in the catchments area intense and prolonged rainfall, downstream blocking of river channels by landslides, avalanches or sudden breach or burst of artificial/ natural lakes are some of them.
In the State, since the rivers are snow-fed, flooding of rivers mostly occurs in summer due to snowmelt coupled with heavy rain. Flash floods due to cloud burst are a common phenomenon in the project area. Past history of the project area shows the project area had experienced flash floods quite frequently.

There were 8 flash floods in the area during past 32 years. This cannot be predicted and to that extent, the project runs a great risk. Another form of flash flooding in this State is principally associated with small regions. The duration of this phenomenon is short, but can cause extensive damage. The State experienced large incidences of floods in the past. Though the State has faced severe flood disasters between 1975 and 1988, the last decade (1997-2005) has been one of the worst as both the magnitude and frequency of floods had gone up. There were several incidences of floods/flashfloods during 1997-2005 and of which about five were really gigantic. The flash flood of 1st August 2000, in the Satluj left a trail of destruction in Shimla and Kinnaur district killing more than 150 people and washing away bridges. These floods had claimed a heavy toll in terms of killing several hundreds of people, large number of cattle, causing heavy loss to the State exchequer running into several thousand millions of rupees[8].

ii) Lack of Infrastructure

Apart from the fact that Himachal Pradesh in general, and the project activity in particular, lack infrastructure, the geological risks add a new dimension to the infrastructure inadequacies. Any natural calamities are capable of throwing even the existing infrastructure into haywire requiring reconstruction. As this is totally dependent on the geological risk, it cannot be anticipated. The experience of the project has proved how real the problem can be as the PP had to spend huge

[6] http://asc-india.org/seismi/seis-himachal-pradesh.htm
[7] http://www.iisc.ernet.in/currsci/oct102004/863.pdf

[8] Floods and Flash Floods in Himachal Pradesh : A Geographical Analysis Dr. D. D.Sharma ,Himachal Pradesh University,Shimla ,http://nidm.gov.in/idmc/Proceedings/Flood/B2-%206.pdf

sum towards social cost, more than what was envisaged towards construction of village paths, approach roads, construction of foot bridges and various social costs.

Conclusion

From the foregoing, it could be seen the barriers faced by the project activity. It is neither possible nor feasible to ascertain the timing and extent of geological risks likely to occur or the financial implications and halt in generation. The difficulty in quantification of such risks renders them a serious barrier for the project. Small hydro power projects have been a learning-by-doing exercise for both the project developers and financiers. With limited information, both project developers and financiers have to take a decision on setting up and financing the project, which is a major constraint in this project. Thus, the project is not a business-as-usual scenario. The project is, therefore additional and requires CDM benefits to overcome the barriers.

Early consideration of CDM

As per the Guidance issued by the EB (Annex 46 of EB 41), the demonstration and assessment of prior consideration of CDM, wherein it has been stated that the prior consideration of CDM can be demonstrated by PP through indication awareness of the CDM prior to the project activity start date and that the benefits of the CDM were a decisive factor in the decision to proceed with the project. The Guidance states that the evidence to support this would include, *inter alia*, minutes and/or notes related to the consideration of the decision by the Board of Directors of the PP to undertake the project as a CDM project activity.

Although the project activity was conceived in 2001, due to many unforeseen circumstances its implementation was delayed. The project proponent signed an implementation agreement with HPSEB on the 14th of July 2007. The project proponent was able to get many No Objection Certificates (NOCs) from several state government agencies, but was unable to commence work due to a lack of funds. Hence the project crawled at a snail's peace during the initial years, after it was conceived. However, once the project proponent was able to raise the necessary equity component required by the project activity, the project activity progressed swiftly.

On the 14th of March 2007, the project proponents had a board meeting in which the matter of taking the project activity through the CDM route was discussed. The members of the board felt that the project activity, as a bundled project activity, would require the additional financial revenue, by the means of CDM, to make the project activity financially viable. The minutes of the meeting are attached to substantiate the same. Following which, on the 14th of June 2007, the project proponent was able to sign an implementation agreement with the Himachal Pradesh Government.

Also, the project proponents have approached the Rural Electrification Corporation (REC) for providing a loan to cover the debt component of the project activity. The loan sanction letter, on page number 7, states that the "The Company (PP) shall also apply for CDM benefits to the concerned authority & the benefits, if any, accrued/available for the project shall be directly passed to REC against adjustment of loan". This substantiates the claim of the project proponent that CDM was seriously considered before the implementation of the project activity, as their

financiers (REC) have approved loan sanction and have appraised the project activity keeping in mind its CDM revenues.

The following events clearly depict the chronologic movement of the project activity:

S.No	Particulars	Belij Project	Gehra Project
1.	Public Works Department NOC	**08/01/2003**	**08/01/2003**
2.	Gram Panchayat Approval	**05/08/2003**	**27/02/2007**
3.	HPSEB Techno-economic Clearance	**24/03/2005**	**22/12/2000**
4.	I&PH Department NOC	**02/12/2002**	**02/12/2002**
5.	Board Resolution	**14/03/2007**	**14/03/2007**
6.	Project Implementation Agreement with Government of Himachal Pradesh	**14/06/2007**	**07/06/2007**
7.	Draft PPA with HPSEB approved by HPERC	**01/08/2008**	**23/08/2008**
8.	Department of Fisheries NOC	**23/05/2008**	**23/05/2008**
9.	Pollution Control Board NOC	**14/07/2008**	**20/11/2007**
10.	Allotment of Forest Land to Project Activity	**03/06/2008**	**30/05/2008**
11.	Equipment Supply Agreement	**23/02/2009**	**To be awarded**
12.	Design & Erection Agreement	**23/02/2009**	**To be awarded**
13.	Construction Works	**23/02/2009**	**To be awarded**
14.	Electro-mechanical equipment supply	**26/02/2009**	**To be awarded**
15.	Loan Sanction	**03/11/2009**	**To be applied**
16.	Board Resolution	**14/03/2007**	**14/03/2007**
17.	Appointment of CDM Consultants	**05/11/2009**	**05/11/2009**
18.	Appointment of DOE	**23/11/2009**	**23/11/2009**

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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The project activity uses a renewable energy source for the generation of electricity, which is exported to a grid system. The grid, being fed by both fossil fuel fired generating plants (using fuels such as coal, natural gas, diesel, naphtha etc.) and non-fossil fuel based generating plants (such as hydro, nuclear, biomass and wind). For this category, there are no project emissions. Also the project activity has a generating capacity of 7 MW and the proponents plan no capacity additions in the future. Since the capacity is below 15 MW and is grid connected, the project proponents have chosen to opt for the AMS I.D methodology version 15.

As transfer of generating equipment is not envisaged, there are no leakage emissions. The applicable baseline, as per Clause 29 of Appendix B, indicative simplified baseline and monitoring methodologies is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kgCO2/kWh) calculated in a transparent and conservative manner. The baseline emission is the KWh produced by the renewable generating unit multiplied

by weighted average emissions (in Kg CO2e/ KWh) of the current generation mix. The combined margin is chosen as it is calculated in a transparent and conservative manner.

The project activity is located in Himachal Pradesh and is present in the northern region of India. The project activity exports the electricity generated to HPSEB. HPSEB is part of the northern regional grid of India. The baseline has been prepared by extrapolating the build margin and operating margin data, published by The Central Electricity Agency, for the northern regional grid of India.

B.6.2. Data and parameters that are available at validation:

Data / Parameter:	**Efy**
Data unit:	tCO2 e /MWh
Description:	Combined margin
Source of data used:	User Guide of CO2 Baseline Database for the Indian Power Sector (version 5.0 dated Nov 2009) prepared by Central Electricity Authority (Ref: http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver5.pdf)
Value applied:	0.82
Justification of the choice of data or description of measurement methods and procedures actually applied :	The combined margin emission is chosen as it is calculated in a transparent and conservative manner. The project activity comes under NEWNE grid.
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

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The combined margin is obtained by taking the weighted average of the operating margin and the build margin, the weights of each being taken as 50%. According to data published by the CEA[9]:

The operating margin, for the northern regional grid, for the past three years are as follows:

Year	2006-07	2007-08	2008-09	Average
Operating Margin	1.01	1.00	1.01	1.005

[9] (Ref: http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver5.pdf)

The build margin, for the northern regional grid, for the past three years are as follows:

Year	2006-07	2007-08	2008-09	Average
Build margin	0.63	0.60	0.68	0.635

The combined margin is the sum of the weighted average operating margin and average build margin:

CM = Average operating margin * 50% + Average build margin * 50%
CM = 1.005 * 50% +0 .635 * 50%
CM = 0.82

As per AMS I.D, the baseline emissions are calculated on the electricity generated by the project activity multiplied with the baseline emission factor (combined margin) for the project grid:

Emissions Reductions = Net Electricity Generated by project activity * Combined Margin of the Grid

$ER_y = BE_y - PE_y - LE_y$

Since, there are no emissions generated by the project activity and no leakages present. PE_y and LE_y is zero
$ER_y = BE_y$
ER_y = 33320 MWh * 0.82 tCO2/MWh
ER_y = 27322 tCO2e/year

B.6.4 Summary of the ex-ante estimation of emission reductions:

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Years	Estimation of Project Activity Emissions (tCO2 e)	Estimation of baseline emission (tCO2 e)
2010	0	19227
2011	0	26918
2012	0	26918
2013	0	26918
2014	0	26918
2015	0	26918
2016	0	26918
2017	0	26918
2018	0	26918
2019	0	26918
Total	0	261489

B.7 Application of a monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:	
Data / Parameter:	Electricity supplied to the grid by Belij project activity
Data unit:	MWh/year
Description:	This is the power generated by the project exported to the grid after local use.
Source of data to be used:	Import/Export Meters installed
Value of data	23.45 GWh/year
Description of measurement methods and procedures to be applied:	The data will be recorded both at the project site as well as at the grid substation, which is under the control of HPSEB. The energy will be measured and recorded using calibrated meters at the HPSEB substation. Records of measurements will be used for verification of emissions reductions. Sales bills / receipts may be compared as an alternative proof of the power exported to the grid.
QA/QC procedures to be applied:	The energy meters will be periodically calibrated and the calibration certificates will be maintained. The project proponents also have the provision of check meters, which are also regularly calibrated whenever the main meter becomes faulty the check meter, is used as reference for arriving at the energy generated data.
Any comment:	Monitored for baseline Emissions

Data / Parameter:	Electricity supplied to the grid by Gehra project activity
Data unit:	MWh/year
Description:	This is the power generated by the project exported to the grid after local use.
Source of data to be used:	Import/Export Meters installed
Value of data	9.38 GWh/year
Description of measurement methods and procedures to be	The data will be recorded both at the project site as well as at the grid substation, which is under the control of HPSEB. The energy will be measured and recorded using calibrated meters at the HPSEB substation. Records of measurements will be used for verification of emissions

applied:	reductions. Sales bills / receipts may be compared as an alternative proof of the power exported to the grid.
QA/QC procedures to be applied:	The energy meters will be periodically calibrated and the calibration certificates will be maintained. The project proponents also have the provision of check meters, which are also regularly calibrated whenever the main meter becomes faulty the check meter, is used as reference for arriving at the energy generated data.
Any comment:	Monitored for baseline Emissions

B.7.2 Description of the monitoring plan:

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The monitoring plan is developed in accordance with the modalities and procedures for small-scale CDM project activities and is proposed for grid-connected small hydroelectric project being implemented in Himachal Pradesh in India. The monitoring plan, which will be implemented by the project proponent describes about the monitoring organization, parameters to be monitored, monitoring practices, quality assurance, quality control procedures, data storage and archiving.

Project Management
The authority and responsibility for registration, monitoring, measurement, reporting and reviewing of the data rests with the Board of Directors. The Boards may delegate the same to a competent person identified for the purpose. The identified person will be the in charge of GHG monitoring activities and necessary reports will be submitted to the management or it's Committee for review.

Monitoring Requirements

The monitoring plan includes monitoring of energy parameters such as Gross energy, Auxiliary consumption, energy export to the HPSEB grid system, and energy import to the project activity from grid. Emission reductions resulted from the project activity will be calculated based on the net energy export to the grid system in accordance with the calculations illustrated in Section B.6.3 of the PDD. Emission reductions generated by the project shall be monitored at regular intervals. The crediting period chosen for the project activity is 10 years.

Monitoring equipment comprises of energy meters, which will monitor the energy fed by the plant to HPSEB grid system by the proposed project. In accordance with the PPA, project proponents have to install two energy meters one is main meter and the other is check meter. Project proponent will calibrate both the meters according to the procedures laid down by PPA. Project proponent will appoint a Designated Operational Entity (DOE) for verification of emission reductions and leakages resulted by the project activity at regular intervals.

CDM – Executive Board

Methodology adopted for determining baseline emission factor is the Combined Margin (Including Imports) of the generating mix in the NEWNE grid system, which will represent the intensity of carbon emissions of the grid system. The baseline emission factor is fixed ex-ante for all the years of the crediting period using the official data published by the Central Electricity Authority for the NEWNE grid for the year 2008-09.

QA & QC Procedures

The project shall employ latest state of art microprocessor based high accuracy monitoring and control equipment that will measure, record, report, monitor and control of various key parameters of the project. These monitoring and controls will be the part of the Control Systems of hydroelectric plant. Necessary standby meters or check meters as required would be installed, to operate in standby mode or when the main meters are not working. All meters will be calibrated and sealed as per industry practices at regular intervals. Records of calibration certificates will be maintained for verification. Hence, high quality is ensured with the above parameters. Sales records will be used and kept for checking the consistency of the recorded data.

Data Recording and Storage

For measuring the delivery/import of energy by the project at the interconnection point, one set of Main Meter and Check Meter, shall be provided by the project proponent and the HPSEB, respectively, at the interconnection point. Representatives of both the project proponent and HPSEB will sign the document which will contain all details such as the equipment data, calibration status, previous reading, current reading, export, import, net billable units, date and time of recording etc. This document will be used as a basic document for monitoring and verification of the net energy exported to the grid. HPSEB will pay the project proponent based on this document. The above document will be kept at safe storage for verification of emission reductions generated from the project activity. Supporting documents such as receipts of payments released by HPSEB will also be kept in safe storage for later verification by an independent third party. The period of storage will be 2 years after the end of crediting period or till the last issuance of CERs for the project activity whichever occurs later

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

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Date of completing the final draft of the baseline: 01/12/2009
Name of the entity determining the baseline:

Organization: Energy Economy & Environmental Consultants (Not a Project Participant)
No. 624, 6th 'A' Main, 17th cross, Indiranagar 2nd stage
City: Bangalore
State/Region: Karnataka
Postfix/ZIP: 560 038
Country: INDIA
Telephone: +91 (80) 25213986-89

CDM – Executive Board

FAX: +91 (80) 25259172
E-Mail: mail@3ecindia.com, eeec@vsnl.com
Title: Managing Director
Name: Mrs. Muktha Rao

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

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Start of the project: 23 February 2009

C.1.2. Expected operational lifetime of the project activity:

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30 years and 0 months

C.2 Choice of the crediting period and related information:

The project activity will use a renewable crediting period**.**

C.2.1. Renewable crediting period

Not Chosen

C.2.1.1. Starting date of the first crediting period:

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C.2.1.2. Length of the first crediting period:

>>

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>

1st September 2010 or a date not earlier than the date of registration of project activity

C.2.2.2. Length:

>>

10 years and 0 months

SECTION D. Environmental impacts

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D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

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As per the prevailing regulations of the Host Party i.e. India represented by the Ministry of Environment and Forests (MoEF), Govt. of India and also the concerned ministry for environmental issues in India, Environmental Impact Assessment (EIA) studies need not to be conducted for the projects less than Rs. 1000 millions. Since the total cost of the project is approximately Rs.500 millions only, the project activity doesn't call for EIA study.
However the project activity is required to obtain permission from Himachal Pradesh State Environment Protection & Pollution Control Board (HPPCB) for setting up of the project. The project proponents have obtained necessary clearance in this regard. As per present dispensation of Ministry of Environment and Forests (MoEF), Govt. of India, Environmental Impact Assessment (EIA) studies need not to be done for the project activity under the Environment Impact Assessment Notification vide S.O. 1533(E) dated 14/09/2006 has listed a set of activities in Schedule I of the notification which, for setting up new projects or modernization/ expansion, will require prior environmental clearance and which may require to conduct an Environmental Impact Assessment (EIA) study as a part of obtaining the clearance.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

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No significant environmental impact is likely to occur due to implementation of project activity which is a run of river hydro project.

SECTION E. Stakeholders' comments

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E.1. Brief description how comments by local stakeholders have been invited and compiled:

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The local stakeholder comment invitation and compilation process involved is as follows:

The local stakeholders are those who are immediately affected by the activities of the project. The effect is on the local environment, social life and economics. All the individuals and organizations falling in the above effects are perceived as stakeholders. They can be within the boundaries of the village, district, state or nation.
During interaction of the corporate headquarter and the plant management, the stakeholders were identified as:

- Local Populace represented by the Village Panchayat

- Himachal Pradesh State Electricity Board (HPSEB)
- Himachal Pradesh State Environment Protection and Pollution Control Board (HPPCB)
- Energy Department
- I&PH department
- Public Works Department
- Fisheries department
- Forest department

All the above identified stakeholders are statutory organizations / governing bodies and need to be consulted and personally approached with necessary documentation to seek their approvals / clearances / licenses before setting up any project. After scrutiny of the documentation, the stakeholders release their consent / licenses / approvals to the project participants.

The Village Panchayat represents the local populace, which is an elected body for administration of the village. The local stakeholders have been consulted by calling the meeting of all villagers (known as Village Panchayat – headed by elected governing council). Clearance from the concerned Village Panchayat in the form of "No Objection Certificate" is mandatory for any project before starting implementation. For this purpose, the project proponents conducted a meeting within the village with the Village Panchayat together with the villagers, where they were apprised about the project allotment and planned activities for the implementation of the project. Village Panchayat issued No-Objection Certificate to set up the project. In fact, the local populace is welcoming the project due to various benefits like development of infrastructure in the area and improvement in socio-economic standards due to the project activity. These No-Objection Certificates were issued in 2003 for the project at Belij and 2007 for Gehra, the same has been portrayed in the table of the events in B.5.

The project participants have already approached the above stakeholders for implementation of the project. No negative comments are received from them. Necessary clearances / approvals are already released in favor of the project.

HPPCB has prescribed standards of environmental compliance and monitors the adherence to the standards and has issued consent to establish the project.

HPSEB will give clearance for evacuation and feeding of power to the grid. This will be through proper Power Purchase Agreement. The company had extensive discussions with HPSEB and signed the power purchase agreement.

In addition the project proponent took it upon himself to have an additional stakeholder consultation on 16th December 2009. The project proponent floated an advertisement for the same in the local newspapers.

E.2. Summary of the comments received:

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CDM – Executive Board

The stakeholders, during the meeting held on the 16th of December 2009, expressed their opinions about the project activity, which are mentioned below:

The stakeholders, in general, appreciated the project proponent's effort for taking an initiative and setting up the hydel power station. They were convinced that the project activity would lead to the development of the entire region. They also expressed eagerness to get employment and infrastructure. Even though they have apprehensions like displacement of people and negative impacts of the project, they are satisfied with the explanation and promise that no people will be displaced and there would be no harm to people living nearby and water sources.

E.3. Report on how due account was taken of any comments received:

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The comments received from local stakeholders concerns mainly displacement of people and employment. Due account was taken by the project proponent to clear the concerns of stakeholders and below points only proves this.

- The company has hired the local people for all labour related works and the talented local people for Managerial, administrative & operational works.
  Unskilled - approximately 125 people
  Skilled - approximately 38 people
  Managerial - approximately 18 people

- Basic infrastructure like guest houses for the employees, road for vehicles movement, store-room, and Electricity connection are provided etc.
- Not even a single person is displaced by the project during its construction.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	M/s. Raajratna Energy Holdings Pvt. Ltd.
Street/P.O.Box:	Plot no. 431, Road no 21, Jubilee Hills
Building:	
City:	Hyderabad
State/Region:	Andhra Pradesh
Postfix/ZIP:	500033
Country:	India
Telephone:	040-23559922
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E-Mail:	
URL:	
Represented by:	
Title:	Chief Financial Officer
Salutation:	Mr.
Last Name:	Adhikari
Middle Name:	Rao
First Name:	Mohan
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