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

CONTENTS

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: 3.1
Date: 11/12/2012.

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

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The project activity involves 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 project activity consists of 5 MW small hydropower plant located at Belij, Chamba district, Himachal Pradesh, India (hereafter referred to as Belij Project or Project Activity), being developed by Belij Hydro Power Private Limited.

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 electricity 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 23.445 GWh annually, after taking auxiliary consumption, transformation losses and transmission losses into account. The electricity generated will be fed into HPSEB substation at Jarangal which is connected to Northern, Eastern, Western, North-Eastern Grid (NEWNE Grid).

At the time of webhosting the PDD for the Global stakeholder comment process the PP intended to develop the proposed CDM project activity as 7 MW bundled small hydropower project (hereafter referred to as the bundled project or project activity) located at Himachal Pradesh, India. The bundled hydro power project consisted of the Belij project and 2 MW small hydropower plant located at Gehra, Chamba district, Himachal Pradesh, India (hereafter referred to as Gehra project). The Belij Project was being developed by Belij Hydro Power Private Limited and the Gehra Proejct was being implemented by Gehra Hydro Power Private Limited. The same PDD was submitted to the host country approval and subsequently the Host Country approval was granted to the 7 MW Bundled Project activity consisting of the Belij Project located in Hibra Village, Chamba district and the Gehra project located in the Gehra Village, Chamba district.
However considering the technical implementation difficulties of the construction Gehra Project, the Board of Directors of Gehra Hydro Power Private Limited (GHPPL) has passed a resolution not to implement the Gehra Project. Thus GHPPL has not placed the Equipment Supply contract or EPC contract for the Gehra Project. Hence the PDD is subsequently revised to include only the Belij project. The revised PDD has been submitted to the DOE for the validation. The project title has not been revised as it was approved by the host country DNA

GHG emission reduction:

The purpose of the project activity is to produce renewable energy using hydro power and supplying electricity to the Northern Eastern Western North-Eastern (NEWNE) grid.

In the absence of the project activity equivalent amount of electricity would have been generated by the operation of grid connected fossil fuel based power plants. The Project activity thus reduces the anthropogenic emissions of greenhouse gases (GHGs) in to the atmosphere associated with the equivalent amount of electricity generation from the fossil fuel based grid connected power plant. The annual emission reduction resulting from a project activity is estimated to be 19,693 tCO_2e.

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 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

- 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. The project has been sanctioned under the Decentralized Distributed Generation Scheme, with The Rural Electrification Corporation as the Nodal Agency. The scheme's objective is to bring electricity to the rural areas with a lower carbon footprint through use of Renewable Energy with lower requirement for Transmission and Distribution Infrastructure.[1]

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 the Integrated Northern, Eastern, Western, and North-Eastern regional grids (NEWNE) 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:

[1] http://www.idfc.com/pdf/report/Chapter-11.pdf

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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Hibra 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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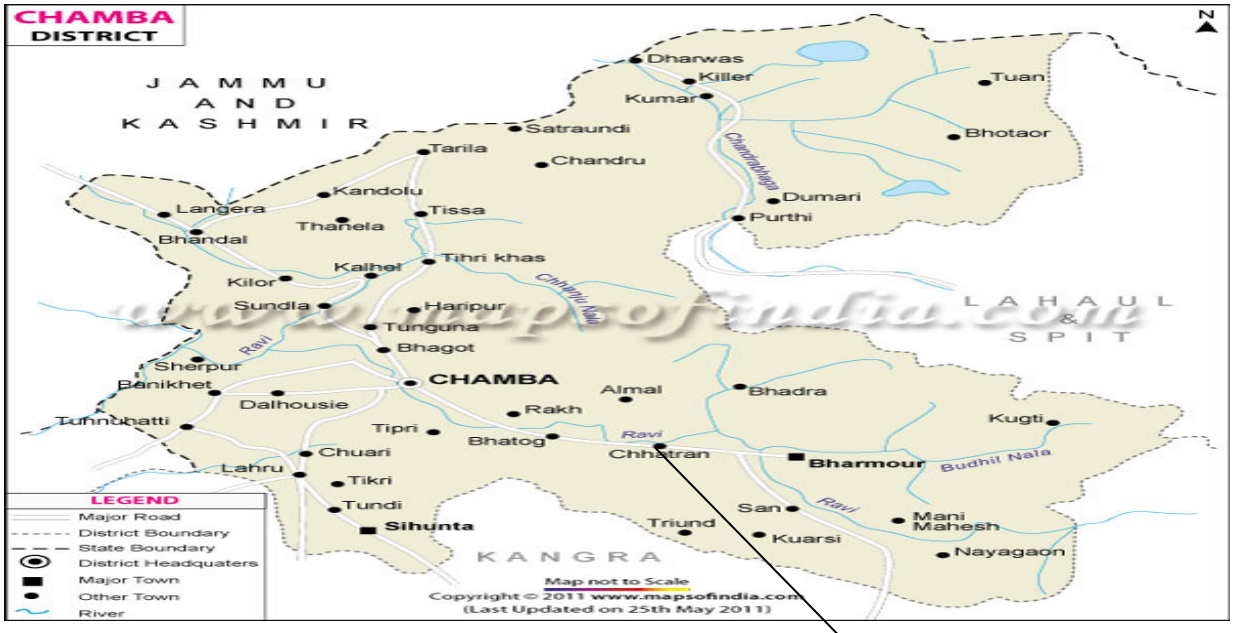
Belij Project

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.



S. No	Particulars	Geographical Coordinates of Power House	Geographical Coordinates of Wier
1	Longitude	76º23'51'' East	76^0 20' 0.42" East
2	Latitude	32º29'33'' North	32º 32' 15.41'' North

The nearest airport to the project activity is in Gaggal (District. Kangra) and the nearest rail station is Pathankot

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

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Belij Project is a 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.

S. No	Particulars	Belij
1	**Hydrology**	
a	Stream	Belij
b	Tributary	Ravi River
c	Design discharge	3.325 cumecs (m^3/sec)
2	**Penstock**	
a	Type	Circular, surface, steel
b	Length	360 m
3	**Power house**	
A	Type	Surface
B	Installed capacity	2 x 2.5 MW = 5 MW
C	Gross head	225.087 m
D	Net head	221.25 m
E	Generating unit	Pelton turbine
F	Gross Energy Generated	24.81 GWh
G	Transmission Losses (4.5%), Transformation Loss (0.5%) & Auxiliary Power Consumption (0.5%)	1.36 GWh
H	Electricity Supplied to the Grid after consideraiton of the Transmission Losses (4.5%) Transformation loss (0.5%) and Auxiliary Power (0.5%) (GWh)	23.445 GWh

Technical Characteristics of Turbine	
Rated Net Head	221.50m
Design Flow	3.20m^3/s
Rated Power	2.500MW @ 1.33Cumecs 2.500MW + 20% COL @ 1.61Cumecs
Runner Bucket PCD	1200mm
Rated Speed	500 RPM
Runaway Speed	871.1RPM

Technical Characteristics of Generator	
Capacity	2.500 MW + 20% COL
Voltage Output	6600V
Rated Speed	500RPM
Frequency	50Hz
Power Factor	0.85 Lag
Configuration	Horizontal

The project activity utilizes hydropower for electricity generation, which falls into the category of renewable energy. Since the capacity of the project is 5 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 activities, 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 17 EB 61

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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Total Chosen Crediting Period is from 01/01/2013 to 31/12/2022.

Table: Annual Emissions Reductions

Years	Estimation of annual emission reductions in tonnes of CO_2 e
2013	19,693
2014	19,693
2015	19,693
2016	19,693
2017	19,693
2018	19,693
2019	19,693
2020	19,693
2021	19,693
2022	19,693
Total estimated reductions (tonnes of CO_2 e)	196,930
Total number of crediting years	**10**
Annual average of the estimated reductions over the crediting period (tCO_2e)	19,693

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:

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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.

As per EB 54 Annex 13

" A proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:

(a) With the same project participants;
(b) In the same project category and technology/measure; and
(c) Registered within the previous 2 years; and
(d) Whose project boundary is within 1 km of the project boundary of the proposed small- scale activity at the closest point."

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

- 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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The categories for the project activity according to the UNFCCC's published "Appendix B -Indicative Simplified Baseline and Monitoring Methodologies for Selected Small-Scale CDM Project Activities" is **AMS.I.D** "Grid connected renewable electricity generation" version 17;
Sectoral scope 01; EB 61

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

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Technology/Measures	Justification
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 proposed project activity is a hydro power project that supplies electricity to the Northern, Eastern, Western, and North Eastern regional grid (NEWNE) of India. Hence the project activity is in compliance with paragraph 1(a).
2. Illustration of respective situations under which each of the methodology (i.e. AMS-I.D, AMS-I.F and AMS-I.A) applies is included in Table 2	The project activity "supplies electricity to the national / regional grid "and hence as per Table 2 of AMS 1.D (Version 17, EB 61), the project activity is eligible to apply this methodology. Hence this criterion is applicable.
3. This methodology is applicable to project activities that (a) install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) Involve a	The project activity is installation of new power plant at site where there was no renewable energy plant operating prior to the implementation of the project

replacement of (an) existing plant(s).	activity (Greenfield). Hence this criterion is applicable.
4. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: • The project activity is implemented in an existing reservoir with no change in the volume of reservoir; • The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m2. • The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m2	The project activity is a run of river project activity, hence this condition is not applicable
5. If the new unit has both renewable and non-renewable components (e.g., a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	The project activity will generate electricity from hydro energy which is renewable source of energy; hence this condition is not applicable
6. Combined heat and power (co-generation) systems are not eligible under this category.	The project activity does not involve co-generation; hence this condition is not applicable.
7. In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.	The project activity doesn't involve the addition of renewable energy generation units at an existing renewable power generation facility; hence this condition is not applicable.
8. In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.	The project activity doesn't retrofit or replace an existing facility; hence this condition is not applicable.

Based on the above justifications, it can be concluded that the project activity is eligible to apply this methodology.

B.3. Description of the project boundary:

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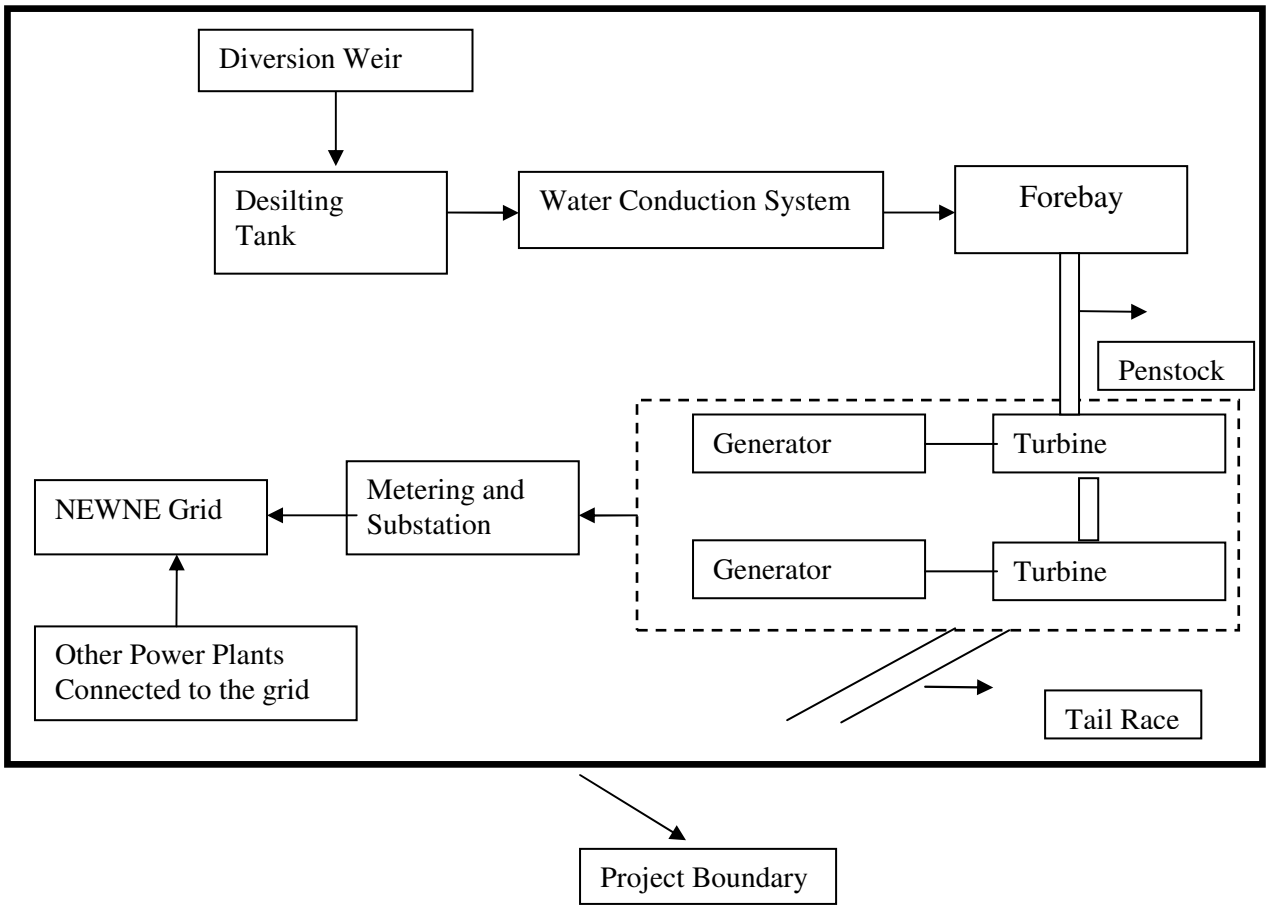
In accordance with paragraph 9 of AMS I.D Version 17, the project boundary encompasses the physical, geographical site of the renewable generation source.

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, the transmission system to the evacuation point and auxiliary power consumed by the plant. The below figure illustrates the boundary of project activity.



The power generated from the project will be metered and accurately quantified. The electricity will be exported to the Himachal Pradesh State Electricity Board (HPSEB) which is connected to NEWNE grid

B.4. Description of baseline and its development:

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The project activity involves electricity generation through hydro power plant and sale of the electricity to the North East West North East (NEWNE) grid.

In the absence of the project activity equivalent amount of electricity would have been generated by the operation of fossil fuel based power plants connected to NEWNE grid. The Project activity thus reduces the anthropogenic emissions of greenhouse gases (GHGs) in to the atmosphere associated with the equivalent amount of electricity generation from the fossil fuel based power plants connected to NEWNE grid.

As per AMS I D version 17:
Paragraph 10. The baseline scenario is that 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.

Paragraph 11. The baseline emissions are the product of electrical energy baseline $EG_{BL, y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor.

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

Where:

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

As per AMS I D version 17 paragraph 12 the Emission Factor has to 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 tCO_2e/MWh) of the current generation mix. The data of the year in which project generation occurs must be used.

Calculations must be based on data from an official source (where available) and made publicly available.

Accordingly, the option (a) of the paragraph 12, version 17, AMS I D has been chosen. The emission coefficient (measured in tCO_2e/MWh) calculated in a transparent and conservative manner as 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 (version 02)" (hereafter referred to as "Tool"). This is being determined in line with paragraph 12 (a) of AMS-I.D version 17. Baseline scenario would be equivalent amount of electricity generation by the prevailing generation mix of the NEWNE Grid.

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:

In the absence of the project activity the equivalent amount of electricity would have been generated by the operation of grid connected power plants that are predominantly GHG intensive Thermal power plants. The Project activity will thus reduce the anthropogenic emissions of greenhouse gases (GHGs) in to the atmosphere associated with the equivalent amount of electricity generation.

Additionality

As explained above, the project initiative qualifies under Type I D. The following paragraph has been detailed on project additionality.

In accordance with simplified modalities and procedures for small-scale Clean Development Mechanism (CDM) project activities, a simplified baseline and monitoring methodology listed in Appendix B may be used if project participants can demonstrate that the project activity would otherwise not be implemented due to the existence of one or more barrier(s) listed in "Guidelines On The Demonstration Of Additionality Of Small-Scale Project Activities", Version 09, Annex 27, EB 68.

Project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers:

- **Investment barrier**:
- **Technological barrier:**
- **Barrier due to prevailing practice**:
- **Other barriers**

The additionality of the project activity is being established using the following barriers:

a) Investment barrier

a) Investment Barrier:

The investment analysis method recommends three analysis methods: simple cost analysis, investment comparison analysis and benchmark analysis. The proposed project produces economic benefits through the sales of electricity other than CDM related income; therefore, the simple cost analysis can not be taken. The investment comparison analysis is not applicable to the proposed project because the alternative of the proposed project is "Equivalent electricity service provided by the grid", is outside the direct control of the PP.

As per "Guidelines on the Assessment of Investment Analysis", Annex 05 of EB 62, the benchmark approach is suited to circumstances where the baseline does not require investment or is outside the direct control of the project developer, i.e. cases where the choice of the developer is to invest or not to invest. In the project activity the baseline scenario is the generation of equivalent amount of electricity from the grid connected power plants.

The baseline scenario is outside the direct control of the PP. Hence, the benchmark analysis is chosen and the Project IRR is used as the financial indicator to assess the financial viability of the project activity.

The purpose of the project IRR calculation is to determine the viability of the project to service debt. As 70% of the project cost is serviced by Debt, hence Project IRR is considered appropriate financial indicator to assess the financial viability of the project activity.

Benchmark: As per the "Guidelines on the Assessment of Investment Analysis" Version 05, Local commercial lending rates or weighted average costs of capital (WACC) are appropriate benchmarks for a project IRR. Hence the benchmark is based upon weighted average of the cost of debt and equity component as determined for the project activity.

Cost of Equity: The cost of equity has been determined based upon the Capital Asset Pricing Model (CAPM)

$$CoE = r_f + \beta(ERP)$$

Where:
CoE = cost of equity
r_f = risk free rate
ERP = equity risk premium for the market
β =Beta or systematic risk for this type of equity investment coefficient reflecting the volatility (risk) of the stock relative to the market

Yield to Maturity (YTM) of Central Government Securities for the latest month available at the time of decision making has been chosen as proxy for the Risk Free Rate. This works out 8.067% for the project activity[2].

Capital Asset Pricing Model (CAPM) provides the framework for computing risk premium. Risk premium, or market risk premium as it is commonly known as is the difference between the market return and the risk free return (YTM on Government Securities). As required by CAPM, market Index representing a widely diversified portfolio with the timeline comparable to the period of assessment has been selected to compute the market return. Amongst the stock indices available in the Country at present, BSE 100 Index has been in operation for more than 20 years. The base value of BSE 100 index is considered as 100 as on 01/04/1984. The return on BSE 100 index has been computed from 01/04/1984 till 12/03/2007 the day prior to which the decision was taken for the project activity. This return works out to 19.97% for the project activity.

Based on the market return arrived at as explained above and the risk free return, the market risk premium works out to be 11.91% for the project activity.

The risk of the project type has been computed using Beta. Beta has been computed for all power generating companies listed and traded in the stock exchange and having a minimum track period of 5 years. There were in all 4 companies for the decision taken by PP vis-a-vis CESC Limited, Gujarat Industries Power Co. Ltd. (GIPCL), Tata Power Limited, Neyveli Lignite Corporation Limited.

The beta of the selected companies was computed using 5 years trading data by regressing the stock return on BSE 100 index and the resultant beta represents both business and leverage risk. The leverage risk has been eliminated by using the well accepted HAMADA equation and using the gearing and the tax rate of the respective companies. Out of the beta the weighted average beta has been chosen to compute the risk premium to reflect the risk of the project type. This works out to 0.94 for the project activity.

The cost of equity is obtained by adding the risk premium reflecting the risk of the project type to the government bond rates which works out to 19.29%.

[2] http://www.rbi.org.in/scripts/BS_ViewBulletin.aspx?Id=8293

Weighted Average Cost of Capital (WACC):

In computing the WACC, debt equity ratio has been taken at 70:30, which is the debt equity ratio as per the Detailed Project Report which was available at the time of decision making, prevailing PLR i.e. 12.375%[3] has been considered as the cost of debt and cost of equity has been computed based on CAPM. The WACC works out to 13.47%, which is calculated as below:

WACC : Cost of debt * % of debt * (1 – tax) + cost of equity * % of equity
: (12.375% * 70%*(1-0.1133(Minimum Alternate Tax (MAT)[4])) + (19.29% *30%)
: 13.47%

Project IRR Calculation:

As per the guidance on assessment of Investment Analysis version 05, "Both project IRR and equity IRR calculations shall as a preference reflect the period of expected operation of the underlying project activity (technical lifetime), or - if a shorter period is chosen - include the fair value of the project activity assets at the end of the assessment period. In general a minimum period of 10 years and a maximum of 20 years will be appropriate." The period considered for Project IRR calculation is 20 years which is recommended as the maximum assessment period for the Project IRR calculation and the fair value has been included at the end of assessment period.

The following table details the assumptions to compute the financial indicator for the project activity.

Project Capacity in MW	5.00	Section 1.3.7, Page Number 9 of the Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Gross Electricity Generation (GWh)	24.81	Section 1.3.9, Page Number 9 of Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Plant Load Factor	56.644%	Calculated based on the Electricity Generation Detailed Project Report Prepared by Sai Engineering Foundation

[3] http://www.rbi.org.in/scripts/WSSView.aspx?Id=10923

[4] The Project Activity is eligible to avail 80 IA Benefits for 10 years out of the first 15 years of the operation. Consequently the PP is exempted from paying the Normal Income Tax on the Gross Total Income for the years in which the 80 IA Benefit is availed. The 80 IA Benefit is availed when the carried forward losses are set off. In the project activity, the carried forward losses are computed to be set off in the 9th year of operaiton. Thus the 80 IA Benefits are considered from 9th year till 15th year. Further on the account of the carried forward losses till the 9th year of operation, the PP needs to pay only the MAT on the Profit Before Tax. Thus the PP pays MAT till 15th year of operation from the commissioning. The interest payments are considered for 12 years in the Project activity, whereas the tax liability for the first 15 years of operation is on account of payment of MAT. Thus the interest payment will reduce the tax liability till the extent of Cost of Debt * (MAT). Thus the after tax cost of debt is Cost of Debt * (1-MAT). Hence consideration of MAT is appropriate against considering the Normal Income Tax Rate

Transmission Losses (4.5%), Transformation Loss (0.5%) & Auxiliary Power Consumption (0.5%)	5.50%	Section 1.3.9, Page Number 9 of Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Electricity Supplied to the Grid after consideration of the Transmission Losses (4.5%) Transformation loss (0.5%) and Auxiliary Power (0.5%) (GWh)	23.445	Section 1.3.9, Page Number 9 of Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Operation & Maintenance Cost (% of the Capital Cost)	2.25%	Section 13.1, Chapter 13, Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
% of escalation per annum on O & M Charges every year	5.00%	Section 13.1, Chapter 13, Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
General and Administrative Expenses (% of Capital Cost)	0.50%	Section 13.1, Chapter 13, Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
% of escalation per annum on General & Administrative Expenses every year	5.00%	Section 13.1, Chapter 13, Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Tariff for sale - Rs./Kwh	2.50	Hydro Power Policy 2006
% Energy sale to grid at free of cost from 12th year till 30th year	12.00%	Hydro Power Policy 2006
Project Cost	INR Million	
Land & Site Development	4.894	Section 13.4, Chapter 13, Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Plant Civil Works	137.183	Section 13.4, Chapter 13, Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Electro mechanical works	82.348	Section 13.4, Chapter 13, Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Hydro mechanical works	28.392	Section 13.4, Chapter 13, Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Transmission	37.000	Section 13.4, Chapter 13, Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Other infrastructure works	2.500	Section 13.4, Chapter 13, Detailed Project Report Prepared by Sai Engineering Foundation, February 2007

Preliminary expenses	0.841	Section 13.4, Chapter 13, Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Preoperative expenses	35.234	Section 13.4, Chapter 13, Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
IDC	13.172	Section 13.4, Chapter 13, Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Working capital margin	2.464	Section 13.4, Chapter 13, Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Contingency	5.80	Section 13.4, Chapter 13, Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Total Project Cost	349.82	Section 13.4, Chapter 13, Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Capital Subsidy (45% of Project cost limited to Rs. 2.25 Crores + Rs. 37.50 Lacs per MW.)[5]	41.25	Hydro Power Policy 2006 (The capital subsidy will be released after successful commissioning and commencement of commercial generation)
Means of Finance	INR Million	
Internal Accruals	104.95	Debt:Equity Ratio considered as 70:30 as per section 13.2 of Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Loan Component	244.88	Debt:Equity Ratio considered as 70:30 as per section 13.2 of Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Total Source	349.82	Section 13.4, Chapter 13, Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Interest rate	12.375%	http://www.rbi.org.in/scripts/WSSView.aspx?Id=10923
Repayment Period (Number of Quarterly Instalments)	48.00	Section 13.1, Chapter 13, Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Moratorium (Number of Quarterly Instalments)	2.00	Section 13.1, Chapter 13, Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Fixed Asset Head	**WDV Rates under**	

[5] http://www.ireda.gov.in/Compendium/Data/HP/HP%20%20SHPup%20to%205%20MW-03.pdf

	Income Tax Act[6]	
Electro mechanical	15.00%	Income Tax Act, 1961
Hydro mechanical works	15.00%	Income Tax Act, 1961
Plant civil works	10.00%	Income Tax Act, 1961
Transmission	15.00%	Income Tax Act, 1961
Other infrastructure works	10.00%	Income Tax Act, 1961
Fixed Asset Head	**WDV Rates under Companies Act[7]**	
Civil Works	10.00%	Schedule XIV of the Indian Companies Act, 1956
Electro Mechanical Works	15.33%	Schedule XIV of the Indian Companies Act, 1956
Hydro Mechanical Works	15.33%	Schedule XIV of the Indian Companies Act, 1956
Transmission Line	15.33%	Schedule XIV of the Indian Companies Act, 1956
Other infrastructure	10.00%	Schedule XIV of the Indian Companies Act, 1956
Income Tax		
Income Tax rate	30.00%	Income Tax rates as per First Schedule of Income Tax Act 1961 as amended by Finance Act 2007[8]
Minimum Alternate Tax	10.00%	Income Tax rates as per First Schedule of Income Tax Act 1961 as amended by Finance Act 2007[9]
Surcharge	10.00%	Income Tax rates as per First Schedule of Income Tax Act 1961 as amended by Finance Act 2007[10]
Education Cess & Secondary and Higher Education Cess	3.00%	Income Tax rates as per First Schedule of Income Tax Act 1961 as amended by Finance Act 2007[11]
Construction Period (Number of Months)	30.00	Detailed Project Report Prepared by Sai Engineering Foundation

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

[6] http://law.incometaxindia.gov.in/DIT/File_opener.aspx?page=ITRU&schT=rul&csId=4a23cee1-1818-45d6-ab19-f155e08ed789&rNo=&sch=&title=Taxmann%20-%20Direct%20Tax%20Laws

[7] *asa-**india**.com/asa/**Depreciation**%20Rates%20**Companies**%20**Act**.pdf*

[8] http://indiabudget.nic.in/ub2007-08/fb/bill81.pdf

[9] http://indiabudget.nic.in/ub2006-07/bh/bh1.pdf

[10] http://indiabudget.nic.in/ub2007-08/fb/bill81.pdf

[11] http://indiabudget.nic.in/ub2007-08/fb/bill2.pdf

S. No	Particulars	Belij project
1	WACC	13.47%
2	IRR	9.89%

ensitivity analysis:

Sensitivity Analysis				
Particulars	**Project IRR**			**To breach the benchmark WACC**
	-10%	**0%**	**10%**	
PLF	8.08%	9.89%	11.55%	+22.9%
Project Cost	11.91%	9.89%	8.11%	-16.8%
O&M Expenses	10.23%	9.89%	9.53%	-115.5%
Tariff	8.08%	9.89%	11.55%	+22.9%

The assessment of the probability of the occurrence of the scenarios where the variation in the parameters resulting in the financial indicator crossing the benchmark is described in detail in the below paragraph:

The Plant Load Factor assumed for the calculation of the financial indicator is 56.644% that is considered from the Detailed Project Report prepared by the third party. Furthermore Himachal Pradesh Electricity Regulatory Commission (HPERC) in its order "HPERC Order on "SMALL HYDRO POWER PROJECTS TARIFF AND OTHER ISSUES dated 18/12/2007" had considered a PLF of 45% for mini-hydel power projects for the determination of tariff. Hence the possibility of increase in PLF by 22.9 % over the assumed PLF of 56.644% is not practically possible.

The PP has already incurred the cost of INR 555.985 Million for the project activity as per the certificate provided by the Chartered Accountant. Thus, the actual Project cost incurred by the company is 58% higher than the project cost used at the time of decision making; hence the probability of reduction in project cost by 16.8% in comparison to the cost considered during investment decision is not possible.

The O&M costs crosses the benchmark only when it decreases by 115.5% from the cost considered during the investment decision. However, it is a reality that the O & M cost is subject to escalation and also subject to inflationary pressure. Thus, any reduction in the O&M costs is highly unlikely.

For the purpose of calculation of the IRR for the project, the tariff rate taken is at INR 2.50/kWh. This is as per the "Hydro Power Policy 2006" which was the basis during the investment decision. However, the Power Purchase Agreement (PPA) was signed with HPSEB at the tariff of 2.95 INR/kWh which is an increment of 18% above the INR 2.50/kWh. An increase of tariff further is not possible as the tariff for the project activity is fixed for 40 years through the Power Purchase Agreement (P.P.A) signed by the PP. The Project IRR is calculated for the project activity considering the actual tariff of INR 2.95/kWh and Project IRR works out to 12.80% as compared to the benchmark of 13.47%. However it is also to be

noted that the actual project cost incurred by the PP for the project activity has increased to INR 555.985 Million. Thus considering the actual project cost of INR 555.985, the actual project capital expenditure schedule and the actual tariff of INR 2.95/kWh, the Project IRR works out to only 4.90% thus making the project still financially unattractive without the CDM benefits.

The above analysis proves that varying the parameters does not lead to a Project IRR without CDM revenue which will cross the benchmark value.

The carbon revenue from the project activity would provide significant amount of returns from the sale of the Emission Reductions accrued from the project activity and in turn increase the financial attractiveness of the project activity and hence make the project activity more financially viable. The Project IRR after consideration of the carbon revenue alleviates to 12.98%.

Prior consideration of CDM

As per the Guidance issued by the EB (Annex 13 of EB 62), "The Board decided that for project activities with a starting date on or after 2 August 2008, the project participant must inform a Host Party designated national authority (DNA) and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status. Such notification must be made within six months of the project activity start date and shall contain the precise geographical location and a brief description of the proposed project activity, using the standardized form F-CDM-Prior Consideration."

The project proponent has intimated the UNFCCC secretariat on 16/07/2009 as well as the Indian DNA on 27/07/2009 which is within six months from the start date of the project activity. This shows the project proponent had seriously considered the CDM benefits prior to setting up the project activity.

As per the EB's Guidance on Demonstration and assessment of the prior consideration of the CDM, EB 62, Annex 13 the following table indicates the events taken up by the PP to indicate that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation.

S.No	Particulars	Belij Project
1.	Investment decision by the Management to implement the project activity.	**14/03/2007**
2.	Agreement for the Supply for the Hydro Mechanical Items (Start Date)	**23/02/2009**
3.	Design & Detailed Engineering Works Agreement	**23/02/2009**
4.	Civil Construction Works Agreement	**23/02/2009**
5.	Electro-mechanical equipment supply	**26/02/2009**
6.	E-mail of the Prior Consideration of the CDM form to submit the notification of the commencement of the project activity and the intention to seek CDM status to UNFCCC	**16/07/2009**
7.	Submission of the Prior Consideration of the CDM form to Indian DNA for the notification of the commencement of the project activity and the intention to seek CDM status	**27/07/2009**
8.	Loan Sanction	**03/11/2009**
9.	Appointment of CDM Consultants	**05/11/2009**

10.	Appointment of DOE	**23/11/2009**
11.	Stakeholders consultation	**16/12/2009**
12.	Webhosting of the PDD for Global stakeholder comments	**10/03/2010**
13.	Date of Host Country meeting	**11/08/2010**
14.	Host Country Approval date	**11/03/2011**

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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As per AMS I D version 17 paragraph 11:

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

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

Where:

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

Input values and data sources for emission reductions associated with electricity displacement

Parameter	Description	Value	Source
$BE_y = EG_{BL,y} * EF_{CO_2,grid,y}$			
BE_y	Baseline Emissions in year y; t CO_2		Calculated
$EG_{BL,y}$	electricity produced by the renewable generating unit in year *y*; MWh	23445	Calculated based of the Gross Generation – Auxiliary Consumption – Transmission Losses – Transmission Losses as indicated below.
$EF_{CO2,grid,y} = EF_{grid,CM,y}$	CO_2 Emission Factor in year y; t CO_2e/MWh	0.8400	Calculated

Description	Value	Source
Gross Electricity Generation (MWh)	24810	Section 1.3.9, Page Number 9 of Detailed Project Report Prepared by Sai Engineering Foundation, February 2007

Transmission Losses (4.5%), Transformation Loss (0.5%) & Auxiliary Power Consumption (0.5%)	5.50%	Section 1.3.9, Page Number 9 of Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y ($EG_{BL,y}$) after consideration of the Transmission Losses (4.5%) Transformation loss (0.5%) and Auxiliary Power (0.5%) (GWh)	23445	Section 1.3.9, Page Number 9 of Detailed Project Report Prepared by Sai Engineering Foundation, February 2007

As per paragraph 12, AMS ID Version 17 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', Version 02.
OR
(b) The weighted average emissions (in t CO_2e/MWh) of the current generation mix. The data of the year in which project generation occurs must be used.
(c)
Calculations must be based on data from an official source (where available) and made publicly available.

In the project activity, the option A has been used which prescribes use of 'Tool to calculate the emission factor for an electricity system', Version 02.

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

STEP 1: Identify the relevant electricity system

Since the CDM project activity is connected to the NEWNE regional grid it is also preferred to take the NEWNE regional grid as project boundary than the state boundary. It also minimizes the effect of inter state power transactions, which are dynamic and vary widely.

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.

Only Grid power plants are included in the Combined Margin calculation as published by Central Electricity Authority in "The Central Electricity Authority (CEA): Baseline Carbon Dioxide Emission database version 5.0 dated 5th November 2009", hence the Option I has been considered for the project activity.

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

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

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

The two variants "Simple adjusted operating margin" and "Dispatch data analysis operating margin" cannot currently be applied in India due to lack of necessary data.

The simple OM method (option a) can only be used if low cost/must-run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production.

The percentage shares of generation from low cost/must run power plants for the 5 most recent years in the NEWNE grid is as follows:

2004-05	2005-06	2006-07	2007-08	2008-09
25.4%	**18.0%**	**18.5%**	**19.0%**	**17.3%**

Source: CO2 Baseline Database for the Indian Power Sector (Version 3.0 & 5.0)

Percentages of total grid generation by low cost/must run power plants (on the basis of average of five most recent years) = 19.64%

Thus the simple OM method can be used to calculate the operating margin emission factor, as low cost/must run resources constitute less than 50% of total grid generation.

Applying the "Tool to calculate the emission factor for an electricity system", the project participant choose an ***ex ante*** option for calculation of the operating margin emission factor ($EF_{grid,OM,y}$) with a 3-year generation-weighted average, based on the most recent data available at the time of submission of the PDD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period.

STEP 4: Calculate the operating margin emission factor according to Simple OM

The Operating Margin is calculated considering of the generation based weighted average of Operating Margin date for the NEWNE Grid as published by CEA during the years 2006-2007, 2007-2008 and 2008-2009. The average value for the NEWNE Grid is 1.00490 tCO2/MWh. (Source: Central Electricity Authority (CEA) Baseline Carbon Dioxide Emission database version 5.0 dated November 2009. (www.cea.nic.in))

The option B as mentioned in "Tool to calculate the emission factor for an electricity system" Version 01.1 which is "Based on data on net electricity generation, the average efficiency of each power unit and the fuel type(s) used in each power unit" is considered by Central Electricity Authority in the calculation of the Operating Margin as published in the Central Electricity Authority (CEA) Baseline Carbon Dioxide Emission database version 5.0 dated 5th November 2009.

The same option has been revised to Option A in the "Tool to calculate the emission factor for an electricity system" Version 02. Hence the calculation of the operating margin will remain the same for the "Tool to calculate the emission factor for an electricity system" Version 01.1 and Version 02.

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

The sample group of power units m used to calculate the build margin consists of either:

(a) The set of five power units that have been built most recently,

or

(b) The set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

The option (b) has been chosen for the BM calculation.

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 option (1) ex-ante calculation option has been chosen. The Build Margin Emission factor has been calculated and established by CEA.

STEP 6: Calculate the build margin emission factor

Appling "Tool to calculate the emission factor for an electricity system", the build margin emission factor ($\mathbf{EF_{grid,BM,y}}$) for the year 2008-09 (most recent year) for NEWNE grid, applicable for the project is **0.6751** tCO_2e/MWh from the CEA database (Version 5.0). The data for the build margin and the operating margin is taken from the Central Electricity Authority Baseline Carbon Dioxide Emission database version 5.0 dated November 2009. The data for the build margin is calculated by Central Electricity Authority using the formula 12 as mentioned in the "Tool to calculate the emission factor for an electricity system" Version 01.1, which is same as the formula 13 as mentioned in "Tool to calculate the emission factor for an electricity system" Version 02, and the same is published in the Central Electricity Authority Baseline Carbon Dioxide Emission database version 5.0 dated 5th November 2009. The same is considered for project activity and is fixed ex-ante for the entire crediting period.

STEP 7: Calculate the combined margin emissions factor

The combined margin emission factor ($EF_{grid,CM,y}$) or baseline emission factor ($EF_{CO2,grid,y}$) is calculated as follows:

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

Where:

$EF_{grid,BM,y}$	Build margin CO_2e emission factor in year y (tCO_2e/MWh)
$EF_{grid,OM,y}$	Operating margin CO_2e emission factor in year y (tCO_2e/MWh)
W_{OM}	Weighting of operating margin emissions factor (%)
W_{BM}	Weighting of build margin emissions factor (%)

(where $W_{OM} + W_{BM} = 1$)

The "Tool to calculate the emission factor for an electricity system" requires that for intermittent sources for power generation like hydro as in the case of proposed CDM project activity the following weights to be used for calculating the emission factor for Combined Margin.

$W_{OM} = 0.5$
$W_{BM} = 0.5$

Using the values of emission factors for OM and BM for NEWNE grid, provided in the official database and as computed above; and the weights provided above, the value of the emission factor for the combined margin has been determined to be:

$= 1.0049 * 0.5 + 0.6751 * 0.5\ tCO_2e/MWh$
$=$ **0.8400** tCO_2e/MWh

Leakage
In accordance with methodology AMS I.D, leakage is to be considered only if the energy generating equipment is transferred from another activity.
This is not applicable here so $L_y = 0$

Project Emissions

As per AMS ID, Version 17, "For most renewable energy project activities, *PEy* = 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"

As the project activity is run of the river hydro power plant without a reservoir, hence the project emissions from the categories mentioned in the approved methodology AMS ID Version 17 need not be considered.

However the project activity uses DG sets, hence the emissions from the DG set are considered as follows:

Parameter	Description	Value	Source
$PE_{FC,j,y} = \sum_i FC_{i,j,y} \times COEF_{i,y}$ $COEF_{i,y} = NCV_{i,y} \times EF_{CO2,i,y}$			"Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" Version 02 $COEF_{i,y}$ is calculate based on net calorific value and CO_2 emission factor of the fuel type i, in accordance with the option B as specified in the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" Version 02
$PE_{FC,j,y}$	the CO_2 emissions from fossil fuel combustion in process *j* during the year *y* (tCO_2e / yr);		Calculated
$FC_{i,j,y}$	Quantity of fuel type i (HSD) combusted in process j during the year y (Litre)	0	Diesel will be consumed in the DG sets that have been installed to provide the start-up for the Project Plant in case of shut down. In such circumstances the quantity of diesel consumed will be monitored and will be used to calculate the project emissions. However for ex-ante calculation this value is assumed to be 0 litres.
$COEF_{i,y}$	CO_2 emission coefficient of	0.0031233	Calculated from $NCV_{i,y}$

	fuel type i (HSD) in year y (tCO_2e / kg)		and $EF_{CO2,i,y}$ = 9975 kcal/kg × 4.186 × 10^(-9) (For Conversion from kcal to TJ) × 74.8 tCO2e/TJ
$NCV_{i,y}$	$NCV_{i,y}$ is the weighted average net calorific value of the fuel type i (HSD) in year y (kcal/kg)	9975	CENTRAL ELECTRICITY AUTHORITY: CO2 BASELINE DATABASE, Version 5.0
D_{HSD}	Density of HSD (kg/l)	0.83	CENTRAL ELECTRICITY AUTHORITY: CO2 BASELINE DATABASE, Version 5.0
$EF_{CO2,i,y}$	weighted average CO2 emission factor of fuel type i (HSD) in year *y* (tCO_2e/TJ)	74.8	IPCC Default Value

Hence Project Emissions = $PE_{FC,j,y}$

Emissions Reductions (ER_y) = Baseline Emissions ($BE_{y,}$) – Project Emissions ($PE_{FC,j,,y}$) – Leakage (L_y)

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

Data / Parameter:	$EF_{grid,OM\ ,\ y}$
Data unit:	tCO_{2e}/MWh
Description:	The Operating Margin emission factor of NEWNE Grid
Source of data used:	Central Electricity Authority (CEA) Baseline Carbon Dioxide Emission database version 5.0 dated November 2009
Value applied:	1.0049
Justification of the choice of data or description of measurement methods and procedures actually applied :	The value used is calculated ex-ante as average of the last three years of the Operating margin provided by Central Electricity Authority (CEA) Baseline Carbon Dioxide Emission database version 5.0 dated November 2009
Any comment:	

Data / Parameter:	$EF_{grid,BM\ ,\ y}$
Data unit:	tCO_{2e}/MWh
Description:	The Build Margin emission factor of NEWNE grid
Source of data used:	Central Electricity Authority (CEA) Baseline Carbon Dioxide Emission database 5.0 dated November 2009

Value applied:	0.6751
Justification of the choice of data or description of measurement methods and procedures actually applied :	The value used is calculated ex-ante as recent most Build margin provided by Central Electricity Authority (CEA) Baseline Carbon Dioxide Emission database version 5.0 dated November 2009
Any comment:	

Data / Parameter:	$\mathbf{EF_{CO2,grid,y}}$ = $EF_{grid,CM,y}$
Data unit:	tCO_2e/MWh
Description:	The grid CO_2 emission factor in year *y*
Source of data used:	Calculated
Value applied:	0.8400
Justification of the choice of data or description of measurement methods and procedures actually applied :	The value has been calculated as 0.5* $EF_{grid,OM\ ,\ y}$ + 0.5* $EF_{grid,BM\ ,\ y}$
Any comment:	Used for emission reduction calculation. The same is fixed ex-ante for the entire crediting period

Data / Parameter:	D_{HSD}
Data unit:	kg/lt
Description:	Density of HSD
Source of data used:	Central Electricity Authority (CEA) CO2 database version 5 dated November 2009. (www.cea.nic.in)
Value applied:	0.83
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data is considered from the available authentic national data source due to absence of the authentic measurement procedures by PP. This is fixed ex-ante for the entire crediting period.
Any comment:	

Data / Parameter:	$EF_{CO2,i,y}$
Data unit:	$kgCO_2e/TJ$ or tCO_2e/TJ
Description:	Emission Factor of HSD
Source of data used:	IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories
Value applied:	74800 or 74.8
Justification of the	Table 1.4, Chapter 1, Volume 2, 2006 IPCC Guidelines for National

choice of data or description of measurement methods and procedures actually applied :	Greenhouse Gas Inventories
Any comment:	IPCC Default Value and the same will be updated as per the latest IPCC default value

B.6.3 Ex-ante calculation of emission reductions:

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As per AMS I D version 17 paragraph 11:

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

Parameter	Description	Value	Source
$BE_y = EG_{BL,y} * EF_{CO_2,grid,y}$			
BE_y	Baseline Emissions in year y; t CO_2		Calculated
$EG_{BL,y}$	Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)	23445	Calculated based on the Gross Generation – Auxiliary Consumption – Transmission Losses – Transmission Losses as indicated below.
$EF_{CO2,grid,y} = EF_{grid,CM,y}$	CO_2 Emission Factor of grid in year y; t CO_2e/MWh	0.8400	Calculated

Description	Value	Source
Gross Electricity Generation (MWh)	24810	Section 1.3.9, Page Number 9 of Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Transmission Losses (4.5%), Transformation Loss (0.5%) & Auxiliary Power Consumption (0.5%)	5.50%	Section 1.3.9, Page Number 9 of Detailed Project Report Prepared by Sai Engineering Foundation, February 2007
Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y ($EG_{BL,y}$) after consideration of the Transmission Losses (4.5%) Transformation loss (0.5%) and Auxiliary Power (0.5%) (GWh)	23445	Section 1.3.9, Page Number 9 of Detailed Project Report Prepared by Sai Engineering Foundation, February 2007

BE_y = 23445 (MWh) * 0.8400 (tCO_2e/MWh) = 19693 tCO_2e

Leakage
In accordance with methodology AMS I.D, leakage is to be considered only if the energy generating equipment is transferred from another activity.
This is not applicable here so $L_y = 0$

Project Emissions

Carbon dioxide emissions from on-site consumption of fossil fuels ($PE_{FC,j,y}$)

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

$$COEF_{i,y} = NCV_{i,y} \times EF_{CO2,i,y}$$

$PE_{FCj,y} = 0$ (l) * 0.83 (kg/l) * 0.0031233 (tCO_2e/kg) = 0 tCO_2e

Emissions Reductions = Baseline Emissions (BE_y) – Project Emissions ($PE_{FC,j,y}$) – Leakage (L_y)
Hence,

ER_y = 19693 tCO_2 e – 0 tCO_2e = 19693 tCO_2e

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

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Years	Estimation of Project Activity Emissions (tCO_2e)	Estimation of baseline emissions (tCO_2e)	Estimation of leakage (tCO_2e)	Estimation of baseline emission (tCO_2 e)
2013	0	19693	0	19693
2014	0	19693	0	19693
2015	0	19693	0	19693
2016	0	19693	0	19693
2017	0	19693	0	19693
2018	0	19693	0	19693
2019	0	19693	0	19693
2020	0	19693	0	19693
2021	0	19693	0	19693
2022	0	19693		19693
Total	0	196930	0	196930

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

B.7.1 Data and parameters monitored:

Data / Parameter:	EG_{Bly}
Data unit:	MWh
Description:	Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)
Source of data to be used:	Joint Meter Readings and Annexure "A" Calculation of net saleable Energy Based in IPP's Meter reading
Value of data	23445
Description of measurement methods and procedures to be applied:	There is a main meter and a check meter of accuracy class 0.2s at the project plant site. These meters are also referred as plant meters and are bi- directional electrical meters. The electricity exported as well as electricity imported by the project activity is recorded on a monthly basis at the plant site by representatives of PP and HPSEB authorities. This recorded sheet is signed by the representatives of the PP and is called Joint Meter Readings or JMR. The Annexure "A" Calculation of net saleable Energy Based in IPP's Meter reading to the JMR also contains the transmission losses which are calculated by the representative of HPSEB as detailed in the section B.7.2. The difference between the electricity exported and the electricity imported and the transmission losses gives the "Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity" The transmission losses are indicated in the Annexure "A" Calculation of net saleable Energy Based in IPP's Meter reading provided to the PP by HPSEB. Measurement equipment : Energy meters Calibration frequency : Once in 6 months for Energy meters Accuracy of the meters : 0.2s Measurement interval : Continuous measurement, monthly recording
QA/QC procedures to be applied:	Meters will be calibrated prior to synchronization of the project and then recalibrated every 6 months. The calibration certificates of the meters will be stored. The data on net electricity exported to the grid can be cross-checked with the invoices raised by the PP to HPSEB, Further, for the billing purpose, readings from the main meter will be considered. However, readings from check meter will be considered only when the main meter is not functioning or error is beyond accuracy limit. Further, all the readings will be taken jointly by HPSEB official and the PP.
Any comment:	The data will be archived physical and electronically for a minimum of two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later

Data / Parameter:	$FC_{i,j,y}$
Data unit:	Litre
Description:	Quantity of HSD consumed in DG Set in the project activity during the year *y*
Source of data to be used:	Power Plant Log Book

Value of data	0 (for ex-ante)
Description of measurement methods and procedures to be applied:	The measurement is done by dip stick after each time usage. The DG set will have a separate fuel tank. The level indicators give the consumption of HSD in lts. After each usage (frequency) the tank is again filled to maximum level.
QA/QC procedures to be applied:	The Dip stick will be calibrated once every year.
Any comment:	The data will be archived physical and electronically for a minimum of two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later

Data / Parameter:	$NCV_{i,y}$
Data unit:	kcal/kg
Description:	Net calorific value of HSD
Source of data to be used:	Central Electricity Authority (CEA) CO2 database version 5 dated November 2009. (www.cea.nic.in)
Value of data	9975
Description of measurement methods and procedures to be applied:	The calorific value as mentioned in the Central Electricity Authority (CEA) CO2 database version 5 dated November 2009. (www.cea.nic.in) is 10,500 kcal/kg and considering the Delta GCV NCV as 5% as mentioned in CEA CO_2 Baseline Data base Version 5 the NCV comes out to be 9975 kcal/kg. The data is considered from the available authentic national data source due to absence of the authentic measurement procedures by PP. The appropriateness of the values will be checked annually by comparing the same with the latest version of the Central Electricity Authority (CEA) Baseline Carbon Dioxide Emission database published by the host party (India).
QA/QC procedures to be applied:	The QA/QC procedures are not under the control of the PP as the data is considered from the available authentic national data source. Further, the latest value as published in the latest version of the Central Electricity Authority (CEA) Baseline Carbon Dioxide Emission database published by the host party (India) available at the time of verification will be used.
Any comment:	Applicable as option B as specified in the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" Version 02 is used to calculate the project emissions

B.7.2 Description of the monitoring plan:

>>

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.

The Billing of the project is based on the Energy Meter Reading taken at the Jarangala Sub-station of HPSEB Limited. One Set of Main and Check Meters are provided for each of the Circuits. The accuracy

Class of the Meters and the associated equipments is 0.2s Class as per the CEA Metering regulations of 2006.

At the Common Pooling Station, one main and one check meter is provided in the incoming feeder from each of the Project. The accuracy class of Meters and the associated equipments is 0.2s Class.

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 is developed in accordance with the modalities and procedures for small-scale CDM project activities and is proposed for grid-connected bundled 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.

The common transmission line has been constructed by 3 project developers, the project proponent being one of the developers. From the power house of each project the power will be drawn to the common pooling station by separate transmission lines. At the common transmission line separate check meters (before pooling point) are installed to measure the quantum of power being injected by each project. From the common pooling station the power will be evacuated through common transmission line to Jarangala sub station where HPSEB meters are installed.

The transmission losses from common pooling station to Jarangala sub station will be borne by the 3 project developers in proportion to the energy injected into the common transmission line by each project. In this regard a separate agreement is being entered into by the 3 project developers. The transmission losses will be quantified as follows:

Transmission Losses = (Power sent out by single project to the Pooling Station) / (Sum of the Power sent out by all projects) * (Sum of the power sent out by all projects - Power Received at Jarangal Sub Station)

The Billing of the project is based on the Energy Meter Reading taken at the Jarangala Sub-station of HPSEB Limited. One Set of Main and Check Meters are provided for each of the Circuits. The accuracy Class of the Meters and the associated equipments is 0.2s Class as per the CEA Metering regulations of 2006.

HPERC has accepted the PP's above said proposal and has given the approval for the same.

At the Common Pooling Station, one main and one check meter is provided in the incoming feeder from each of the Project. The accuracy class of Meters and the associated equipments is 0.2s Class.

The monitoring plan includes monitoring of energy parameters such as energy export to the HPSEB grid system, and energy import to the project activity from grid. The transmission losses are calculated by HPSEB based on the formula presented above and the same is included in the Joint Meter Reading Report.
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.
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.

The calibration of the Main/ Check Meters and the associated metering system shall be checked once in every 6 months as per the relevant clauses of the PPA.

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 called as Joint Meter Reading Sheet 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 this baseline section *(DD/MM/YYYY)*: 17/12/2011
Name of the responsible entity:
Core CarbonX Solutions Pvt Limited.
6-3-903/A/4/1,Vani Nilayam
Suryanagar Colony
Somajiguda, Rajbhavan Road,
Hyderabad –500482, Andhra Pradesh, India,
Landline: 040-23410367, +91-9908387772, +91-9963047666
Email:info@corecarbonx.com
Core CarbonX Solutions Private Limited is not a project participant.

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:

>>
Start of the project: 23/02/2009[12]

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

>>
30 years and 0 months[13]

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

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

C.2.1. Renewable crediting period

Not Chosen

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

>>

C.2.1.2. Length of the first crediting period:

>>

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>

[12] As per the Agreement for the Supply for the Hydro Mechanical Items

[13] As per manufactures certificate on the lifetime of the equipment

01/01/2013 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

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:

>>
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

>>

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

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

The local stakeholder consultation meeting for the project activity was arranged for the local stakehodlers to discuss on the CDM initiatives taken up on 16th December 2009, 10:00 A.M at Radi Village, near Dunali, Chamba district, Himachal Pradesh. The local stakeholders were identified as the Local Villagers, the Government officials and the employees and the shareholders of the PP.

Accordingly the stakeholders were duly informed by Newspaper advertisement on 15th December 2009 by advertising in the English Daily, Tribune and on 14th December 2009 in the Hindi Daily, Amar Ujjala.

Comments of stakeholders were recorded during the stakeholder meeting.

The stake holder meeting process is followed in the following sequence

- Welcome Speech by the Organizer
- Brief Introduction of the Project activity and its benefits
- Introduction of Climate Change and Clean Development Mechanism.
- Interactive Session stakeholder
- Vote of Thanks

Mr. A G Mohan Kumar, Project Head of the hydro power projects has briefed to the invitees about the project activity and about the agenda of the meeting, introduced the Global Warming and Climate Change. He also explained the role of Kyoto Protocol, Clean Development Mechanism and CDM in mitigating the impacts of climate change.

After the brief introduction of climate change, Kyoto Protocol and CDM, **Mr. A G Mohan Kumar, Project Head** explained the purpose of the stakeholder consultation meeting as to seek the concern, opinion and suggestion of the stakeholders.

Mr. Jagadeesh Kumar, Authorized Representative briefed about the project activity and how the identified project fulfill the requirements of CDM. He explained how the project activity would reduce the emission of GHGs and contribute to the Global impetus.

Mr. Shiv Kailash, local villager briefed to the attendees about the project activity and also explained about the various developments that will take place in the Village.

Subsequently **Mr. A G Mohan Kumar, Project Head** invited the stakeholders to ask for their queries and suggestions.
The meeting was ended up with vote of thanks by Mr. A G Mohan Kumar

E.2. Summary of the comments received:

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

1. What are GHG gases?
Ans. Greenhouse gases are gases in an atmosphere that absorb the reflected solar radiation from earth and then emit radiation back to the earth. This increases the average temperature of earth over a period of time. Green house gas (GHG) gases are C02, methane, nitrous oxide, perfluoro carbon, sulphur hexafluoride and hydro fluorocarbon.

2. What is global warming or climate change?
Ans. Global warming or Climate change reflects abnormal variations to the expected climate within the Earth's atmosphere.

3. What is the reason behind climate change?

Ans. Accumulation of greenhouse gases emitted by human activities like industries, transportation, power plants etc is the major reason behind climate change.

4. What are the indicators of climate change?

- increasing average global temperature
- rising sea levels
- reduced snow or ice coverage
- increased precipitation or storm activity

5. What is renewable energy and non-renewable energy
Ans. Renewable energy is energy generated from natural resources-such as sunlight, biomass, wind, rain, tides and geothermal heat-which are renewable (naturally replenished). Solar is a renewable energy source. Coal can't be naturally replenished hence it non-renewable source of energy.

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

>>
The stakeholders were provided clarifications on the issues raised as above to their satisfaction. None of the concerns expressed by the stakeholders required an action to be taken by the PP during the project operation and at any other stage.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	M/s Raajratna Energy Holdings Pvt Ltd
Street/P.O.Box:	Plot No. 84, Kavuri Hills Phase II
Building:	
City:	Hyderabad
State/Region:	Andhra Pradesh
Postfix/ZIP:	500033
Country:	India
Telephone:	+91-40-23559922
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E-Mail:	
URL:	
Represented by:	
Title:	Chief Financial Officer
Salutation:	Mr.
Last Name:	Adhikari
Middle Name:	Rao
First Name:	Mohan
Department:	Finance
Mobile:	+91 9000266643
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Direct tel:	+91-40-23559930
Personal E-Mail:	mohanarao.a@rehpl.co.in

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding, either national or international, is used for the project financing. The project activity is solely funded by private equity and loan from REC.

Annex 3

BASELINE INFORMATION

Variable	Data Source
$EG_{BL,y}$ – Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year *y* (MWh)	Records maintained by project proponent
Parameter	**Data Source**
$EF_{grid,OM,y}$ - Operating Margin Emission Factor (tCO_2 /MWh)	Central Electricity Authority (CEA) CO2 database version 5 dated November 2009. (www.cea.nic.in)
$EF_{grid,BM,y}$- Build Margin Emission Factor (tCO_2 /MWh)	Central Electricity Authority (CEA) CO2 database version 5 dated November 2009. (www.cea.nic.in)
$EF_{CO2,grid,y}$ – CO_2 Emission Factor for grid in year y	Calculated as the weighted average of the operating margin and build margin

	2006-07	**2007-08**	**2008-09**
NEWNE Grid Net Generation in OM (GWh)	3,79,471	4,01,642	4,21,803
Net electricity import (GWh)	5,126	8,193	0
Net generation incl imports (GWh)	3,84,597	4,09,834	4,21,803
Electricity import from other countries (GWh)	0	0	0
NEWNE Grid OM (tCO2/MWh)	1.01	1.00	1.01
Weighted Generation Operating Margin	1.00490		
Build Margin	0.67518		
wOM	0.5		
wBM	0.5		
Combined Margin	0.84000		

Annex 4

MONITORING INFORMATION

Please Refer Section B7.2

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