**Title of Project:** 7 MW Bundled Hydro power project at Himachal Pradesh of Raajratna Energy Holdings Pvt. Ltd

**Brief description of Project:** The project activity is a 5 MW hydro power project, 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. The purpose of the project activity is to generate clean electricity with utilization of hydro energy.

**Expected Implementation Date:** NA
**Expected duration of Project:** 25 years

**Project Developer:** M/s Raajratna Energy Holdings Pvt Ltd

**Project Representative:** Infinite Solutions

**Project Participants and any communities involved:** M/s Raajratna Energy Holdings Pvt Ltd

**Version of PDD:** 02

**Date of Version:** 09/04/2020

**Host Country / Location:** India

**Certification Pathway (Project Certification/Impact Statements & Products**
**Activity Requirements applied:** Impact statements & products

**Methodologies applied:** Renewable Energy activity requirement

**Product Requirements applied:** AMS-ID. Grid connected renewable electricity generation - Version 18.0

**Regular/Retroactive:** Retroactive

**SDG Impacts:**
1. SDG 7 Affordable and Clean Energy
2. SDG 8 Decent Work and Economic Growth
3. SDG 13 Climate Action

**Estimated amount of SDG Impact Certified**
1. SDG 7- 23,445 MWh/year
2. SDG 8 -
   - Number [employees]: 10 persons
   - Number [Trainings]: Minimum 1 training.
   - The income to all the unskilled workers are made on day to day basis in line with minimum wage requirements.
3. SDG 13- 19,693 tCO2e per annum
SECTION A. Description of project

A.1. Purpose and general description of project

The main purpose of the project activity is to generate electrical energy through sustainable means using hydel power resources, the generated green electricity will contribute to climate change mitigation efforts. This project activity is a small scale hydro project. Raajratna Energy Holdings Pvt Ltd is the project investors for this project activity. The project will replace anthropogenic emissions of greenhouse gases (GHG’s) estimated to be approximately 19,693 tCO2e per annum, thereon displacing 23,445 MWh/year amount of electricity from the generation-mix of power plants connected to the Indian electricity grid, which is mainly dominated by thermal/ fossil fuel based power plant.

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 the Grid.

The project is CDM registered on date 24/12/2012. At the time of webhosting the CDM 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 hydropower 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 Project 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.

The project activity is the installation of a new grid-connected renewable power plant/unit and this is not a CPA that has been excluded from a registered CDM PoA as a result of erroneous inclusion of CPAs.

The details of the project are mentioned in the table:

<table>
<thead>
<tr>
<th>Project Investors’ Name</th>
<th>Capacity in MW</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>M/s Raajratna Energy Holdings Pvt Ltd</td>
<td>5 MW</td>
<td>Himachal Pradesh</td>
</tr>
</tbody>
</table>

Scenario existing prior to the implementation of the project activity

As the project activity is the installation of a new grid-connected renewable power plant/unit. The scenario existing prior to the implementation of project activity is Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system” (Version 7.0, EB 100 annex 4).
Baseline Scenario
Baseline scenario and Scenario existing prior to the implementation of the project activity are both same.

Sustainable Development
The National CDM Authority (NCDMA), which is the Designated National Authority (DNA) for the Government of India (GoI) under the Ministry of Environment, Forest and Climate Change (MoEFCC), has mentioned four indicators for the sustainable development in the interim approval guidelines for Clean Development Mechanism (CDM) projects from India. The project’s contribution towards sustainable development has been addressed based on the following sustainable development aspects, in line with the requirements of the NCDMA:

- **Social well being**
  The project activity will provide job opportunity to local people during erection, commissioning and maintenance of the Hydro power project. Frequency of visiting to villages and nearby areas by skilled, technical and industrialist has increased due to installation/site visit/operation and maintenance work related to the project at plant site. This directly and indirectly positively effects the economy of nearby populace.

- **Environmental well being**
  Hydro power is one of the cleanest renewable energy powers and does not involve any fossil fuel. There are no GHG emissions. The impact on land, water, air and soil is negligible. Thus the project activity contributes to environmental well-being without causing any negative impact on the surrounding environment.

- **Economic well being**
  The project activity generates permanent and temporary employment opportunity within the vicinity of the project. The electricity supply in the nearby area improves which directly and indirectly improves the economy and life style of the area.

- **Technological well being**
  The project activity is step forward in harnessing the untapped hydel potential and further diffusion of the hydel technology in the region. The project activity leads to the promotion and demonstrates the success of solar projects in the region which further motivate more investors to invest in solar power projects. Hence, the project activity leads to technological well-being.

A.2. Eligibility of the project under Gold Standard
The project activity meets the eligibility criteria as per section 3.1.1 of GS4GG Principles & Requirements document as described below.

- The project applies methodology AMS I.D version 18 EB 81, which is an approved methodology under Gold Standard.
- The project type is Hydro which is an eligible project type as it is in accordance with 1.1.1 a) and 1.1.1 b) of the Eligible Project Types & Scope under Renewable Energy Activity Requirements.
- The project activity results in displacement of electricity from thermal power stations while contributing to sustainable development of India. Hence, the project contributes to the Gold Standard Vision and Mission.
- Hydro projects are an approved project type and do not require further approval from Gold Standard.
- This project activity is not associated with geo-engineering or energy generated from fossil fuel or nuclear, fossil fuel switch, nor does it enhances or prolongs such energy generation.

General Eligibility Criteria under Renewable Energy Activity Requirements
- **Project Type**: As discussed above, the project type is eligible.
- **Project Location**: The project is located in India.
- **Project scale**: The project activity is a 5 MW Hydro project and thus qualifies under small scale projects.
Additional Eligibility Criteria for Hydropower project activities

I. The project activity is not located in High Conservation Value (HCV) area. This was ascertained after detailed consultations with the local authorities. Moreover, international sources of information such as the World Database on protected planets (IUCN, UNEP), the Ramsar list of wetlands, and the United Nations list of protected areas were referred to confirm that the project is not located in High Conservation Value (HCV) area.

II. The project has conducted an Environmental Examination Report which was submitted to the Central Environmental Authority, India.

III. Training for the hydropower plant staff shall be planned and conducted in line with the monitoring plan.

IV. The project activity is a 5 MWel which is below the 20 MWel threshold.

V. A Stakeholder Consultation Report, in accordance with the relevant guidelines for a Stakeholder Consultation, shall be conducted during the SFR activity. The project is a CDM registered project and a Stakeholder consultation in line with CDM was already carried out and details can be referred in the registered CDM PDD.

VI. Since the project activity is a run-of-the-river project of less than 20 MW, thus WCD assessment is not required.

In line with Annex A of the Activity Requirements for Renewable Energy Projects, the impact of the project on the six critical issues identified for hydro power projects are described as follows;

- Competing uses of water resources: Since the project is run of the river thus the flow of water in the river remains the same. Further, no domestic users in between the weir and tailrace of the powerhouse. Also there are no proposed or existing water supply or irrigation schemes which depend on the stream between the two sites. Since any usage of water between the weir and tailrace is observed it can be concluded that there is no impact due to the project on competing use of water resources.

- Minimum ecological flow: The project follows the local norms for minimum ecological flow of 15% of flow in the river. The flow is monitored online in line with local norms and can be checked at http://hppcb-livedata.com/belij/.

- Impact on groundwater levels: Since the project is run of the river thus the overall flow of water in the river remains the same. Ground water is not extracted due to the project, also there is no release of any pollutants in the ground water due to the project. Thus it can be stated that there is no impact of the project on ground water levels.

- Sediment Management Plan: The project is a run of river thus there is no dam for the project thus there would not be any change in the river flow downstream of the tailrace of the project. Thereby it would not have any impact on the downstream erosion. Further, the weir for the project would be able to reduce the peak water flow velocity in the rainy season, which will reduce the downstream erosion.

- Effectiveness of fish passages: The project is required to maintain 15% of the flow as minimum discharge in the river. An online monitoring system has been installed and can be checked online at http://hppcb-livedata.com/belij/. The minimum flow in the river allows survival as well as passage route for fishes.

- Mitigation measures for soil erosion: The project is run of river project without any dam thus there would not be any change in the river flow downstream of the tailrace of the project. Further, the project has planted various plants and trees in the area to curb soil erosion. Further, the weir for the project would be able to reduce the peak water flow velocity in the rainy season, which will reduce the downstream erosion.

A.3. Legal ownership of products generated by the project and legal rights to alter use of resources required to service the project

The project participant Raajratna Energy Holdings Pvt Ltd is the legal owners of the project and have the legal rights for the credits that shall be generated by this project activity. The commissioning certificates and the PPA is in the name of the project participant.
A.4. Location of project

A.4.1. Host Country
India

A.4.2. Region/State/Province etc.
Himachal Pradesh

A.4.3. City/Town/Community etc.
Hibra Village in the Chamba District.

A.4.4. Physical/Geographical location

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.

<table>
<thead>
<tr>
<th>S. No</th>
<th>Particulars</th>
<th>Geographical Coordinates of Power House</th>
<th>Geographical Coordinates of Wier</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Longitude</td>
<td>76°32’22.7” East</td>
<td>76° 34’ 75.5” East</td>
</tr>
<tr>
<td>2</td>
<td>Latitude</td>
<td>32°47’90” North</td>
<td>32° 49’ 25.3” North</td>
</tr>
</tbody>
</table>

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

A.5. Technologies and/or measures

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.

<table>
<thead>
<tr>
<th>S. No</th>
<th>Particulars</th>
<th>Belij</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hydrology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a Stream</td>
<td>Belij</td>
</tr>
<tr>
<td></td>
<td>b Tributary</td>
<td>Ravi River</td>
</tr>
<tr>
<td></td>
<td>c Design discharge</td>
<td>3.325 cumecs (m³/sec)</td>
</tr>
<tr>
<td>2</td>
<td>Penstock</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a Type</td>
<td>Circular, surface, steel</td>
</tr>
<tr>
<td></td>
<td>b Length</td>
<td>360 m</td>
</tr>
<tr>
<td>3</td>
<td>Power house</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Type</td>
<td>Surface</td>
</tr>
<tr>
<td>B</td>
<td>Installed capacity</td>
<td>2 x 2.5 MW = 5 MW</td>
</tr>
<tr>
<td>C</td>
<td>Gross head</td>
<td>225.087 m</td>
</tr>
<tr>
<td>D</td>
<td>Net head</td>
<td>221.25 m</td>
</tr>
<tr>
<td>E</td>
<td>Generating unit</td>
<td>Pelton turbine</td>
</tr>
<tr>
<td>F</td>
<td>Gross Energy Generated</td>
<td>24.81 GWh</td>
</tr>
<tr>
<td>G</td>
<td>Transmission Losses (4.5%), Transformation Loss (0.5%) &amp; Auxiliary Power Consumption (0.5%)</td>
<td>1.36 GWh</td>
</tr>
<tr>
<td>H</td>
<td>Electricity Supplied to the Grid after consideration of the Transmission Losses (4.5%) Transformation loss (0.5%) and Auxiliary Power (0.5%) (GWh)</td>
<td>23.445 GWh</td>
</tr>
</tbody>
</table>

**Technical Characteristics of Turbine**

<table>
<thead>
<tr>
<th></th>
<th>221.50m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Net Head</td>
<td>221.50m</td>
</tr>
<tr>
<td>Design Flow</td>
<td>3.20m³/s</td>
</tr>
<tr>
<td>Rated Power</td>
<td>2.500MW @ 1.33Cumecs</td>
</tr>
<tr>
<td></td>
<td>2.500MW + 20% COL @ 1.61Cumecs</td>
</tr>
<tr>
<td>Runner Bucket PCD</td>
<td>1200mm</td>
</tr>
<tr>
<td>Rated Speed</td>
<td>500 RPM</td>
</tr>
<tr>
<td>Runaway Speed</td>
<td>871.1 RPM</td>
</tr>
</tbody>
</table>

**Technical Characteristics of Generator**

<table>
<thead>
<tr>
<th></th>
<th>2.500 MW + 20% COL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>2.500 MW + 20% COL</td>
</tr>
<tr>
<td>Voltage Output</td>
<td>6600V</td>
</tr>
<tr>
<td>Rated Speed</td>
<td>500 RPM</td>
</tr>
<tr>
<td>Frequency</td>
<td>50Hz</td>
</tr>
<tr>
<td>Power Factor</td>
<td>0.85 Lag</td>
</tr>
<tr>
<td>Configuration</td>
<td>Horizontal</td>
</tr>
</tbody>
</table>

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 18 EB 81
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.

The project activity is expected to operate at a plant load factor of 21.36% exporting 23,445 MWh of electrical energy to the Regional grid of India, throughout its entire life span of 25 years. This will result in average annual reduction of 19,693 tCO2 per annum from the project activity. The project activity does not involve any technology transfer.

Baseline Scenario
As the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following as per applied methodology: “Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”.

Hence, pre-project scenario and baseline scenario are the same.

Purpose of the Project
The purpose of the project activity is to generate electrical power using Hydel energy, thereby displacing non-renewable fossil resources resulting to sustainable, economic and environmental development. In the absence of the project activity equivalent amount of power generation would have taken place through fossil fuel dominated power generating stations. Thus the renewable energy generation from project activity will result in reduction of the greenhouse gas emissions.

Positive contribution of the project to the following Sustainable Development Goals:

1. **SDG13: Climate Action**: The project would lead to reduction of approx. 19,693 tCO2 per annum due to implementation of project activity.

2. **SDG 7: Affordable and Clean Energy**: The project is expected to generate 23,445 MWh of clean energy per annum

3. **SDG 8: Decent Work and Economic Growth**: The project is expected to provide direct employment to around 10 persons. The project leads to Trainings & workshops which are conducted for the O&M staff of the PP.

A.6. Scale of the project
Renewable energy project activities with a maximum output capacity of 15 megawatts (or an appropriate equivalent) are small scale project activity and project activities of more than 15 MW are considered as large-scale CDM project activity.

As the project activity is of 5 MW capacity, hence clearly it is Small Scale project.

A.7. Funding sources of project
Private funding and funding from bank. The PP hereby confirms that there is no public funding from Annex 1 countries and no diversion of Official Development Assistance (ODA) involved in the project activity.
A.8. Assessment that project complies with ‘gender sensitive’ requirements

**Question 1:** Does the project reflect the key issues and requirements of Gender Sensitive design and implementation as outlined in the Gender Policy? Explain how.

**Response:** As per Gold Standard Gender Policy, para 13(i) “Foundational gender-sensitive requirement - This strengthens Gold Standard’s ‘do no harm’ approach and addresses safeguards to prevent or mitigate adverse impacts on women or men and girls and boys. Such action is mandatory for all projects seeking Gold Standard certification and includes compliance with the gender ‘do no harm’ safeguards, gender gap analysis and gender sensitive stakeholder consultations.” The project being a renewable energy project is not gender sensitive project. The project does not adversely impact women or men.

**Question 2:** Does the project align with existing country policies, strategies and best practices? Explain how.

**Response:** India is party to “Convention on the Elimination of All Forms of Discrimination against Women” and the project has aligned its policies which does not discriminate on gender.

**Question 3:** Does the project address the questions raised in the Gold Standard Safeguarding Principles & Requirements document? Explain how.

**Response:** The Project shall complete the following gender assessment questions below:

1. **Is there a possibility that the Project might reduce or put at risk women’s access to or control of resources, entitlements and benefits?** No, the Project being a hydro project does not reduce access to or control of resources for women.

2. **Is there a possibility that the Project can adversely affect men and women in marginalised or vulnerable communities (e.g., potential increased burden on women or social isolation of men)?** No, the Project beneficiaries in terms of employment and social upliftment of the area are common for both the gender.

3. **Is there a possibility that the Project might not take into account gender roles and the abilities of women or men to participate in the decisions/designs of the project’s activities (such as lack of time, child care duties, low literacy or educational levels, or societal discrimination)?** No, the CSR activities that are planned to be carried out by the project proponent shall be discussed with the community, consisting both the genders, before the actual implementation.

4. **Does the Project take into account gender roles and the abilities of women or men to benefit from the Project’s activities (e.g., Does the project criteria ensure that it includes minority groups or landless peoples)?** Yes the project takes into account gender roles and abilities of women/men. Job profile is allocated based on the type of work to be carried out.

5. **Does the Project design contribute to an increase in women’s workload that adds to their care responsibilities or that prevents them from engaging in other activities?** No, on the contrary the project leads to increased availability of electricity in the regional grid thereby uplifting the living standards.

6. **Would the Project potentially reproduce or further deepen discrimination against women based on gender, for instance, regarding their full participation in design and implementation or access to opportunities and benefits?** No, since the project is a renewable electricity generation project, thus it will not have discriminated against women.

7. **Would the Project potentially limit women’s ability to use, develop and protect natural resources, taking into account different roles and priorities of women and men in accessing and managing environmental goods and services?** No, in fact, the project leads to improved electricity in the regional grid thereby leading to less usage of fuel for lighting.

8. **Is there a likelihood that the proposed Project would expose women and girls to further risks or hazards?** No, in fact, due to improved electricity availability the usage of fuel for lighting would be reduced as well as indoor air quality would be improved.

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1 [http://hrlibrary.umn.edu/research/ratification-india.html](http://hrlibrary.umn.edu/research/ratification-india.html)
**Question 4:** Does the project apply the Gold Standard Stakeholder Consultation & Engagement Procedure Requirements? Explain how.

**Response:** Since the project is applying retroactively for GS registration, a Stakeholder Feedback round shall be carried out at a later stage. However, a stakeholder consultation was conducted in line with CDM requirements at the site location. The project representative explained how such power projects help in providing clean energy and thereby help in mitigating impacts due to Global Warming and the impacts of Hydro power projects which lead to providing clean energy, increase in employment opportunities both long term and short term, increased income and thereby leading to improvement in living standard of the people. The stakeholders shared full support for the Hydro power project operations.

**SECTION B. Application of selected approved Gold Standard methodology**

**B.1. Reference of approved methodology**

**Title:** Grid connected renewable electricity generation.

**References:** Approved Small Scale Consolidated Methodology: Version 18.0

https://cdm.unfccc.int/filestorage/2/P/7/2P7FS6ZQAR84LG3NKKYUH50W19OD8C/EB81_repan24_AMS-I.D_ver18.pdf

Tools: Tool for the demonstration and assessment of additionality 7.0

http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-001-v7.0.pdf

Tool to calculate the emission factor for an electricity system 7.0

https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-007-v7.0.pdf

**B.2. Applicability of methodology**

As per AMS-I.D (Version 18.0, EB 81 Annex 24), “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;
(b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling”.

The project activity meets the applicability conditions of the approved consolidated baseline and monitoring methodology, Sectoral Scope 1 for Greenfield projects as described below:

<table>
<thead>
<tr>
<th>SL. NO.</th>
<th>Applicability</th>
<th>Compliance of condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>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. (b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.</td>
<td>The project activity is a Renewable Energy Project i.e. Hydro Power Project which falls under applicability criteria option 1(a) i.e., “Supplying electricity to a national or a regional grid”. Hence the project activity meets the given applicability criterion.</td>
</tr>
<tr>
<td>2</td>
<td>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 below:</td>
<td>The 1st option of Table of AMS I.D. Version 18, EB 81, Annex 24 is applicable.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project type</th>
<th>AMS-I.A</th>
<th>AMS-I.D</th>
<th>AMS-I.F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Project supplies electricity to a national/regional grid</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Project</td>
<td>Description</td>
<td>Eligibility</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Project supplies electricity to an identified consumer facility via national/regional grid (through a contractual arrangement such as wheeling)</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Project supplies electricity to a mini grid system where in the baseline all generators use exclusively fuel oil and/or diesel fuel</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Project supplies electricity to household users (included in the project boundary) located in off grid areas</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**3** This methodology is applicable to grid-connected renewable energy power generation project activities that: (a) Install a Greenfield power plant; (b) Involve a capacity addition to (an) existing plant(s); (c) Involve a retrofit of (an) existing operating plants/units; (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s)/unit(s).

The project activity is installation of a new grid connected Hydro power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity (Greenfield plant) and 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: (a) The project activity is implemented in an existing reservoir with no change in the volume of reservoir; (b) 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; (c) 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-the-river small hydro power plant and does not have a reservoir. Hence, this criteria is not applicable to the project activity.

**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 does not have any non-renewable component. The project activity entails power generation through hydro power project of capacity 5 MW which is lower than 15MW. Hence, the project activity complies with the mentioned criterion.

**6** Combined heat and power (co-generation) systems are not eligible under this category.

The project activity is not a co-generation activity. Hence, this condition is not applicable to the given type of project activity.

**7** In the case of project activities that involve the capacity 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.

As the project activity is a Greenfield Project, so this condition is not applicable.
8. In the case of retrofit, rehabilitation or replacement, to qualify as a small-scale project, the total output of the retrofitted, rehabilitated or replacement power plant/unit shall not exceed the limit of 15 MW.

9. In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as “AMS-I.C.: Thermal energy production with or without electricity” shall be explored.

10. In case biomass is sourced from dedicated plantations, the applicability criteria in the tool “Project emissions from cultivation of biomass” shall apply.

As the project activity is a Greenfield Project, so this condition is **not applicable** here.

**Not Applicable**

### B.3. Project boundary

Project boundary has ascertained using AMS I.D (Version 18.0, EB 81, Annex 24) - “The spatial extent of the project boundary includes the project power plant/unit and all power plants/units connected physically to the electricity system that the CDM project power plant is connected to.”

Hence the project boundary includes the Hydro Project activity, sub-station, grid and all power plants connected to grid. The proposed project activity will evacuate power to the Indian grid.

[Diagram of a hydroelectric project]
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 the grid.

**B.4. Establishment and description of baseline scenario**

As per the approved consolidated Methodology AMS-I.D. (Version 18.0, EB 81, Annex 24) “If the project activity is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity, the baseline scenario is electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in “Tool to calculate the emission factor for an electricity system” version 7.0.

The project activity involves setting up of Hydro power plant to harness the power generation from water to produce electricity and supply to the grid. In the absence of the project activity, the equivalent amount of power would have been supplied by the Indian grid, which is fed mainly by fossil fuel fired plants.

The combined margin \( \text{EF}_{\text{grid,CM,y}} \) is the result of a weighted average of two emission factor pertaining to the electricity system: the operating margin (OM) and build margin (BM), in accordance with the Tool to calculate the emission factor for an electricity system – Version 7.0. Calculations for this combined margin must be based on data from an official source (where available) and made publically available. In India, Central Electricity Authority (CEA), Government of India provides this data, and accordingly the same has been used.

The combined margin of the Indian grid used for the project activity is as follows:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Nomenclature</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{EF}_{\text{grid,CM,y}} )</td>
<td>0.8400 tCO2/MWh</td>
<td>Combined margin CO2 emission factor for the project electricity system in year y</td>
<td>In line with approved CDM Emission Factor calculation and Calculated as the weighted average of the operating margin (0.5) &amp; build margin (0.5) values, sourced from Baseline CO2 Emission Database, Version 5 published by Central Electricity Authority (CEA), Government of India.</td>
</tr>
<tr>
<td>( \text{EF}_{\text{grid,OM,y}} )</td>
<td>1.0049 tCO2/MWh</td>
<td>Operating margin CO2 emission factor for the project electricity system in year y</td>
<td>In line with approved CDM Emission Factor calculation and sourced from Baseline CO2 Emission Database, Version 5, published by Central Electricity Authority (CEA), Government of India.</td>
</tr>
<tr>
<td>( \text{EF}_{\text{grid,BM,y}} )</td>
<td>0.6751 tCO2/MWh</td>
<td>Build margin CO2 emission factor for the project electricity system in year y</td>
<td>In line with approved CDM Emission Factor calculation and sourced from Baseline CO2 Emission Database, Version 5, published by Central Electricity Authority (CEA), Government of India.</td>
</tr>
</tbody>
</table>

**B.5. Demonstration of additionality**

The table below is only applicable if the proposed project is deemed additional, as defined by the applied approved methodology or activity requirement or product requirement.

2 [http://cea.nic.in/tpeandce.html](http://cea.nic.in/tpeandce.html)
Specify the methodology or activity requirement or product requirement that establish deemed additionality for the proposed project (including the version number and the specific paragraph, if applicable). | Not Applicable
---|---
Describe how the proposed project meets the criteria for deemed additionality. | Not Applicable

The proposed CDM project generates power using Hydro energy which is a renewable, zero emission source of energy. Baseline considerations for the project are based on approved consolidated baseline methodology AMS-I.D. (Version 18.0, EB 81, Annex 24). Thus the project follows section 5.3.2 of the applied methodology which requires the project proponent to determine the additionality based on “Tool for the demonstration and assessment of additionality”, Version 7.0. However the project is retroactive and is registered under CDM; hence additional. For Additionality, CDM registered PDD can be referred.³

### B.6. Sustainable Development Goals (SDG) outcomes

#### B.6.1. Relevant target for each of the three SDGs

<table>
<thead>
<tr>
<th>Item</th>
<th>Goals and Targets</th>
<th>Indicators</th>
</tr>
</thead>
</table>
| **SDG 7: Affordable and Clean Energy** 7.2: By 2030, increase substantially the share of renewable energy in the global energy mix | **7.2.1:** Renewable energy share in the total final energy consumption  
**Target:** 23,445 MWh per annum |
| **SDG 8: Decent Work and Economic Growth** 8.5: By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value. | **8.5.1:** Average hourly earnings of female and male employees, by occupation, age and persons with disabilities.  
**Target:**  
- Training: 1 nos annually  
- Employment of 10 staff |
| **SDG 13: Climate Action** 13.2: Integrate climate change measures into national policies, strategies and planning | **13.2.1:** Number of countries that have communicated establishment or operationalization of an integrated policy/strategy/plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production (including a national adaptation plan, nationally determined contribution, national communication, biennial update report or other)  
**Target:** 19,693 tCO2 per annum |

³ [https://cdm.unfccc.int/filestorage/L/C/3/LC3VKABH2U8P1YF7OS06JRXDENQ5iZ/PDD_Clean.pdf?i=cfTF8cTN2oXYyfDAvhResTTfm75j4mG4gG2Z](https://cdm.unfccc.int/filestorage/L/C/3/LC3VKABH2U8P1YF7OS06JRXDENQ5iZ/PDD_Clean.pdf?i=cfTF8cTN2oXYyfDAvhResTTfm75j4mG4gG2Z)
B.6.2. Explanation of methodological choices/approaches for estimating the SDG outcome

The company shall conduct regular surveys during construction as well as O&M phases in the villages near project locations to check the requirement of facilities by the villages. Based on the surveys, PP shall identify and work on several scope(s) of developmental activities such as health camps, distribution of furniture & sports kits in schools, toilet requirements in government schools, drinking water requirements etc. For this project activity, following SDGs are expected to be impacted:

**SDG 7 : Affordable and Clean Energy**

The baseline for the project is no project, thus leading to generation in the relevant grid which is dominated by fossil fuel. The clean energy generated by the project is calculated based on the amount of electricity generated by the project per annum. The project is expected to generate 23,445 MWh of clean energy per annum.

**SDG 8: Decent Work and Economic Growth**

The project leads to Trainings & workshops which are conducted for the O&M staff of the PP. It is expected that a minimum of 1 training (either of the above) would be carried out annually.

The project will also provide employment to approximately 10 persons including O&M staff, management, outsourced jobs as well as security guards during the O&M phase.

**SDG13 : Climate Action :**

The project leads to mitigation of 19,693tCO2 per annum.

As per the approved consolidated Methodology AMS-I.D. (Version 18.0, EB 81, Annex 24), Emission reductions are calculated as follows:

\[ ER_y = BE_y - PE_y \]

Where:

\[ ER_y = \text{Emission reductions in year } y \ (t \text{ CO}_2e/yr) \]
\[ BE_y = \text{Baseline emissions in year } y \ (t \text{ CO}_2/yr) \]
\[ PE_y = \text{Project emissions in year } y \ (t \text{ CO}_2e/yr) \]

**Baseline Emissions:**

Baseline Emissions for the amount of electricity supplied by project activity, BEy, is calculated as

\[ BE_y = EGP_{PJ,y} \times EF_{grid,CM,y} \]

Where:

\[ BE_y = \text{Baseline emissions in year } y \ (t \text{ CO}_2/yr) \]
\[ EGP_{PJ,y} = \text{Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year } y \ (\text{MWh/yr}) \]
\[ EF_{grid,CM,y} = \text{Combined margin CO2 emission factor for grid connected power generation in year } y \text{ calculated using the latest version of the “Tool to calculate the emission factor for an electricity system” (t CO2/MWh).} \]

**Calculation of EGP_{PJ,y}**

The calculation of EGP_{PJ,y} is different for

a) Greenfield plants,

b) Retrofits and replacements, and

c) Capacity additions
The project activity is the installation of hydro power project and it is a green field project; so the formula in option (a) i.e., greenfield plants is used to calculate the value of \( \text{EG}_{PJ,y} \). In accordance with para 44 of the applied methodology:

\[
\text{EG}_{PJ,y} = \text{EG}_{\text{facility},y}
\]

Where:

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

The proposed project activity falls under Indian grid, which constitutes of both fossil fuels and non-fossil fuels sources of electricity generation. Emission reductions due to the project activity are considered to be equivalent to the baseline emissions, since the solar project would not lead to any project emission and leakage emissions. Emission reductions are related to the electricity exported by the project and the emission coefficient of the grid system.

Baseline emission factor is calculated as combined margin, consisting of a combination of operating margin and build margin factors according to the procedures prescribed in the latest tool for calculating the emission factor for an electricity system. The steps of calculation are as follows:

**Step 1: Identify the relevant electricity systems**

As described in tool “For determining the electricity emission factors, identify the relevant project electricity system. Similarly, identify any connected electricity systems”. It also states that “If the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used”.

Keeping this into consideration, the Central Electricity Authority (CEA), Government of India has divided the Indian Power Sector into five regional grids viz. Northern, Eastern, Western, North-easter and Southern. However, all the 5 zones have been synchronized and called as Indian Grid.

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

Option I is opted for the project activity i.e. only grid connected power plants are included in the calculation.

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

According to the tool, the calculation of the operating margin emission factor is based on one of the following methods:

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

Any of the four methods can be used for calculating OM. However, the simple adjusted OM and dispatch data analysis OM cannot be currently applied in India due to lack of necessary data however, 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 Share of Low Cost / Must-Run (% of Net Generation) in the generation profile of the different grids in India in the last five years is as follows:

<table>
<thead>
<tr>
<th>Share of Must-Run (Hydro/Nuclear) (% of Net Generation)</th>
<th>2004-005</th>
<th>2005-06</th>
<th>2006-007</th>
<th>2007-008</th>
<th>20008-009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indian Grid</td>
<td>%</td>
<td>18.0%</td>
<td>18.5%</td>
<td>19.0%</td>
<td>17.3%</td>
</tr>
</tbody>
</table>

*Source: CO2 Baseline Database for the Indian Power Sector - Central Electricity Authority (CEA)*
The CEA database uses the option A i.e. data on net electricity generation and CO2 emission factor for each power unit, the average efficiency of each power unit and the fuel type(s) used in each power unit, to calculate the OM of the different regional grids.

\[
\text{EF}_{\text{grid,OMsimple},y} = \frac{\sum (\text{EG}_{m,y} \times \text{EF}_{\text{EL},m,y})}{\sum \text{EG}_{m,y}}
\]

Where:
- \(\text{EF}_{\text{grid,OMsimple},y}\) : Simple operating margin CO2 emission factor in year \(y\) (tCO2/MWh)
- \(\text{EG}_{m,y}\) : Net quantity of electricity generated and delivered to the grid by power unit \(m\) in year \(y\) (MWh)
- \(\text{EF}_{\text{EL},m,y}\) : CO2 emission factor of power unit \(m\) in year \(y\) (tCO2/MWh)
- \(m\) : All power units serving the grid in year \(y\) except low-cost / must-run power units
- \(y\) : The relevant year as per the data vintage chosen in step 3

In India, the Central Electricity Authority (CEA) has estimated the baseline emission factor for the power sector. This data has also been endorsed by the DNA and is the most authentic information available in the public domain.

The Operating Margin is calculated considering of the generation based weighted average of Operating Margin date for the Grid as published by Central Electricity Authority CEA baseline Carbon Dioxide Emission database version 5.0 dated November 2009. (www.cea.nic.in). The average value for the Grid is 1.00490 tCO2/MWh.

The option B as mentioned in “Tool to calculate the emission factor for an electricity system” 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.

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

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.

Project participant should use the set of power units that comprises the larger annual generation. Accordingly, the CEA database calculates the build margin as the average emissions intensity of the 20% most recent capacity additions in the grid based on net generation. The build margin emission factor has been calculated ex-ante based on the most recent information available on units already built for sample group \(m\) at the time of PDD submission to the DOE for validation. This option does not require monitoring the emission factor during the crediting period.

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

\[
\text{EF}_{\text{grid,BM},y} = \frac{\sum (\text{EG}_{m,y} \times \text{EF}_{\text{EL},m,y})}{\sum \text{EG}_{m,y}}
\]

Where:
- \(\text{EF}_{\text{grid,BM},y}\) : Build margin CO2 emission factor in year \(y\) (tCO2/MWh)
- \(\text{EG}_{m,y}\) : Net quantity of electricity generated and delivered to the grid by power unit \(m\) in year \(y\) (MWh)
- \(\text{EF}_{\text{EL},m,y}\) : CO2 emission factor of power unit \(m\) in year \(y\) (tCO2/MWh)
- \(m\) : Power units included in the build margin
- \(y\) : Most recent historical year for which power generation data is available

The CO2 emission factor of each power unit \(m\) (\(\text{EF}_{\text{EL},m,y}\)) is determined as per the procedures given in step 4 (a) for the simple OM, using option A1 for \(y\) most recent historical year for which power generation data is available, and using for \(m\) the power units included in the build margin.
Build margin emission factor is calculated, ex-ante as per the most recent data available. So, build margin emission factor for Indian grid for 2008-2009 is 0.6751 t CO2/MWh.

**Step 6: Calculate the combined margin (CM) emission factor (EFgrid,CM,y)**

The emission factor EFy of the grid is represented as a combination of the Operating Margin (OM) and the Build Margin (BM). Considering the emission factors for these two margins as EFOM,y and EFBM,y then the EFy is given by:

\[
EF_y = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}
\]

Where:

- \( EF_{grid,OM,y} \) = Build margin CO2 emission factor in year y (t CO2/MWh)
- \( EF_{grid,BM,y} \) = Operating margin CO2 emission factor in year y (t CO2/MWh)
- \( w_{OM} \) = Weighting of operating margin emissions factor (per cent)
- \( w_{BM} \) = Weighting of build margin emissions factor (per cent)

According to “Tool to calculate the emission factor for an electricity system” the weights for OM and BM are 0.5 and 0.5 respectively.

Using the values for operating and build margin emission factor provided in the CEA database and their respective weights for calculation of combined margin emission factor, the baseline carbon emission factor (CM) is 0.8400 t CO2e/MWh.

**Project Emission**

As per the AMS-I.D. ver-18.0, Project Emission for most renewable energy power generation project activities, \( PE_y = 0 \). However, some project activities may involve project emissions that can be significant. These emissions shall be accounted for as project emissions by using the following equation:

\[
PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y}
\]

Where:

- \( PE_y \) = Project emissions in year y (t CO2e/yr)
- \( PE_{FF,y} \) = Project emissions from fossil fuel consumption in year y (t CO2/yr)
- \( PE_{GP,y} \) = Project emissions from the operation of geothermal power plants due to the release of non condensable gases in year y (t CO2e/yr)
- \( PE_{HP,y} \) = Project emissions from water reservoirs of hydro power plants in year y (t CO2e/yr).

The project activity involves the generation of electricity from the installation of solar projects. Hence, as per AMS-I.D., Version 18.0, there is no project emission for solar projects. Therefore, project emissions are zero.

**Leakage Emissions**

No leakage emissions are considered in the project activity. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport). Since the emissions sources are small, it is neglected.

**B.6.3. Data and parameters fixed ex ante for monitoring contribution to each of the three SDGs**

<table>
<thead>
<tr>
<th>Relevant SDG Indicator</th>
<th>SDG13 : Climate Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data/parameter</td>
<td>EFOM,y</td>
</tr>
<tr>
<td>Unit</td>
<td>t CO2e/MWh</td>
</tr>
<tr>
<td>Description</td>
<td>Operating Margin Emission Factor of Indian Grid</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Source of data</td>
<td>Calculated from CEA database, Version 05, Nov’09⁴</td>
</tr>
<tr>
<td>Value(s) applied</td>
<td>1.0049</td>
</tr>
<tr>
<td>Choice of data or Measurement methods and procedures</td>
<td>The data are obtained from “CO2 Baseline Database for Indian Power Sector” version 5.0, published by the Central Electricity Authority, Ministry of Power, Government of India.</td>
</tr>
<tr>
<td>Purpose of data</td>
<td>The data is used to calculate baseline emission reductions.</td>
</tr>
<tr>
<td>Additional comment</td>
<td>This parameter is fixed ex-ante for the entire crediting period.</td>
</tr>
</tbody>
</table>

### Relevant SDG Indicator

<table>
<thead>
<tr>
<th>SDG13 : Climate Action</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Data/parameter</th>
<th>EF&lt;sub&gt;BM&lt;/sub&gt;, y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit</td>
<td>tCO2e/MWh</td>
</tr>
<tr>
<td>Description</td>
<td>Build Margin Emission Factor of Indian Grid</td>
</tr>
<tr>
<td>Source of data</td>
<td>Calculated from CEA database, Version 5.0</td>
</tr>
<tr>
<td>Value(s) applied</td>
<td>0.6751</td>
</tr>
<tr>
<td>Choice of data or Measurement methods and procedures</td>
<td>Calculated as per “Tool to calculate the emission factor for an electricity system,”. The data are obtained from “CO2 Baseline Database for Indian Power Sector” version 5.0, published by the Central Electricity Authority, Ministry of Power, Government of India.</td>
</tr>
<tr>
<td>Purpose of data</td>
<td>The data is used to calculate baseline emission reductions.</td>
</tr>
<tr>
<td>Additional comment</td>
<td>This parameter is fixed ex-ante for the entire crediting period.</td>
</tr>
</tbody>
</table>

### Relevant SDG Indicator

<table>
<thead>
<tr>
<th>SDG13 : Climate Action</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Data/parameter</th>
<th>EF&lt;sub&gt;CM&lt;/sub&gt;, y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit</td>
<td>tCO2e/MWh</td>
</tr>
<tr>
<td>Description</td>
<td>Combined Margin Emission Factor of Indian Grid</td>
</tr>
<tr>
<td>Source of data</td>
<td>Calculated from CEA database, Version 05</td>
</tr>
<tr>
<td>Value(s) applied</td>
<td>0.8400</td>
</tr>
<tr>
<td>Choice of data or Measurement methods and procedures</td>
<td>Calculated as per “Tool to calculate the emission factor for an electricity system,”. The data is obtained from “CO2 Baseline Database for Indian Power Sector” version 5.0, published by the Central Electricity Authority, Ministry of Power, Government of India.</td>
</tr>
<tr>
<td>Purpose of data</td>
<td>The data is used to calculate baseline emission reductions.</td>
</tr>
<tr>
<td>Additional comment</td>
<td>-</td>
</tr>
</tbody>
</table>

### B.6.4. Ex ante estimation of outcomes linked to each of the three SDGs

**SDG 7: Affordable and Clean Energy** - Project expected to generate 23,445 MWh clean energy every year

**SDG 8: Decent Work and Economic Growth** - Minimum 1 training to be carried out annually, apart from providing employment to approximately 10 persons.

**SDG13 : Climate Action** - The project leads to mitigation of 19,693 tCO2 per annum.

Calculation of Outcome for SDG13: Climate Action

Baseline emissions
The baseline emissions are the product of electrical energy baseline $E_{G\pi,y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by an emission factor.

Where,
$E_{G\pi,y}$ = Total quantity of net electricity delivered to the Indian grid.
$E_{F_{grid,CM},y}$ = Combined margin CO2 emission factor for grid connected power generation in year y

$E_{F_{grid,CM},y} = 0.8400 \ t CO2/MWh$.

---

<table>
<thead>
<tr>
<th>Project Participant</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raajratna Energy Holdings Pvt Ltd</td>
<td>5 MW</td>
</tr>
</tbody>
</table>

| Gross Electricity Generation (MWh) | 24810 |
| Transmission Losses (4.5%), Transformation Loss (0.5%) & Auxiliary Power Consumption (0.5%) | 5.5% |
| Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y ($E_{GL,y}$) after consideration of the Transmission Losses (4.5%) Transformation loss (0.5%) and Auxiliary Power (0.5%) (GWh) | 23445 |
| Baseline Emission Factor (tCO2/MWh) | 0.8400 |
| Baseline emissions (tCO2/year) | 19,693 |

$BE_y = 23,445 \times 0.8400 \ t CO2/ year = 19,693 \ tCO2/year$

Project emissions
$PE_y = 0$

Leakage
No leakage emissions are applicable.

Emission reductions
$ER_y = BE_y - PE_y = 19,693 - 0 = 19,693 \ tCO2/year$

B.6.5. Summary of ex ante estimates of each SDG outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Baseline estimate</th>
<th>Project estimate (MWh)</th>
<th>Net benefit MWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>0</td>
<td>23,445</td>
<td>23,445</td>
</tr>
<tr>
<td>Year 2</td>
<td>0</td>
<td>23,445</td>
<td>23,445</td>
</tr>
<tr>
<td>Year 3</td>
<td>0</td>
<td>23,445</td>
<td>23,445</td>
</tr>
<tr>
<td>Year 4</td>
<td>0</td>
<td>23,445</td>
<td>23,445</td>
</tr>
<tr>
<td>Year 5</td>
<td>0</td>
<td>23,445</td>
<td>23,445</td>
</tr>
<tr>
<td>Total</td>
<td>0</td>
<td>117,225</td>
<td>117,225</td>
</tr>
</tbody>
</table>

Annual average over the crediting period
0 MWh | 23,445 | 23,445 |
The proposed project activity falls under Indian grid, which constitutes of both fossil fuels and non-fossil fuels sources of electricity generation hence in baseline, the affordable and Clean Energy generated was 0. Since the project is a solar energy project, therefore the Affordable and Clean Energy produced by the project is 23,445 MWh per year.

### SDG 8: Decent Work and Economic Growth

<table>
<thead>
<tr>
<th>Year</th>
<th>Baseline estimate</th>
<th>Project estimate</th>
<th>Net benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>0 Training, 0 Jobs</td>
<td>1 Training, 10 Jobs</td>
<td>1 Training, 10 Jobs</td>
</tr>
<tr>
<td>Year 2</td>
<td>0 Training, 0 Jobs</td>
<td>1 Training, 10 Jobs</td>
<td>1 Training, 10 Jobs</td>
</tr>
<tr>
<td>Year 3</td>
<td>0 Training, 0 Jobs</td>
<td>1 Training, 10 Jobs</td>
<td>1 Training, 10 Jobs</td>
</tr>
<tr>
<td>Year 4</td>
<td>0 Training, 0 Jobs</td>
<td>1 Training, 10 Jobs</td>
<td>1 Training, 10 Jobs</td>
</tr>
<tr>
<td>Year 5</td>
<td>0 Training, 0 Jobs</td>
<td>1 Training, 10 Jobs</td>
<td>1 Training, 10 Jobs</td>
</tr>
<tr>
<td>Total</td>
<td>0 Training, 0 Jobs</td>
<td>5 Trainings, 10 Jobs</td>
<td>5 Trainings, 10 Jobs</td>
</tr>
</tbody>
</table>

There was no training in the baseline however the training and jobs generated by the project activity is 1 and 10 jobs.

### SDG13 : Climate Action

<table>
<thead>
<tr>
<th>Year</th>
<th>Baseline estimate tCO2</th>
<th>Project estimate tCO2</th>
<th>Net benefit tCO2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>19,693</td>
<td>0 tCO2</td>
<td>19,693</td>
</tr>
<tr>
<td>Year 2</td>
<td>19,693</td>
<td>0 tCO2</td>
<td>19,693</td>
</tr>
<tr>
<td>Year 3</td>
<td>19,693</td>
<td>0 tCO2</td>
<td>19,693</td>
</tr>
<tr>
<td>Year 4</td>
<td>19,693</td>
<td>0 tCO2</td>
<td>19,693</td>
</tr>
<tr>
<td>Year 5</td>
<td>19,693</td>
<td>0 tCO2</td>
<td>19,693</td>
</tr>
<tr>
<td>Total</td>
<td>98,465</td>
<td>0 tCO2</td>
<td>98,465</td>
</tr>
</tbody>
</table>

The proposed project activity falls under Indian grid, which constitutes of both fossil fuels and non-fossil fuels sources of electricity generation hence in baseline, the estimated emission is 19,693 tCO2 per year. Since the project is hydro energy project, therefore the project does not emit any GHG.

**B.7. Monitoring plan**

**B.7.1. Data and parameters to be monitored**

<table>
<thead>
<tr>
<th>Relevant SDG Indicator</th>
<th>SDG 7.2.1 : Affordable and Clean Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data / Parameter</td>
<td>EGBilly</td>
</tr>
<tr>
<td>Unit</td>
<td>MWh</td>
</tr>
<tr>
<td>Description</td>
<td>Quantity of net electricity supplied to the grid</td>
</tr>
<tr>
<td>Source of data</td>
<td>Joint Meter Readings and Annexure “A” Calculation of net saleable Energy Based in IPP’s Meter reading</td>
</tr>
<tr>
<td>Value(s) applied</td>
<td>23,445 MWh</td>
</tr>
</tbody>
</table>
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  
**Accuracy of the meters**: 0.2s  
**Measurement interval**: Continuous measurement, monthly recording

**Monitoring frequency**  
Once in 6 months for Energy meters

**QA/QC procedures**  
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.

**Purpose of data**  
The Data/Parameter is required to calculate the baseline emission

**Additional 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

**Relevant SDG Indicator**  
SDG 7.2.1 : Affordable and Clean Energy

<table>
<thead>
<tr>
<th>Data / Parameter</th>
<th>Unit</th>
<th>Description</th>
<th>Source of data</th>
<th>Value(s) applied</th>
<th>Measurement methods and procedures</th>
<th>Monitoring frequency</th>
<th>QA/QC procedures</th>
<th>Purpose of data</th>
<th>Additional comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC_{i,j,y}</td>
<td>Litre</td>
<td>Quantity of HSD consumed in DG Set in the project activity during the year y</td>
<td>Power Plant Log Book</td>
<td>0 (for ex-ante)</td>
<td>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.</td>
<td>The Dip stick will be calibrated once every year.</td>
<td>-</td>
<td>The Data/Parameter is required to calculate the baseline emission</td>
<td>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</td>
</tr>
</tbody>
</table>

**Relevant SDG Indicator**  
SDG 7.2.1 : Affordable and Clean Energy

<table>
<thead>
<tr>
<th>Data / Parameter</th>
<th>Unit</th>
<th>Description</th>
<th>Source of data</th>
<th>Value(s) applied</th>
<th>Measurement methods and procedures</th>
<th>Monitoring frequency</th>
<th>QA/QC procedures</th>
<th>Purpose of data</th>
<th>Additional comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCV_{i,y}</td>
<td>kcal/kg</td>
<td>Net calorific value of HSD</td>
<td>Central Electricity Authority (CEA) CO2 database version 5 dated November 2009. (<a href="http://www.cea.nic.in">www.cea.nic.in</a>)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Value(s) applied</strong></td>
<td>9975</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Measurement methods and procedures</strong></td>
<td>The calorific value as mentioned in the Central Electricity Authority (CEA) CO2 database version 5 dated November 2009. (<a href="http://www.cea.nic.in">www.cea.nic.in</a>) is 10,500 kcal/kg and considering the Delta GCV NCV as 5% as mentioned in CEA CO2 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).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Monitoring frequency</strong></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>QA/QC procedures</strong></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Purpose of data</strong></td>
<td>The Data/Parameter is required to calculate the baseline emission</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Additional comment</strong></td>
<td>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</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Relevant SDG Indicator

**SDG 8.5.1: Decent Work and Economic Growth**

| **Data / Parameter** | • Quantitative employment,  
|                      | • Quality of employment  
|                      | • Income generation |
| **Unit** | • Number(Trainings)  
|          | • Number (employees)  
|          | • INR (salary) |
| **Description** | • Number of Trainings provided to employees & O&M staff  
|                 | • Number of project employees with Number of male/female, permanent/temporary, age and person with disabilities.  
|                 | • Salary given to the employees of the project.  

The income to all the unskilled workers are made on day to day basis in line with the minimum wage requirements. Annual records of income paid to all the employees would be available.

| **Source of data** | Training Records (HSE & HR)  
|                    | Salary Slip of the project employees. |
| **Value(s) applied** | The trainings & workshops will be given to the O&M staff are:  
|                      | • HSE Training Record  
|                      | • Soft Skill Training |

It is expected that a minimum of 1 training (either of the above) would be carried out annually.

The training programmes help in making the workforce efficient and skilled at their job. This not only helps the company but adds to growth of individual employees. Thus, the project has a positive impact on the parameter.

| **Measurement methods and procedures** | • Training Attendance sheets.  
|                                      | • Employee Records  
|                                      | • Salary slip of the employees |
| **Monitoring frequency** | Once in a Monitoring period |
| **QA/QC procedures** | The number of persons employed would be mentioned in the plant register, which can be cross checked with daily attendance register. Salary slip can be checked for earnings of employees |
| **Purpose of data** | Continuation of regular trainings/workshops for employees & O&M staff |
### Relevant SDG Indicator

**SDG13.2.1 : Climate Action**

### Data / Parameter

Air quality

### Unit

tCO2

### Description

Reduction in CO2 emission reduction due to implementation of project activity

### Source of data

Calculated as per “Tool to calculate the emission factor for an electricity system,”. The data are obtained from “CO2 Baseline Database for Indian Power Sector” version 05.0, published by the Central Electricity Authority, Ministry of Power, Government of India.

### Value(s) applied

19,693 tCO2 emission reductions estimated per annum

### Measurement methods and procedures

Calculated from CEA database and Energy Generation

### Monitoring frequency

Once in 6 months for Energy meters

### QA/QC procedures

A check meter is also installed near to the export meter to cross check the electricity exported to the grid. The check meter reading would also be used in case of failure of export meter

### Purpose of data

Calculation of baseline emissions

### Additional comment

The data will be archived for crediting period+2 years

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**B.7.2. Sampling plan**

Sampling is not required for the given project activity.

**B.7.3. Other elements of monitoring plan**

The monitoring plan is developed in accordance with the modalities and procedures for CDM project activities and is proposed for grid-connected solar power project/unit being implemented in Himachal Pradesh, India. The monitoring plan, which will be implemented by the project participant describes about the monitoring organisation, 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) \times (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 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 grid for the year 2008-09.

The monitoring team will composed the following staff:

Responsibilities of Site Incharge (PP): Overall functioning and maintenance of the project activity, the Site incharge shall coordinate with the O&M operator as well as the site supervisors.

Responsibilities of O&M Representative: Co-ordination between Site incharge of the O&M operator as well as the project participant and further report to PP head office.

Responsibilities of Site In-charge (O&M Operator): Responsibility for maintaining the data records, ensures completeness of data, and reliability of data (calibration of equipment) as well as data recording for all the parameters.
Responsibilities of Shift In-charge: Responsibility for day to day data collection and maintains day to day monitored data.

Data archiving policy: All monitored data will be archived electronically for a period of two years after the end of the crediting period or the last issuance of CERs, whichever occurs later.

Data Measurement: Projects activity comprises of installation Energy meters at a Pooling Substation prior to the Delivery point.

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.

SECTION C. Duration and crediting period

C.1. Duration of project

C.1.1. Start date of project

23/02/2009

C.1.2. Expected operational lifetime of project

30 years and 0 months

C.2. Crediting period of project

C.2.1. Start date of crediting period

01/08/2018, or two years prior to the date of Project Design Certification, whichever is later.

6 As per manufactures certificate on the lifetime of the equipment

7 The project is CDM registered and CDM CP is 01/01/2013 - 31/12/2022 (Fixed) Hence the GS CP will be only till 31/12/2022.
C.2.2. Total length of crediting period

5 years (CDM Crediting Period is 01/01/2013 - 31/12/2022 (Fixed); Hence the GS CP will be only till 31/12/2022.)

SECTION D. Safeguarding principles assessment

D.1. Analysis of social, economic and environmental impacts

<table>
<thead>
<tr>
<th>Safeguarding principles</th>
<th>Assessment questions</th>
<th>Assessment of relevanc e to the project (Yes/potentially/no)</th>
<th>Justification</th>
<th>Mitigation measure (if required)</th>
</tr>
</thead>
</table>
| 1. Human Rights          | a. The Project Proponent and the Project shall respect Internationally proclaimed human rights and shall not be complicit in violence or human rights abuses of any kind as defined in the Universal Declaration of Human Rights.  
   b. The Project shall not discriminate with regards to participation and inclusion. | No | a. The Project is not in conflict with the economic livelihood or other issue of the local community. Thus, the Project does not cause any human rights abuse and respects internationally proclaimed human rights issue.  
   b. Project activities are not expected to cause any human rights abuse. As a member of United Nations and part of UN Agreement on Human Rights, it is ensured by law in India that no action can be taken against human rights. | Not Required |
| 2. Gender Equality & Women’s Rights | 1. The Project shall complete the following gender assessment questions in order to inform Requirements, below:  
   a. Is there a possibility that the Project might reduce or put at risk women’s access to or control of resources, entitlements and benefits?  
   b. Is there a possibility that the Project can adversely affect men and women in marginalised or vulnerable communities (e.g., potential increased burden on women or social isolation of men)?  
   c. Is there a possibility that the Project might not take into account women’s roles while engaging them and thereby provide equal rights to men and women? | NO | 1. The project does not decrease women’s access to or control of resources.  
   a) No, the Project does not reduce women’s access to or control of resources, entitlements and benefits. The project will benefit to local community regardless of gender.  
   b) No, the Project does not create any adverse effect on the local community.  
   c) No, the Project does not consider the gender roles while engaging them and thereby provide equal rights to men and women. Local community meetings are scheduled considering equality of women. | Not Required |

8 [https://labour.gov.in/lcandilasdivision/india-ilo](https://labour.gov.in/lcandilasdivision/india-ilo)
10 [https://labour.gov.in/sites/default/files/Equal%20Remuneration%20Rules,%201976.pdf](https://labour.gov.in/sites/default/files/Equal%20Remuneration%20Rules,%201976.pdf)
account gender roles and the abilities of women or men to participate in the decisions/designs of the project’s activities (such as lack of time, child care duties, low literacy or educational levels, or societal discrimination)?

d. Does the Project take into account gender roles and the abilities of women or men to benefit from the Project’s activities (e.g., Does the project criteria ensure that it includes minority groups or landless peoples)?

e. Does the Project design contribute to an increase in women’s workload that adds to their care responsibilities or that prevents them from engaging in other activities?

f. Would the Project potentially reproduce or further deepen discrimination against women based on gender, for instance, regarding their full participation in design and implementation or access to opportunities and benefits?

g. Would the Project potentially limit women’s ability to use, develop and protect natural resources, taking into account different roles and priorities of women and men in accessing and managing environmental goods and services?

h. Is there a likelihood that the proposed Project would expose women and girls to further risks or hazards?

2. The Project shall not directly or indirectly lead to/contribute to adverse impacts on gender equality and/or the situation of women.

d) The project does not discriminate the local community on basis of gender or caste or religion and therefore equally serve to all.11

e) No, the Project design neither increase women’s workload nor prevent them from engaging in other activities.

f) There is no room for discrimination against women in this Project12.

g) The Project will not limit women’s ability regarding natural resources. The project is solely utilizing solar power and therefore does not impact natural resources of the region.

h) No, the Project will not expose women and girls to further risks or hazards.

2. The project does not create any direct or indirect impacts on gender equality and/or the situation of women:

   a. The project proponent has a grievance cell which would investigate complaints.

   b. Project participation by women or girls is merely voluntary basis and there is no compulsion on them. The project


   12
a. Sexual harassment and/or any forms of violence against women - address the multiple risks of gender-based violence, including sexual exploitation or human trafficking.

b. Slavery, imprisonment, physical and mental drudgery, punishment or coercion of women and girls.

c. Restriction of women’s rights or access to resources (natural or economic).

d. Recognise women’s ownership rights regardless of marital status - adopt project measures where possible to support to women’s access to inherit and own land, homes, and other assets or natural resources.

3. Projects shall apply the principles of non-discrimination, equal treatment, and equal pay for equal work, specifically:

a. Where appropriate for the implementation of a Project, paid, volunteer work or community contributions will be organised to provide the conditions for equitable participation of men and women in the identified tasks/activities.

b. Introduce conditions that ensure the participation of women or men in Project activities and benefits based on pregnancy, maternity/paternity leave, or marital status.

c. Ensure that these conditions do not limit the access of women or men, as the case may be, to Project participation and benefits.

4. The Project shall refer to the country’s national gender strategy or equivalent national commitment to aid in assessing gender risks.

proponent has a grievance cell which would investigate complaints.

c. The Project will not restrict women’s rights or access regarding natural resources.

d. Marital status is completely irrelevant to the Project. The project proponent does not discriminate on gender, caste, religion etc.

3. The project has applied the principles of non-discrimination and equal treatment, pay & work as follows:

a. Yes, the Project has equal opportunity for women and men to contribute both in volunteer and working positions.

b. The project proponent has a specified HR policy that considers participation by both men and women.

c. There is no limit on the access to Project participation and benefits from either of these conditions.

4. Raajratna Energy Holdings Pvt Ltd does not involve in any form of discrimination in any kind. India also ratified relevant ILO core conventions on equality, namely Equal Remuneration Convention (Convention No 100) and Discrimination (Employment and Occupation) Convention (Convention No 111) in 1997.

<table>
<thead>
<tr>
<th>3. Community Health, Safety &amp; Working Conditions</th>
<th>a. The Project shall avoid community exposure to increased health risks and shall not adversely affect the health of the workers and the community.</th>
<th>No</th>
<th>a. The project proponent is committed to the employee’s workplace health &amp; safety during all phases of the project. All employees will attend health &amp; safety trainings. This is issued in the Labour code on Occupational Safety, Health and Working Conditions and UN Agreement on Human Rights(^1).</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Cultural Heritage, Indigenous Peoples, Displacement and Resettlement</td>
<td>a. Does the Project Area include sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g., knowledge, innovations, or practices)(^6)?</td>
<td>b. Does the Project require or cause the physical or economic relocation of peoples (temporary or permanent, full or partial)?</td>
<td>a. As per the Environmental Clearance report, there are no protected archeological and cultural heritage sites are reported within the project footprint”. Law on Cultural heritage is protected against alteration, damage or removal by the “law on cultural heritage(^15)”.</td>
</tr>
<tr>
<td></td>
<td>b. Does the Project require any change to land tenure arrangements and/or other rights?</td>
<td>d. For Projects involving land-use tenures, are there any uncertainties with regards land tenure, access rights, usage rights or land ownership?</td>
<td>b. The project does not involve any settlement areas. Thus, this project does not cause the physical or economic relocation of peoples. The project activity does not involve any alteration of existing roads as well as it does not add additional traffic. Since the site located isolated area, the traffic volume is negligible. Hence, there is no additional burden to the existing traffic. In addition, the project proponent built new roads for those sites which do not have road access.</td>
</tr>
<tr>
<td></td>
<td>c. Are indigenous peoples present in or within the area of influence of the Project and/or is the Project located on land/territory claimed by indigenous peoples?</td>
<td>e. Are indigenous peoples present in or within the area of influence of the Project and/or is the Project located on land/territory claimed by indigenous peoples?</td>
<td>c. 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. Hence, project does not require any change to land tenure arrangements or other rights.</td>
</tr>
<tr>
<td></td>
<td>d. For Projects involving land-use tenures, are there any uncertainties with regards land tenure, access rights, usage rights or land ownership?</td>
<td>e. Are indigenous peoples present in or within the area of influence of the Project and/or is the Project located on land/territory claimed by indigenous peoples?</td>
<td>d. NA, It is a run of the river hydro Project.</td>
</tr>
<tr>
<td>1. Corruption</td>
<td>a. The Project shall not involve, be complicit in or inadvertently contribute to or reinforce corruption or corrupt Projects.</td>
<td>No</td>
<td>e. No cultural heritage/ indigenous people are replaced by the project.</td>
</tr>
</tbody>
</table>

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\(^1\) [https://www.ohchr.org/EN/Countries/AsiaRegion/Pages/INIndex.aspx](https://www.ohchr.org/EN/Countries/AsiaRegion/Pages/INIndex.aspx)

\(^6\) [https://cpwd.gov.in/Publication/ConservationHertBuildings.pdf](https://cpwd.gov.in/Publication/ConservationHertBuildings.pdf)

2. Economic Impacts

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. The project does not employ and is not complicit in any form of child labor.</td>
<td>No</td>
</tr>
<tr>
<td>b. The project provides workers with a safe and healthy work environment and is not complicit in exposing workers to unsafe or unhealthy work environments.</td>
<td></td>
</tr>
<tr>
<td>c. The project does not involve and is not complicit in any form of forced or compulsory labor.</td>
<td></td>
</tr>
</tbody>
</table>

a. Raajratna Energy Holdings Pvt Ltd and their subcontractors complying with all relevant national laws regarding child labor. It will not employ children in any shape or form for their works. India has ratified ILO “C138 – Minimum Age Conventions” and “C182 – Worst Forms of Child Labour Convention”17.

b. The project owner is committed to the safe and healthy working conditions all phases of the project. All employees will attend trainings health & safety. This issue is protected by Labor code18 and UN Agreement on Human Rights19.

c. Raajratna Energy Holdings Pvt Ltd and appointed contractors will not involve in any form of forced or compulsory labour. India has ratified ILO “C029 – Forced Labour Convention”20.

ENVIRONMENTAL & ECOLOGICAL SAFEGUARDING PRINCIPLES

<table>
<thead>
<tr>
<th>1. Climate and Energy</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Will the Project increase greenhouse gas emissions over the Baseline Scenario?</td>
<td>No</td>
</tr>
<tr>
<td>b. Will the Project use energy from a local grid or power supply (i.e., not connected to a national or regional grid) or fuel resource (such as wood, biomass) that provides for other local users?</td>
<td></td>
</tr>
</tbody>
</table>

b. On the contrary the project generates renewable energy and supplies (except plant’s auxiliary consumption) to the grid. The auxiliary consumption is measured by deduction of power supplied to the grid from the total power generated by the plant. However, it’s to be noted that the auxiliary power consumed by the plant is generated as renewable energy and thereby no emission involved. Hence, it’s not required to be monitored.

Not required

<table>
<thead>
<tr>
<th>2. Water</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Will the Project affect the natural or pre-existing pattern of watercourses, ground-water and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?</td>
<td>No</td>
</tr>
<tr>
<td>b. Could the Project directly or indirectly cause additional</td>
<td></td>
</tr>
</tbody>
</table>

b. As per Environmental Clearance, the Project does not affect the natural or pre-existing pattern of watercourses, ground-water and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity.

Not required

18 https://www.ohchr.org/EN/Countries/AsiaRegion/Pages/INIndex.aspx
19 https://www.ohchr.org/EN/Countries/AsiaRegion/Pages/INIndex.aspx
erosion and/or water body instability or disrupt the natural pattern of erosion? If ‘Yes’ or ‘Potentially’ proceed to question 2.

c. Is the Project’s area of influence susceptible to excessive erosion and/or water body instability?

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Does the Project involve the use of land and soil for production of crops or other products?</td>
<td>NO</td>
</tr>
<tr>
<td>b. Will the Project be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions?</td>
<td>NO</td>
</tr>
<tr>
<td>c. Could the Project be negatively impacted by the use of genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development)?</td>
<td>NO</td>
</tr>
<tr>
<td>d. Could the Project potentially result in the release of pollutants to the environment?</td>
<td>NO</td>
</tr>
<tr>
<td>e. Will the Project involve the manufacture, trade, release, and/or use of hazardous and non-hazardous chemicals and/or materials?</td>
<td>NO</td>
</tr>
<tr>
<td>f. Will the Project involve the application of pesticides and/or fertilisers?</td>
<td>NO</td>
</tr>
<tr>
<td>g. Will the Project involve the harvesting of forests?</td>
<td>NO</td>
</tr>
<tr>
<td>h. Does the Project modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives?</td>
<td>NO</td>
</tr>
</tbody>
</table>

b. No. As per Environmental Clearance, the risk of erosion is unlikely by the project.

c. No. As per Environmental Clearance report, the risk of erosion is unlikely by the project.

3. Environment, Ecology and Land Use

a. The Project does not involve the use of land and soil for production of crops or other products.

b. The project is susceptible to decreased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme conditions.

c. As per the Environmental Clearance, the project does not affect the herbal life.

d. The project takes a precautionary approach regarding environmental challenges and is not complicit in practices contrary to the precautionary principle. The environment is protected by several Laws and Regulations in India. The purpose of the “Law on Environmental Protection” is to protect the environment with principles of sustainable development and environment. The project owner also follows necessary procedures for environmental safety at the project.

e. All hazardous and non-hazardous wastes will be disposed as per the local regulations. The methods are categorized for all materials in the Environmental Clearance report.

f. Not applicable for solar power plants.

g. No. the project area was deserted before project implementation.

h. No. The project does not modify the quantity or nutritional quality of food available.

i. No. Not applicable for hydel project.

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i. Will the Project involve animal husbandry?

j. Does the Project physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites[1] identified?

k. Are there any endangered species identified as potentially being present within the Project boundary (including those that may route through the area)?

l. Does the Project potentially impact other areas where endangered species may be present through transboundary affects?

j. The project activity is not located in High Conservation Value (HCV) area. This was ascertained after detailed consultations with the local authorities. Moreover, international sources of information such as the World Database on protected planets (IUCN, UNEP), the Ramsar list of wetlands, and the United Nations list of protected areas were referred to confirm that the project is not located in High Conservation Value (HCV) area.

k. No. There were no endangered species found in the project boundary as per report.

l. No. The project does not impact other areas where endangered species may be present.

SECTION E. Local stakeholder consultation

E.1. Solicitation of comments from stakeholders

PP had conducted this Stakeholder consultation physical meeting in line with the CDM requirements and guidelines.

The CDM 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 stakeholders 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 stakeholder 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.

The Minutes of LSH meeting and Feedback round along with List of Attendees, copy of Public Notice, invitations etc. will be submitted to the DOE.

Additionally, after the preliminary review will get finished, the Project Developer will create a link for the public comments as per the GS4GG Guidelines to provide comments on the proposed project in an open and transparent manner and also will invite the below stakeholders to participate in the meeting though an email:
(a) Local people, communities and representatives like Sarpanch, School principal and teachers, local doctors, Shopkeepers and other villagers.
(b) Stakeholders with land-tenure rights to the project.
(c) MoEFCC i.e. NCDMA Designated National Authority (DNA)
(e) Local non-governmental organisations (NGOs), Women Groups working on topics relevant to the project or working with Raajratna Energy Holdings Pvt Ltd.
(f) A Gold Standard representative at help@goldstandard.org
(g) Relevant international Gold Standard NGO Supporters of Asia and all Gold Standard NGO Supporters located in India.

Nevertheless, PP will conduct a stakeholder feedback consultation round inline with GS4GG requirements and guidelines to incorporate all the feedback recived for the project activity if any.

E.2. Summary of 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. Greenhouse gas (GHG) gases are CO₂, 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 consideration of comments received
There were no negative comments raised by the stakeholders and they were totally in support for setting up of these kinds of projects in the region.
Appendix 1. Contact information of project participants

<table>
<thead>
<tr>
<th>Organization name</th>
<th>Raajratna Energy Holdings Pvt Ltd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration number with relevant authority</td>
<td>U40100AP2004PTC076551</td>
</tr>
<tr>
<td>Street/P.O. Box</td>
<td>Plot No. 84, Kavuri Hills Phase II</td>
</tr>
<tr>
<td>City</td>
<td>Hyderabad</td>
</tr>
<tr>
<td>State/Region</td>
<td>Andhra Pradesh</td>
</tr>
<tr>
<td>Postcode</td>
<td>500033</td>
</tr>
<tr>
<td>Country</td>
<td>India</td>
</tr>
<tr>
<td>Telephone</td>
<td>+91 -40-23559922</td>
</tr>
<tr>
<td>Fax</td>
<td>-</td>
</tr>
<tr>
<td>E-mail</td>
<td><a href="mailto:gautamkumar@ksk.co.in">gautamkumar@ksk.co.in</a></td>
</tr>
<tr>
<td>Website</td>
<td>-</td>
</tr>
<tr>
<td>Contact person</td>
<td>Mr. Gautam Kumar</td>
</tr>
<tr>
<td>Title</td>
<td>Head-Finance</td>
</tr>
<tr>
<td>Salutation</td>
<td>Mr.</td>
</tr>
<tr>
<td>Last name</td>
<td>Kumar</td>
</tr>
<tr>
<td>Middle name</td>
<td>-</td>
</tr>
<tr>
<td>First name</td>
<td>Gautam</td>
</tr>
<tr>
<td>Department</td>
<td>-</td>
</tr>
<tr>
<td>Mobile</td>
<td>9910509744</td>
</tr>
<tr>
<td>Direct fax</td>
<td>-</td>
</tr>
<tr>
<td>Direct tel.</td>
<td>-</td>
</tr>
<tr>
<td>Personal e-mail</td>
<td><a href="mailto:gautamkumar@ksk.co.in">gautamkumar@ksk.co.in</a></td>
</tr>
</tbody>
</table>

Revision History

<table>
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<th>Version</th>
<th>Date</th>
<th>Remarks</th>
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</thead>
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<td>1.1</td>
<td>24 August 2017</td>
<td>Updated to include section A.8 on 'gender sensitive' requirements</td>
</tr>
<tr>
<td>1</td>
<td>10 July 2017</td>
<td>Initial adoption</td>
</tr>
</tbody>
</table>