



**CLEAN DEVELOPMENT MECHANISM
FORM FOR SUBMISSION OF BUNDLED SMALL SCALE PROJECT ACTIVITIES
(SSC-CDM-BUNDLE)**

SECTION A. General description of the Bundle

A.1. Title of the Bundle:

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Title: 10 MW bundled Luni – III & Luni – II hydroelectric projects for a grid system at Sri Sai Krishna Hydro Energies Private Limited in Kangra District, Himachal Pradesh.

A.2. Version and Date:

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Version: 4

Date : 13/04/2009

A.3. Description of the Bundle and the sub-bundles:

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The purpose of the 10 MW bundled Luni – III & Luni – II hydroelectric projects is to generate clean electrical energy in a sustainable manner, optimising the utilization of renewable hydro resource in order to meet the power demand in the state of Himachal Pradesh.

The bundled small hydroelectric projects Luni - III & Luni – II are proposed as run of the river schemes across Luni Khad, a tributary of river Binwa in Baijnath Tehsil, Kangra District of Himachal Pradesh. The proposed projects generates about 43800 MWh in which 40296 MWh will be exported to HPSEB Dehan substation under Power Purchase Agreement (PPA), thereby improving the quality and energy availability under the service area of the substation.

Project Activity	Type	Category	Technology/measure
5 MW Luni – III hydroelectric project	Type I – Renewable Energy Project	A.M.S. I.D Grid connected renewable electricity generation	This category comprises renewable energy generation units ,such as photovoltaic, hydro, tidal/wave, wind geothermal and renewable biomass, that supply electricity to and/or displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating plant.
5 MW Luni – II hydroelectric projects	Type I – Renewable Energy Project	A.M.S. I.D Grid connected renewable electricity generation	This category comprises renewable energy generation units ,such as photovoltaic, hydro, tidal/wave, wind geothermal and renewable



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			biomass, that supply electricity to and/or displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating plant.
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A.4. Project participants:

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Name of the party involved ((Host) indicates a host party)	Private and/or public entity (ies) project participants
India (Host)	Private Entity: Sri Sai Krishna Hydro Energies (P) Limited, Hyderabad

SECTION B. Technical description of the Bundle:

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B.1. Location of the Bundle:

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B.1.1. Host Party (ies):

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India

B.1.2. Region/State/Province etc.:

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State: Himachal Pradesh

B.1.3. City/Town/Community etc:

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District: Kangra

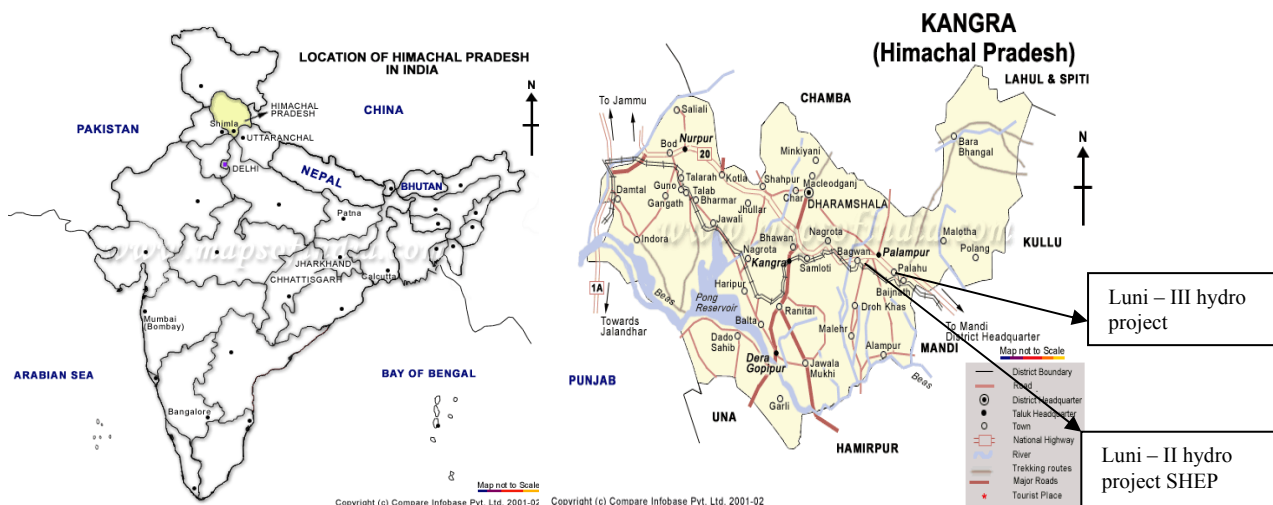
Tehsil: Baijnath

B.1.4. Details of physical location, including information allowing the unique identification of this Bundle:

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The proposed Luni – II small hydro project is a downstream development of proposed Luni-III small hydro project on Luni khad, a tributary of river Binwa in Kangra District, Himachal Pradesh. The location could be approached through Baijnath - Deol road. Deol village is at a distance of 8 kms from Baijnath town. The project site is located at a distance of 18 kms from Baijnath, which is also the nearest railhead, on Pathankot – Palampur - Baijnath National Highway. The nearest airport is at Gagal (Kangra) located at a distance of 56 kms. The geographical co-ordinates of Luni III are 76°45' to 76°47' East (Longitude) and 32°11' to 32°12' North (latitude) and that for Luni II are 76°41' to 77°47' East (Longitude) and 32°5' to 32°10' North (latitude).

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Map 1: Location of Himachal Pradesh state in India

Map 2: Location of the project sites in Kangra District of HP

B.2. Type(s), category (ies) and technology/ (ies)/Measure/(s) of the bundle:

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According to the Appendix B to the simplified modalities and procedures for small-scale CDM project activities the proposed project activities falls under the following type and category.

Project Type: Type I – Renewable Energy Projects
Category I.D: A.M.S I.D Grid connected renewable electricity generation

The project activity utilizes renewable hydro potential for power generation and exports the generated power to the grid. Accordingly, the applicable methodology for the project activity shall be AMS I.D/ Version 13, EB 36, which includes hydro electric generation for a grid system.

The capacity of the bundled CDM project is 10 MW. This is below the 15 MW limit¹ of output-capacity for small-scale projects and therefore the project qualifies as a small-scale CDM project. Hence, AMS.I.D 'Grid connected renewable electricity generation' is applied for the proposed small scale project activity.

Since, the capacity of the proposed bundled CDM project is only 10 MW, which is well below the qualifying capacity of 15 MW, the project activity is small scale CDM project activity and UNFCCC indicative simplified modalities and procedures can be applied.

The water and power studies carried out for these two projects demonstrate that the project activities will remain under the limits of SSC through out the crediting period.

Technical details of the project activities

¹ In accordance with the simplified modalities and procedures for small-scale CDM project activities (annex II to decision 21/CP.8 contained in document FCCC/CP/2002/7/Add.3):

<http://cdm.unfccc.int/Reference/Documents/AnnexII/English/annexII.pdf>



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The projects are designed to generate electricity for grid system using available water sources. The technology of power generation process using hydro resources is converting the potential energy available in the water flow into mechanical energy using hydro turbines and then to electrical energy using alternators. The generated power will be transformed to match the nearest grid sub-station for proper interconnection and smooth evacuation of power.

No technology transfer is envisaged for the proposed CDM project activities.

The project employs the use of hydel energy for the purpose of electricity generation. Since, the technology employed by the project proponent does not result in GHG emissions; the project does not cause any negative effects on the environment. Hence, the technology used for the project activities do not pose any threat to the environment when compared to the fossil fuel-fired power plants.

The proposed projects shall use the potential energy in a flowing river by diversion weirs for running Pelton Wheel turbines to generate power. The components involved in each of the hydro electric schemes consists of construction of a raised drop type trench weir across the stream at elevations, intake chamber, desalting tank, cut and cover type channel, fore bay, penstocks, power house and the tailrace discharging water back into the river. Power will be generated at a lower voltage, which will be stepped up to higher voltage level within the project boundary to facilitate export of power to Himachal Pradesh State Electricity Board.

The total capacities of the turbine generators are 10 MW, which generates electricity at 3.3 kV level and evacuated at 33 kV level. It is anticipated that the plants can operate at a Plant Load Factor (PLF) of 50 %. The annual export to the regional grid is 40296 MWh from both of the hydroelectric projects, after accounting for auxiliary consumption of 3504 MWh (8%) from the gross electricity generation of 43800 MWh .

Table A.1: Technical specifications of the some of the important items of plant and machinery:

Parameter	Luni – III	Luni - II
<i>Hydrology</i>		
Design Discharge	1.32 cumecs	1.98 cumecs
Gross head	448.13 m	302.00 m
Net rated head	441.11 m	292.75 m
<i>Plant Equipment</i>		
Type of Hydro turbine	Pelton Wheel	Pelton Wheel
Type of generator	Synchronous, Brushless	Synchronous, Brushless
No. of generating units	2	2
Capacity of each generating units	2.5 MW	2.5 MW
Generation voltage	3.3 kV	3.3 kV
Grid interfacing voltage	33 kV	33 kV
Frequency	50 Htz	50 Htz
HPSEB substation	132/33 kV at Dehan	132/33 kV at Dehan
<i>Energy</i>		
Gross energy generation	21900 MWh	21900 MWh
Auxiliary Consumption (8%)	1752 MWh	1752 MWh



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Annual export to the grid	20148 MWh	20148 MWh
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B.3 Estimated amount of emission reductions over the chosen crediting period:

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The crediting period chosen for the proposed project activity is 10 years. Estimation of total emission reductions as well as annual estimates for the chosen crediting period are furnished below.

Table A.2: Annual estimation of Certified Emission Reductions (CERs)

Year	Estimation of annual emission reductions (tonnes of CO ₂ e)
2009	32,658
2010	32,658
2011	32,658
2012	32,658
2013	32,658
2014	32,658
2015	32,658
2016	32,658
2017	32,658
2018	32,658
Total estimated reductions (tonnes of CO₂ e)	326,580
Total number of crediting years	10
Annual average of the estimated reductions over the crediting period (tonnes of CO₂ e)	32,658

In the above table, the year 2009 corresponds to the period starting from 01.06.2009 to 31.05.2010. Similar interpretation shall apply for remaining years.

SECTION C. Duration of the project activity / Crediting period:**C.1. Duration of the Bundle**

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C.1.1. Starting date of the Bundle:

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03/03/2006

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

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20 y – 0 m

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

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Fixed crediting period.

C.2.1. Renewable crediting period:

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Not applicable

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

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Not applicable

B.2.1.2. Length of the first crediting period:

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Not applicable

C.2.2. Fixed crediting period:

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C.2.2.1. Starting date:

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01/06/2009 or from the date of registration of the project activity whichever occurs

C.2.2.2. Length:

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10 y – 0 m

SECTION D. Application of a monitoring methodology:

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

Project Management

The authority and responsibility for registration, monitoring, measurement, reporting and reviewing of the data rests with the Board of Directors. The Board 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 its Committee for review.

Training to the plant personnel

The PP would employ qualified and certified personnel for operation and maintenance of the plant including monitoring of the CDM parameters. Training of the plant personnel on operation and

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maintenance of electro-mechanical equipment will be initially imparted by the supplier of the equipments M/s.Shanghai Leichaun Indian Trading Co. Pvt. Ltd. This is confirmed by the supplier.

Monitoring Requirements

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

Monitoring equipment comprises of energy meters, which will monitor the energy fed by the plants to HPSEB grid system by the proposed projects. In accordance with the PPA, project proponents have to install two energy meters one is main meter and the other is check meter for each of the two projects. Project proponent will calibrate both the meters according to the procedures laid down by PPA. Project proponent will appoint a Designated Operational Entity (DOE) for verification of emission reductions and leakages resulted by the project activities at regular intervals. As per simplified modalities and procedures for small-scale CDM project activities, the same DOE who validated the project can undergo verification of emission reductions and leakage generated by the projects.

Methodology adopted for determining base line emission factor is the **combined margin** of the generating mix in the Northern regional grid system, which will represent the intensity of carbon emissions of the grid system. The baseline emission factor as shown in B.6.1 is adopted from the “CO₂ Baseline Database” Ver 03 December 2007 published by CEA for the latest available year for the Northern Grid and considered fixed ex-ante for the duration of the crediting period.

QA & QC Procedures

The projects 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 plants. 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.

Leakage Monitoring

The proposed bundled 10 MW Luni hydroelectric projects are renewable energy type and it utilizes flowing water for power generation and it does not involve any GHG emissions. No leakages are involved in the proposed activities.

Data Recording and Storage

The net energy fed to the grid system by the project activities will be recorded by project proponents using either of the two meters (main meter and check meter) in the presence of the representative of HPSEB in a document whose format is acceptable to HPSEB. Representatives of both the project proponent and HPSEB will sign the document which will contain all details such as the equipment data, calibration status, previous reading, current reading, export, import, net billable units, date and time of



recording etc. This document will be used as a basic document for monitoring and verification of the net energy exported to the grid. HPSEB will pay to project proponents based on this document.

The above document will be preserved for verification of emission reductions from the projects, in safe storage. Supporting documents such as receipts of payments released by HPSEB will also be preserved 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 activities whichever occurs later.

**Annex 1****CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY**

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