



**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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10 MW Renewable Energy Project for a Grid at Taraila, Himachal Pradesh

A.2. Version and Date :

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SSC-CDM- Bundle Version 1, 10th November, 2006

Version: 03 dt.13/03/2007

A.3. Description of the Bundle and the subbundles :

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The project activity is a bundle of two individual hydroelectric projects of capacity 5 MW each on the Baira khad located in Chamba district of Himachal Pradesh state, India. The generated power will be exported to Himachal Pradesh State Electricity Board (HPSEB), a state owned power utility company.

The two projects that form part of the bundled CDM project activity are:

- a) 5 MW Upper Taraila small hydroelectric project
- b) 5 MW Taraila II small hydroelectric project

The two hydroelectric projects together supply 50.51 GWh of electricity to HPSEB. The project activity will reduce the Green house gas emissions produced by thermal energy using fossil fuels and the annual emission reductions will be of the order of 36,031 tons of CO₂.

Upper Taraila SHP is proposed as a run of the river scheme on Upper Taraila rivulet, a tributary of Baira nallah, which is a tributary of Ravi river. The scheme is 0.5 km away from the Upper Taraila village.

Taraila II SHP is also proposed as a run of the river scheme on Taraila rivulet, which is 1.5 km away from the village Dumas. Taraila II is located at a distance of 4 km from Upper Taraila project.



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A.4. Project participants:

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| Name of Party involved (*) (host) indicates a host Party) | Private and/or public entity(ies) project participants (*) (as applicable) | Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No) |
|--|---|--|
| India (Host) | Private Entity: AT Hydro (P) Ltd. & Cimaron Power Ltd | No |

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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Himachal Pradesh

B.1.3. City/Town/Community etc:

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| | <u>Upper Taraila SHP</u> | <u>Taraila SHP</u> |
|-------------|---------------------------------|---------------------------|
| Village | Upper Taraila | Taraila (near Dumas) |
| Taluk/Block | Tisa | Tisa |
| District | Chamba | Chamba |

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

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The locations of the two SHPs are as follows:

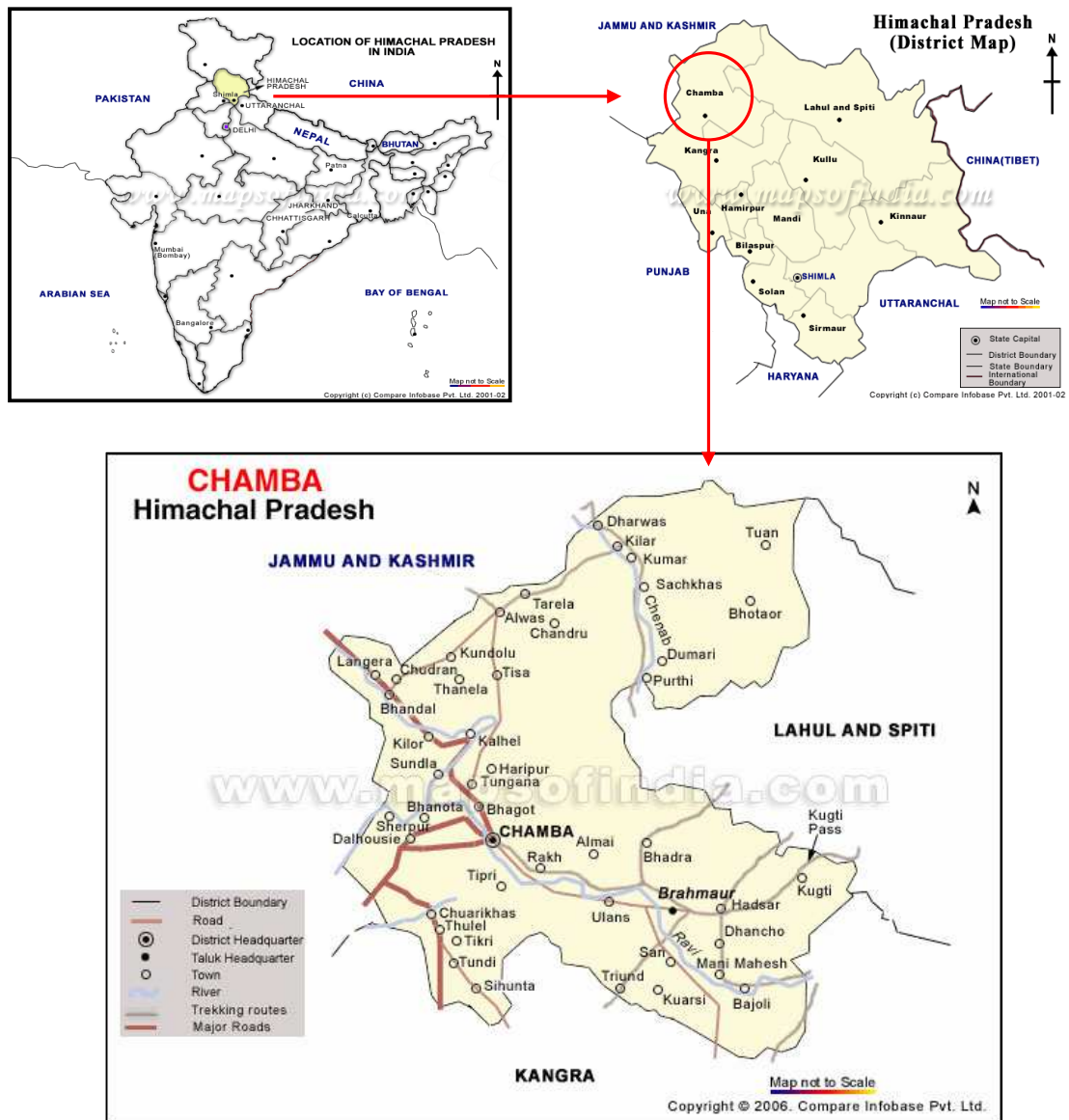
Upper Taraila SHP:

The proposed project is located 0.5 km away from the village Upper Taraila of taluk Tisa in Chamba district of Himachal Pradesh. The village is 99 km from Chamba town, the district head quarter. The power house site is located near Upper Taraila and is about 93 km from Chamba. From Tisa, a 5/7 m wide metalled road of about 43 km length connects upper Taraila village. The state capital Shimla is 544 km away from Upper Taraila, which is also the nearest airport. The geographical co-ordinate of the project site is between longitude 76°08'10" E and 76°09'50" E and latitude 33°55'10" N and 33°53'55" N.

Taraila II SHP:

The Taraila SHP is located in Taraila, near village Dumas of Tisa Taluk in Chamba district. The small township in Taraila is located about 97 km from Chamba town, the district head quarter. The power house site is located near Dumas village and is about 90 km from Chamba. From Tisa a 5/7 m wide metalled road of about 40 km length connects Dumas village. The state head quarter Shimla is 540 km away from the village Dumas. The geographical co-ordinate of the project site is between longitude 76°08'10" E and 76°09'50" E and latitude 34°54'50" N and 32°52'55" N. Physical location of the project is marked in the maps below:

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Map : Location of Project Site in Chamba district of Himachal Pradesh in India

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

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Type & Category:

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

Project Type: Type I – Renewable Energy Projects



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Category I.D: Renewable Electricity Generation for a grid

The project activity utilizes renewable hydro potential for power generation and exports the generated power to the grid. Since, the capacity of the CDM project is 10 MW, which is less than the qualifying capacity of 15 MW, the project activity is regarded as small-scale CDM project activity and UNFCCC indicative simplified modalities and procedures are applied.

Technical details of the project activity:

The technology employed for power generation in a hydroelectric plant is, converting the potential energy available in the water flows into mechanical energy using hydro turbines and then electrical energy using alternators. The generated power will be transformed to match the nearest grid substation for proper interconnection and smooth evacuation of power.

The 10 MW Taraila grid connected hydroelectric project is a bundled project of two small scale hydel projects namely Upper Taraila and Taraila II of 5 MW each. Each hydroelectric project comprises a conveyance channel, control structure, flushing conduit, desilting tank, power channel, forebay, penstock, power house, and tail race channel.

Power station in each project comprises two identical power-generation units of capacity 2500 kW each. Power will be generated at a lower voltage level, which will be stepped up to higher voltage level within the project boundary to facilitate export of power to the Himachal Pradesh State Electricity Board (HPSEB). The average annual gross energy expected to be generated in a year is 54.90 GWh and the net energy available for sale is 50.51 GWh.

Brief technical parameters of both the projects under the CDM project activity are furnished below:

| Parameter | Upper Taraila Project | Taraila – II Project |
|-----------------------------------|-----------------------|----------------------|
| <i>Hydrology</i> | | |
| Design flow | 3.68 Cumecs | 4.88 Cumecs |
| Gross head | 170.00 m | |
| Net rated head | 162.90 m | 122.00 m |
| <i>Energy</i> | | |
| Gross energy generation | 27.66 GWh | 27.25 GWh |
| Auxiliary Consumption | 2.21 GWh | 2.18 GWh |
| Annual export to the grid | 25.44 GWh | 25.07 GWh |
| <i>Plant Equipment</i> | | |
| Type of hydro turbine | Horizontal Francis | Horizontal Francis |
| Type of generator | Synchronous | Synchronous |
| No. of generating units | Two | Two |
| Capacity of each generating units | 2500 kW | 2500 kW |
| Generation voltage | 3.3 kV | 3.3 kV |
| Grid interfacing voltage | 33 kV | 33 kV |
| Frequency | 50 Htz | 50 Htz |



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Technology transfer:

No technology transfer from other countries is involved in the project.

Demonstration for being with in the limits of SSC through out the crediting period:

The water and power studies carried out for this project demonstrate that the project activity will remain under the limits of SSC throughout the crediting period. To determine the capacity of the power plant two important inputs are required, viz. the head available and discharge of water in the stream. The hydrology studies carried out have established the envisaged capacity of the plant. Based on the head and discharge available for the two SSC projects, the optimum capacity of each power plant has been envisaged at 5 MW. Thus the capacity of the bundled project activity is 10 MW, which is below the 15 MW limit¹ of output-capacity for small-scale projects and therefore the project qualifies as a small-scale CDM project.

By keeping the above considerations, the project proponent declares that the project will be within the limits of small scale through out the crediting period.

B.3 Estimated amount of emission reductions over the chosen crediting period:

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Emission reductions due to the project activity depend on the energy fed to the Northern Regional grid and the content of fossil fuel based generation in the Northern grid system. Hence, power fed to the regional grid and the generation mix in the baseline region becomes the basis for estimating emissions reductions.

The expected emission reductions are calculated based on the net electricity sales and simple weighted average emission factor² of 713.32 tCO₂/GWh for the Northern Grid. The resulting emission reductions are 36,031 tCO₂ / annum, which is 360,310 tCO₂ certified emission reductions (CER) during the chosen crediting period of 10 years. Annual estimates of emission reductions by the project activity during the crediting period are furnished below.

Table A 1: Annual estimation of Certified Emission Reductions (CERs)

| Years | Annual estimation of emission reduction in tonnes of Co ₂ e |
|-------|--|
| 2007 | 36,031 |
| 2008 | 36,031 |
| 2009 | 36,031 |
| 2010 | 36,031 |
| 2011 | 36,031 |
| 2012 | 36,031 |
| 2013 | 36,031 |
| 2014 | 36,031 |
| 2015 | 36,031 |
| 2016 | 36,031 |

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>

² “CO₂ Baseline Database” published by CEA



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| | |
|---|---------|
| Total Emission reductions (Tones of CO ₂ e) | 360,310 |
| Total number of crediting years | 10 |
| Annual average over the crediting period of estimated reductions (tones of CO ₂ e) | 36,031 |

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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01/02/2006

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

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C.2.1. Renewable crediting period:

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Not Chosen

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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01/10/2007

C.2.2.2. Length:

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10y-0m

**SECTION D. Application of a monitoring methodology:**

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Name of Methodology: *Metering the Electricity Generated by the Renewable Technology*Reference: **Clause 13 of AMS ID Appendix B** of simplified modalities and

The following data is to be monitored to ascertain project emissions and emission reductions.

| ID number | Data type | Data variable | Data unit | Measured (m), calculated (c) or estimated (e) | Recording frequency | Proportion of data to be monitored | How will the data be archived? (electronic/paper) | For how long is archived data to be kept? | |
|-----------|-----------------|---------------------------|-----------------------|---|---------------------|------------------------------------|---|---|--|
| D.3.1 | Power | Gross Generation* | kWh | M | Continuous | 100% | Electronic and Paper | Crediting period plus 2 years | |
| D.3.2 | Power | Auxiliary Consumption* | kWh | M | Continuous | 100% | Electronic and Paper | Crediting period plus 2 years | |
| D.3.3 | Power | Power Import* | kWh | M | Continuous | 100% | Electronic and Paper | Crediting period plus 2 years | |
| D.3.4 | Power | Power Export* | kWh | M | Continuous | 100% | Electronic and Paper | Crediting period plus 2 years | |
| D.3.5 | Emission Factor | Grid Emission Factor (EF) | tCO ₂ /GWh | ----- | ----- | 100% | Electronic and Paper | Crediting period plus 2 years | |

* The data variable will be monitored for both Upper Taraila and Taraila II SHPs

**CDM-SSC-BUNDLE****Monitoring Plan**

All the parameters mentioned in the monitoring plan will be monitored in the plant. The entire process of monitoring will be made available in the required format during the verification process and for subsequent useful purposes. Energy exports, imports and auxiliary consumption, etc are being maintained in different formats.

The calibration of monitoring equipment will be maintained as per the requirement of HPSEB and the same will be done accordingly. Power Generation, Import, Export & Auxiliary Consumption are being recorded daily and the same will be verified and approved by General Manager of the plant. These records are being sent to Head Office for review and for corrective actions if necessary.

The Plant will be equipped with energy meters/export meters for monitoring and control purpose. There are two energy meters at HPSEB sub station to measure the export power, namely main meter and check meter with 0.5 class accuracy. The energy meters shall be tested and calibrated utilizing a standard meter. The standard meter shall be calibrated once in a year at the approved laboratory of Govt. of India or Govt. of Himachal Pradesh as per terms and conditions of supply. The tests of meters shall be jointly conducted by authorised representatives of both the parties and the results and correction so arrived at mutually will be applicable and binding on both the parties. The energy meters shall not be interfered with, tested or checked except in the presence of representatives of company and HPSEB. If any of the meters is found to be registered inaccurately, the affected meter will be replaced immediately. The meters will be checked in presence of both the parties on mutually agreed periods. If during the test checks both the meters are found beyond permissible limits of error, both the meters shall be immediately replaced and the correction will be applied to the consumption registered by the main meter to arrive at the correct energy exported for billing purposes for the period of one month up to the time of test check, computation of exported energy for the period thereafter till next monthly reading shall be as per the replaced meter.

Corrections in exported energy shall be applicable to the period between the two previous monthly reading and the date and time of test calibration in the current month when error is observed. Power generation, export and auxiliary consumption are being recorded at the plant from the installed meters. However, for applying monthly bill to HPSEB the meter readings will be taken every month by HPSEB officials in presence of company representatives and readings will be jointly certified.

The following log sheets will be maintained for the critical equipment of the plant and readings are being recorded on day to day basis:

1. Turbine log
2. Electrical log

If both check meters fail to record or if any of the PT fuses are blown out, the exported energy will be computed on a mutually agreeable basis for the point of defect. Power generation, export and auxiliary consumption, will be recorded at the plant daily and the same is being verified by General Manager of the plant. These records sent to head office for review by the director and for corrective actions if necessary. Emission levels are being monitored as per the statutory requirement.



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Annex 1**CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY****PROJECT PARTICIPANT – 1 (Upper Taraila HEP)**

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|------------------|--|
| Organization: | AT Hydro (P) Limited |
| Street/P.O.Box: | Plot No.125, Nava Nirman Nagar, Road No.71, Jubilee Hills, |
| Building: | |
| City: | Hyderabad |
| State/Region: | Andhra Pradesh |
| Postcode/ZIP: | 500033 |
| Country: | India |
| Telephone: | 91-40-23541603 |
| Fax: | 91-40-23541604 |
| E-Mail: | mrr@vamshirubber.org |
| Represented by: | |
| Title: | Director |
| Salutation: | Mr. |
| Last Name: | Reddy |
| Middle Name: | Ramesh |
| First Name: | M |
| Department: | |
| Mobile: | 91-98488 48436 |
| Personal E-Mail: | mrr@vamshirubber.org |



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PROJECT PARTICIPANT – 2 (Taraila-II HEP)

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|------------------|--|
| Organization: | Cimaron Power Limited |
| Street/P.O.Box: | Plot No.125, Nava Nirman Nagar, Road No.71, Jubilee Hills, |
| Building: | |
| City: | Hyderabad |
| State/Region: | Andhra Pradesh |
| Postcode/ZIP: | 500033 |
| Country: | India |
| Telephone: | 91-40-23541603 |
| Fax: | 91-40-23541604 |
| E-Mail: | mrr@vamshirubber.org |
| Represented by: | |
| Title: | Managing Director |
| Salutation: | Mr. |
| Last Name: | Reddy |
| Middle Name: | Ramesh |
| First Name: | M |
| Department: | |
| Mobile: | 91-98488 48436 |
| Personal E-Mail: | mrr@vamshirubber.org |