**CLEAN DEVELOPMENT MECHANISM**
**SIMPLIFIED PROJECT DESIGN DOCUMENT**
**FOR SMALL-SCALE PROJECT ACTIVITIES (SSC-CDM-PDD)**
**Version 02**

**CONTENTS**

**Revision history of this document**

| Version Number | Date | Description and reason of revision |
|---|---|---|
| 01 | 21 January 2003 | Initial adoption |
| 02 | 8 July 2005 | • The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document.<br>• As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>. |

## SECTION A. General description of the small-scale project activity

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

>>
Title: 10 MW Renewable Energy Project for a Grid at Taraila, Himachal Pradesh.
Version: 03 dt.13/03/2007

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

>>
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 $CO_2$.

**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.

The implementation of the project activity would bring in the following local benefits:

- Employment to local poorer section of the population and thereby reducing urban migration
- Availability of reliable and stable power in the local area.
- Energy for domestic and commercial purpose and thereby reducing dependencies on forests
- Development of rural industries such as fruit processing and preservation industries, power looms for wool production and other cottage industries.
- Climate change mitigation, through renewable energy generation and reducing the demand for fossil fuel based power
- Contributing to the national electricity capacity through additional power generation

**View of project participant about the project activity's contribution to Sustainable Development**

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

1. Social well-being
2. Economic-well being
3. Environmental well being and
4. Technological-well being

The project activity contributes to the above indicators in the following manner.

Social Well-Being

The location where the project has been proposed is a rural area and is backward due to the extremely harsh climatic conditions. Majority of population depend upon marginal cultivation in the terraced fields or work as labourers. The economic condition of the area is poor due to low agricultural yield and adverse climatic conditions. Setting up of the hydro projects will open up employment opportunities in the local area by making available clean hydro power especially for power intensive industries and to its population for their socio-economic upliftment as well as for improving their living conditions and life styles.

The project activity feeds the generated power to the nearest substation at Nakror. Energy availability and quality of the power improves significantly under the service area of the substation. The electrical energy produced shall be utilized for augmenting the energy supply in the local rural distribution network. The stable supply of power in the region reduces drudgery in women, eases working hours, increase access to media, enhance general standard in their lives.

Economic Well-Being

Project proponents will mobilise investment to the region to an extent of about Rs. 522.27 millions which otherwise would not have happened in the absence of the project activity. This is a significant investment in a remote area.

Project activity will be implemented in a rural area, which does not have proper roads and other infrastructure facilities. These villages get benefited by the project activity since project proponents will be developing basic infrastructure such as communications, schools, medical facilities and the same could be utilised by the local population. As per the requirements of project implementation, the project proponents are required to spend 1% of the total project investment towards local area development. A sum of Rs. 5.17 millions will be spent in the local area for creating minimum amenities as detailed above which would not have happened in the absence of the project activity.

The project may bring a change in life and economy of the local people with the availability of power. It will open opportunities of self-employment and definitely boost their income. The local people can open restaurants and food centres and hotels etc. to boost their income, as the project area has lot of potential in tourism sector.

After commissioning of the projects, local people can develop cottage industry in the area with better power availability. These industries can be selected on the basis of raw-material available in the region such as wool, wood, and herbs etc. Local farmers can develop green houses for growing vegetables and set up breeding farms for sheep, goats, rabbits etc. Availability of Electricity will lead to Tourism, which in turn will be a source of income for the local people.

Environmental Well-Being

The proposed project activity utilises hydro potential available for power generation. The state of Himachal Pradesh is part of Northern Regional grid system. Since the project activity will not result in increase of GHG emissions, it will reduce the carbon intensive nature of the Northern Grid which is

dominated by fossil fuels such as coal, lignite and gas. The project activity will cause no negative impact on the environment both at local as well as at the global level. Further, the project activity does not result in degradation of any natural resources, health standards, etc. at the project area. The project will not cost any air, water, or noise pollution at the local level.

Technological Well-Being

The project will result in utilisation of environmentally safe and sound technologies in small-scale hydroelectric power sector. Further the project demonstrates harnessing hydro potential in small streams and encourages setting up of such new projects in future. The project generates real, measurable and long term emissions reductions.

The above benefits due to the project activity ensure that the project would contribute to the sustainable development of the region.

**A.3. 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:<br>**AT Hydro (P) Ltd.**<br>**&**<br>**Cimaron Power Ltd** | No |

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

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

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**A.4.1.1. Host Party(ies):**

>>

India

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

>>

Himachal Pradesh

**A.4.1.3. City/Town/Community etc:**

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

**A.4.1.4. Detail of physical location, including information allowing the unique identification of this small-scale project activity (ies):**

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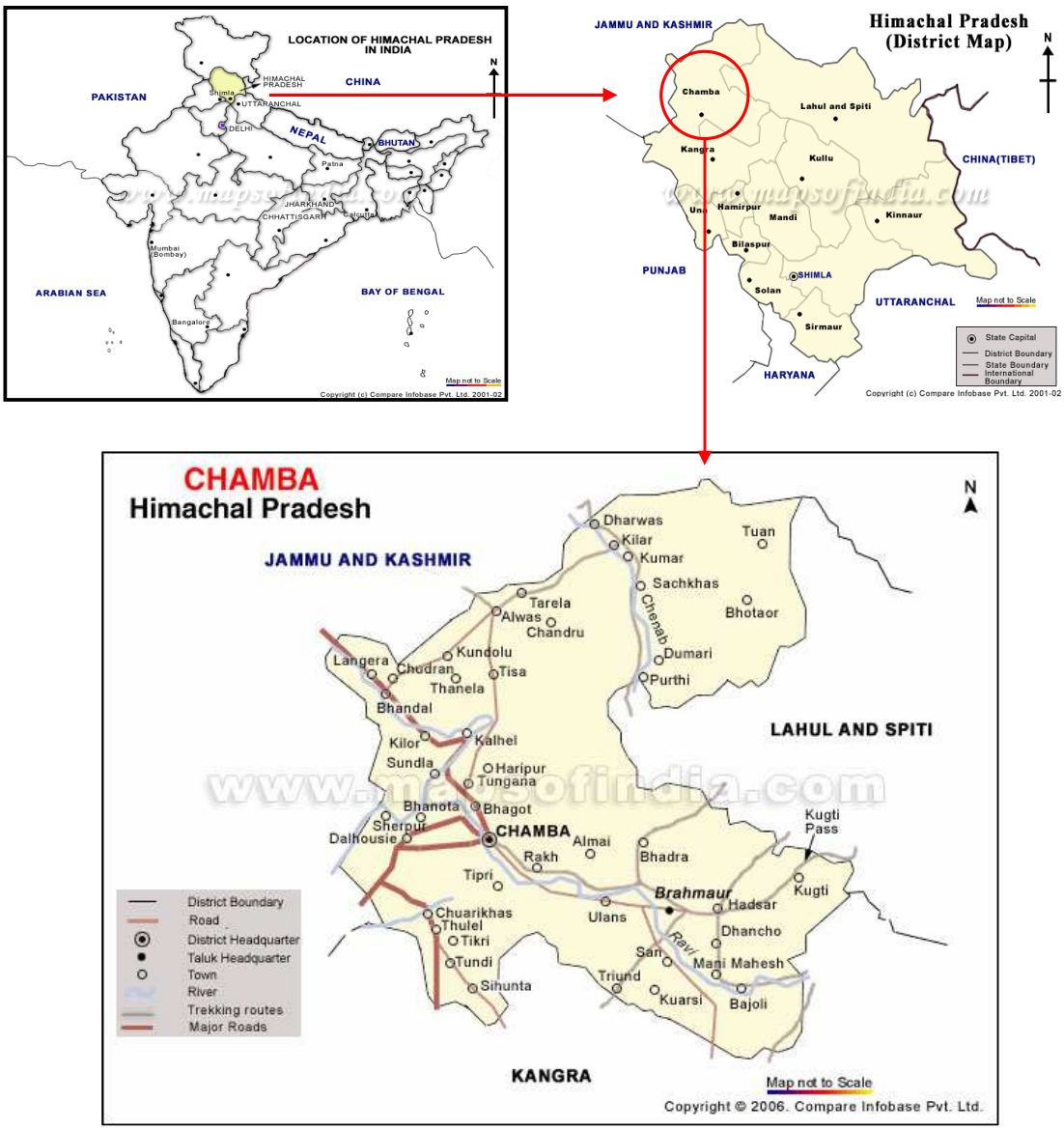
The locations of the two SHPs are as follows:

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 $76^0 08' 10''$ E and $76^0 09' 50''$ E and latitude $33^0 55' 10''$ N and $33^0 53' 55''$ 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 $76^0 08' 10''$ E and $76^0 09' 50''$ E and latitude $34^0 54' 50''$ N and $32^0 52' 55''$ N. Physical location of the project is marked in the maps below:




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

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

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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
**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** |
|---|---|---|
| | | |
| ***Hydrology*** | | |
| Design flow | 3.68 Cumecs | 4.88 Cumecs |
| Gross head | 170.00 m | |
| Net rated head | 162.90 m | 122.00 m |
| | | |
| ***Energy*** | | |
| 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 |
| | | |
| ***Plant Equipment*** | | |
| 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 |

**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 limit[1] 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.

**A.4.3. Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHGs) by sources are to be reduced by the proposed small-scale project activity, including why the emission reductions would not occur in the absence of the proposed small-scale project activity, taking into account national and/or sectoral policies and circumstances:**

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**Project activity and baseline scenario**

The project activity is setting up of two small hydro projects of 5 MW each. The proposed project activity generates electricity-using hydro potential and exports the generated power to the regional grid system, which is northern region grid. Hence, the generation by the proposed project activity is non-GHG source and it is expected that the proportion of fossil fuel based generation in the grid will be reduced by the project activity leading to lesser carbon intensity in the grid.

The baseline scenario in the absence of project activity continuous to be highly carbon intensive and emission reductions generated by the project activity are additional. The associated emissions are calculated based on the net amount of electricity fed into the grid and the simple weighted emission factor for the grid. The project activity neither results in any direct emissions of green house gases nor in any leakage outside the project boundary.

**Additionality:**

The project activity is not usual as the baseline scenario and the emissions reductions would therefore not occur in the absence of the project activity. The project activity is not required by law, and the national and state policies in place are not sufficient to make the project commercially viable on its own.
Most importantly, the project activity faces barriers, which in the absence of CDM would be prohibitive. These barriers include:

- Investment barriers related to lack of transmission system for evacuation of power, high specific investment cost;
- Remote location combined with lack of infrastructure and qualified labour force;
- Significant risk of cost overruns and delays in the construction phase, due to difficult terrain and geology and high elevation;

[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

- Lack of comprehensive hydrological data;

In addition, prevailing practice is a key barrier for the project activity. Small-scale hydro projects are not a common practice in Himachal Pradesh. Instead, the focus of generation in the State of Himachal Pradesh is on large hydro. Very few small-scale hydro projects are in operation in the state today, despite the large potential for such schemes. The existing small hydro schemes are mostly government-owned and quite old. Of the few small scale projects that have been taken up recently by the private sector, the majority are known to rely on the CDM revenue.

CDM will help to make the proposed project activity viable. The CDM revenues will help to deal with various risks described above. In addition, CDM revenues are in hard currency and come typically from CER buyers with a good credit rating. This helps to mitigate the credit and currency risks associated with a publicly owned Indian power off-taker.

For details on the baseline, additionality and national / sectoral policies, please refer to Sections B.3.

**A.4.3.1 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 factor[2] of 713.32 $tCO_2$/GWh for the Northern Grid. The resulting emission reductions are 36,031 $tCO_2$ / annum, which is 360,310 $tCO_2$ 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 |
| **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** |

[2] "$CO_2$ Baseline Database" published by CEA

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

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The project activity does not involve any public funding from Annex 1 countries.

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

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In accordance with Appendix C[3] of the Simplified Modalities and Procedures for Small-Scale CDM project activities "DETERMINING THE OCCURANCE OF DEBUNDLING", it can be confirmed that this project activity is not a debundled component of a larger CDM project.

No other CDM activity has been undertaken by the project participant, which is in the same project category and whose boundary is within 1 km of the project boundary of this project activity at the closest point.

## SECTION B. Application of a baseline methodology:

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

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Project Category Title: **Type I**, Renewable Energy project, Renewable Electricity Generation for grid.
Reference: **AMS I.D**, Version 10 (23rd December, 2006)

**B.2 Project category applicable to the small-scale project activity:**

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With a capacity of 10 MW, the proposed hydro project activity qualifies as small scale project and therefore is eligible to use approved methodology AMS I.D. The application of the methodology is described below.

**Selection and justification of calculation approach:**

The project activity is located in the State of Himachal Pradesh which is part of Northern regional grid system. The boundary for determining the baseline emission factor is the Northern Region of India as defined by Central Electricity Authority (CEA).

The baseline emissions are calculated based on the net energy provided to the grid (in GWh /year), and an emission factor for the displaced grid electricity (in $tCO_2$ /GWh). AMS I.D requires that the baseline emission factor be calculated in a transparent and conservative manner, based on either

(a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the approved methodology ACM0002.

**Or**

(b) The weighted average emissions (in kg CO2equ/kWh) of the current generation mix.

The baseline emission factor has been considered from the "**$CO_2$ Baseline Database**" published by CEA[4]. The emission factor published by CEA for the latest year 2004-05 is 713.32 $tCO_2$/GWh based on weighted average approach and 754.60 $tCO_2$/GWh based on combined margin approach. As required by

[3] http://cdm.unfccc.int/EB/Meetings/007/eb7ra07.pdf
[4] $CO_2$ Baseline Database, http://www.cea.nic.in/planning/c%20and%20e/Govertment%20of%20India%20website.htm

the methodology, the project proponents, following conservative approach, have considered weighted average emission factor for determining the emission reductions. Actual emission reductions will be calculated ex post based on the actual baseline emission factor for each year.

**B.3. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:**

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**a) Justification for application of simplified methodology to the project activity**

The capacity of the proposed project is 10 MW and the project activity is generation of electricity for a grid system using hydro potential. Hence, the type and category of the project activity meets the criteria specified under I.D. in Appendix B of the indicative simplified baseline and monitoring methodologies for small scale CDM project activities as well as those related to demonstration of additionality for small-scale activities (Attachment A to Appendix B).

**b) National Policies and Circumstances**

**National policy on Coal, Lignite, Oil and Natural Gas**

The Ministry of Power (MoP), Government of India has set an agenda of providing power for all by the year 2012. To meet the present national deficit of 8.4%[5] and to achieve the above target, around 100,000 MW of new capacity needs to be added by the end of 2012 to the existing installed capacity of 126,089[6] MW. In line with the Five Year Plan system being followed by the Planning Commission of India, the MoP decided to add about 46,000 MW during the period 2002-2007 and about 61,000 MW during the period 2008-2012. Emphasis has been laid on setting up large pithead stations to avoid high costs associated with transporting high ash bearing Indian coal and over-straining the already stretched rail network.

To push forward the power sector reforms further, the Government of India has opened up the coal sector for private participation. Captive coal mining is allowed by the Ministry of Coal to facilitate coal mining by power generating units for their fuel needs. In addition, coal imports are allowed for power projects. This has significantly strengthened the preference of the private sector for coal-based mega power projects over other energy sources.

The Government of India has also opened oil and natural gas exploration for private sector participation. In the oil and natural gas sector, both central sector and private sector organisations are involved and already exploring the potential available in India.

**Hydropower Policy in India and Himachal Pradesh**

The grid electricity in India today is clearly dominated by thermal generation, predominantly coal. The overall nationwide mix of thermal to hydroelectric power stands currently at around 83:17[7] (Source www.cea.nic.in as on March 2006).

The National Policy on Hydropower Development provides for exploitation of untapped potential located in the Northern and North Eastern States. Ministry of Power (MOP) has developed appropriate strategies to fully exploit the country's hydro potential and accords high priority for its development. MoP has

[5] CEA report as on 30th June 2006. www.cea.nic.in/planning/POWER SCENARIO AT A GLANCE/ index.htm
[6] CEA report as on 30th June 2006. www.cea.nic.in/planning/POWER SCENARIO AT A GLANCE/ index.htm
[7] http://www.cea.nic.in/god/opm/Monthly_Generation_Report/18col_06_03.pdf

identified some of the potential sites for hydropower development. However, the focus of these initiatives is clearly on large and medium-sized projects (Refer Table B.1).

The levels of industrialisation and power consumption in Himachal Pradesh are relatively low. The state is an important net exporter of electricity within the Northern Grid. Power generation in Himachal Pradesh is today based exclusively on hydro power. Most of this generation comes from large stations with installed capacities between 100 and 1,500 MW. The total installed capacity of hydro power in the state was 1471.9 MW as of June 2006[8]. Thereof, only 89.5 MW[9] were small hydro schemes with a capacity below 25 MW.

Likewise, the capacity additions in Himachal Pradesh in the 10th plan and 11th plan periods are exclusively focused on hydro. Table B.1 provides a breakdown of the capacity additions in the 10th plan and their status. The plan does not include any small hydro schemes in the state, except one unit of 8.7 MW.

**Table B.1 Capacity Addition during 10th Plan**

(As per Planning Commission target for the state – Himachal Pradesh). Source: www.cea.nic.in

| Project Name | Type | Status | Installed Capacity (MW) | Capacity Addition During Xth Plan (MW) | Benefits Shares of state (MW) | Commissioned/ slipped during 2002-2007 | | Last Unit Commissioning Date/ (Likely Date of Commissioning) |
|---|---|---|---|---|---|---|---|---|
| **CENTRAL-SECTOR** | | | | | | | | |
| NATHPA JHAKRI | H | S | 1500.00 | 1500.00 | 547.00 | COMM | 1500.00 | 31.03.2004 |
| TEHRI-ST-I | H | S | 1000.00 | 1000.00 | 28.00 | | | (JUNE,2006) |
| DHAULIGANGA | H | S | 280.00 | 280.00 | 10.00 | COMM | 280.00 | 17.10.2005 |
| DULHASTI | H | S | 390.00 | 390.00 | 14.00 | | | (JULY,2006) |
| CHAMERA-II | H | S | 300.00 | 300.00 | 47.00 | COMM | 300.00 | 26.02.2004 |
| TEHRI ST II PSS | H | S | 1000.00 | 1000.00 | 28.00 | SLIP | 1000.00 | (2009-2010) |
| KOTESHWAR | H | S | 400.00 | 400.00 | 11.00 | SLIP | 400.00 | (2007-2008) |
| RIHAND -II | T | S | 1000.00 | 1000.00 | 33.00 | COMM | 1000.00 | 24.09.2005 |
| SEWA ST.II | H | C | 120.00 | 120.00 | 4.00 | SLIP | 120.00 | (2007-2008) |
| RAMPUR | H | N | 400.00 | 400.00 | 62.00 | SLIP | 400.00 | (2010-2011) |
| UNCHAHAR III | T | N | 210.00 | 210.00 | 8.00 | | | (JULY,2006) |
| DADRI II | H | N | 490.00 | 490.00 | 16.00 | SLIP | 490.00 | (2011-2012) |
| BARSINGSAR LIGN | T | N | 500.00 | 250.00 | 8.00 | SLIP | 250.00 | (2009-2010) |
| KAHALGAON-II | T | C | 1320.00 | 660.00 | 13.00 | SLIP | 160.00 | IN ADD PROJ. |
| BARH | T | C | 1980.00 | 660.00 | 20.00 | SLIP | 660.00 | (2009-2010) |
| NORTH KARANPURA | T | N | 1980.00 | 660.00 | 18.00 | SLIP | 660.00 | (2011-2012) |
| TALA REPLACE. | T | S | 1020.00 | 1020.00 | 52.00 | | | (2006-2007) |
| **CENTRAL-SECTOR TOTAL:-** | | | | | **919.00** | | | |
| **STATE-SECTOR** | | | | | | | | |
| LARGI | H | C | 126.00 | 126.00 | 126.00 | | | (MAY,2006) |
| KASHANG-I | H | N | 66.00 | 66.00 | 66.00 | SLIP | 66.00 | (2010-2011) |
| SMALL HYDRO | H | S | 8.78 | 17.00 | 17.00 | | | |
| **STATE - SECTOR TOTAL:-** | | | | | **209.00** | | | |
| **PRIVATE-SECTOR** | | | | | | | | |
| BASPA-2 * | H | S | 300.00 | 300.00 | 300.00 | COMM | 300.00 | 27.05.2003 |
| DHAMVARI SUNDA | H | C | 70.00 | 70.00 | 70.00 | SLIP | 70.00 | (2010-2011) |
| **PRIVATE-SECTOR TOTAL:-** | | | | | **370.00** | | | |
| **GRAND-TOTAL:-** | | | | | **1498.00** | | | |

**HIMURJA Policy**

Himachal Pradesh Energy Development Agency (HIMURJA) founded in 1989, is the nodal agency of Government of Himachal Pradesh for development of hydro projects. HIMURJA's main objective is to promote projects less than 5 MW in order to exploit hydro potential and to harness clean form of energy

[8] Page No: 15, CEA report as on 30th June 2006. www.cea.nic.in/planning/POWER SCENARIO AT A GLANCE/ index.htm
[9] www.hpseb.com/hydro_potential.htm

by involving private sector participation. HIMURJA has framed elaborated guidelines for allotment of projects to the private investors and every investor who would like to set up a small hydro project in the state has to follow meticulously the guidelines framed.

HIRMUJA has so far signed implementation agreement for about 64 projects for a total capacity of 186.35 MW[10]. Out of these projects only 10 projects with a total capacity of 22.35 MW have been commissioned. (Source: Statistics from HIMURJA).

## c) Barrier Analysis

Under UNFCCC simplified modalities, project activity should seek to establish additionality of the project activity as per Attachment A to Appendix B, which lists various barriers, out of which at least one barrier shall be identified due to which the project would not have occurred any way. Project participants identified the following barriers for the proposed project activity.

***i) Investment Barriers.***

The investment of over Rs.52.28 million per MW required for the implementation of the project activity is high compared to the investment required for setting up of the least cost generation option a conventional power plant.

In addition to higher investment cost the project proponents have noticed the following serious barriers for implementation of the project activity.

Transmission Risks:

The evacuation of power generated by the project to the grid is a major concern. At present there are no facilities for evacuation of power from the project activity. There is 11/33 kV sub station at Nakror, which is about 15 km from the powerhouse site. However this substation has no capacity to evacuate power. The next substation is located at Bathri at a distance of 60 km. The conductor connecting between 132 kV Bathri and Nakror sub stations is '*Dog*' conductor and cannot properly evacuate the power. If transmitted the losses will go up as high as 25% and the maximum capacity it can evacuate is 5 MW. Therefore the same is not suitable for power evacuation. In order to make the project activity feasible, the project proponents' are proposing a 132 kV sub station at Kurtala Village which in turn is connected to Bathri 132 kV sub station, which is about 43 km. The Proposed sub station will have capacity to transmit 100 MW. The cost involved is about Rs.400 million, which will be shared by about 20 independent power projects that are expected to come up in the same area. Each project will have to invest an amount of Rs.20 million for the construction of the transmission line. If the required number of developers is not pooled in time to take up the transmission construction activity, there will be extra burden on the project proponent for mobilising additional funds for taking up the construction of transmission lines. This is a serious barrier involving additional investment as well as extra effort, which if not established in time might affect the project implementation and may result in cost over runs.

Lack of infrastructure:

The project location is underdeveloped, hence no infrastructure such as roads, electricity, communication, transportation and proper civic amenities etc. are available. Each of these projects requires laying approach road up to a length of 1 to 1.5 km for carrying construction material. The project promoters have to make additional investments to develop these facilities before implementation

[10] www.himachal.nic.in/himurja/ongprojects..html

of the project. An approach was planned for Upper Taraila with an investment of Rs.0.38 million but by the time the same is completed, the cost went up to Rs.2.85 million which is an indication that how the estimates go wrong in these terrains.

The project activity area has no proper civic infrastructure facilities such as banks, schools, post office, medical facilities etc. The nearby town is Tisa located a t a distance of 25 km. Banks, medical facilities, public telephone, schools are located at Tisa and one has to go up to this town for usage of any of the facilities. Due to lack of the above facilities and as the location is far off and inaccessible, it is difficult to provide necessary technical skills and spares in case of breakdowns, necessitating long shutdown requiring heavy expenditure and loss of revenue. Access to skilled manpower is difficult due to poor accommodation and transport facilities.

Construction Risks:

The project proponents are facing several difficulties in procuring the materials as the transportation and storage involve huge investment and risk. Cement will have to be procured from Barmana on NH-21 in Bilaspur District, which is about 465 km from project site. Steel has to be procured from steel stockyard at Jalandhar, which is about 320 km from the project site. Other materials for the project activity shall be procured from Chamba or Pathankot, which are 90-100 km away from project site. These factors have a substantial impact on the cost of these materials and the construction cost.

These constructions involves labor working on hill slopes and the construction has to be carried out manually. So the labor would charge high costs for the work. This translates into risk with respect to possible cost overruns, and also possible delays in plant commissioning.

In addition, the project area experiences regular snow fall and sub-zero temperatures. As a result, work is hindered during winter season. This again translates into risk of delay for the construction and start of revenue generation.

***ii) Prevailing practice***

In the Indian power sector, the common practice is investing only in medium or large scale power projects, both fossil fuels fired and hydro power. This is evident from a host of planned projects that comprises mostly large-scale fossil fuel based power generation projects. This is mainly due to the assured return on investment, economies of scale and easy availability of finances. This is also true in the Northern Region. There are three main indicators proving that investment in small hydro power (defined as plants with a capacity not exceeding 25 MW) is currently not a common practice in India in general, or in Himachal Pradesh.

Contribution of small hydro to total power supply

The total installed capacity of power projects in India was 1,24,302 MW as on 30.04.2006.[11].Against this small hydro projects in operation in India was 1748 MW as on the same date, giving an idea of the contribution of small hydro projects in the total power generation at 1.40%. This percentage is only related to the installed capacities. It is a well known fact that plant load factor of the small hydro projects is generally less, compared to approx. 70-90% for thermal plants.

In the Northern region, the total installed capacity of power plants is 33,757 MW[12] against small hydro installations of 525 MW. This corresponds to a share 1.55% for small hydro. Out of the total

[11] www.cea.nic.in/Planning/Power Scenario at a glance
[12] Power Scenario at a glance for northern region , as on April 2006, www.cea.nic.in

installations of small hydro in Northern region, the contribution of Himachal Pradesh is to an extent of 112.2 MW[13] as per HPSEB or 0.33% of the total capacity in the Northern region.

Tapping of Small Hydro Potential

In Himachal Pradesh, the total hydro potential has been estimated at 20,400 MW, and the potential for small hydro projects (below 25 MW) is approx. 750 MW[14]. However, the total installed capacity of small hydro power plants is only 112.2 MW today. 89.5 MW of these was constructed by the state power generator HPSEB over several years. The remainder was established under the HIMURJA program, partly as CDM activities.

*iii) Other barriers:* Proposed projects face other barriers related to various risks as given below.

Slide zone:

The project area lies in a slide zone. Even a little spell of rain would disturb the terrain and there will be land slides affecting the movement of men and material.

Movement of material:

Transportation of material to the weir, water conductor system etc is difficult due to lack of proper approach, a rope way is being constructed for the purpose and mules are used for movement of material for short distances.

Hydrological risks:

Proposed projects are on stream with limited water flow and the power generation is possible whenever there is water flowing in the stream. Water flow is estimated based on Baira Nala located at a distance of 15 km.

The actual gauge data is not available for the river. Usually for a high head scheme the minimum amount of water available for power generation plays a significant role in power generation. The dependability has been arrived for various flows based on the data available for nearby catchments. This is a risk as the nearby catchments characteristics such as run-off, absorption etc. are not exactly studied. Hence, a possibility of error in the calculation of lower discharges cannot be ignored for energy calculations and lack of exact data on flows is a barrier for investments.

Hence, the proposed project is additional and not the same as the baseline scenario and would not have occurred without the CDM. CDM revenues are expected to leverage the project economics in case of any unforeseen outages due to the above uncertainties, and also CDM revenues will help the project proponents to overcome some of the barriers.

**d) Early Consideration of CDM:**

The project proponent has considered CDM as viable alternative to mitigate the barriers mentioned above. The proponents have approached Indian DNA as early as December 2004 for host country approval after appointing a consultant for the purpose. The documentary evidence of the various measures taken for considering CDM would be made available for validation.

[13] www.hpseb.com/hydro_potential.htm
[14] www.hpseb.com/hydro_ potential.htm

**B.4. Description of how the definition of the project boundary related to the baseline methodology selected is applied to the small-scale project activity:**

>>

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

The project boundary is therefore the physical boundary around the catchment areas, weirs, desilting tank, headrace tunnel, fore bay, penstock, powerhouse, tailrace and the transmission system till the evacuation point. The power generated from this project is metered and accurately quantifiable.

In addition, the project boundary also includes the connected electricity system, i.e. the Indian Northern grid, for the purpose of determining the baseline emission factor for displaced grid electricity. The Northern grid covers the following states: Delhi, Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab, Rajasthan, Uttar Pradesh, Uttaranchal and Chandigarh.

**B.5. Details of the baseline and its development:**

>>

The baseline for the project activity is according to clause 9.b of AMS ID, Version 10. i.e. weighted average emissions of the current generation mix (in $kgCO_2e/kWh$), applicable for Type I.D CDM project activities, as contained in Appendix B of simplified modalities and procedures for small scale CDM project activities.

Date of completion of the baseline: 21/12/06
Name of the person / entity determining the baseline: Zenith Energy Services (P) Ltd

Contact information of the above entity furnished below:

| | |
|---|---|
| Organization: | Zenith Energy Services (P) Limited |
| Street/P.O. Box, Building: | 10-5-6/B, My Home Plaza, Masabtank, |
| City: | Hyderabad |
| State/Region: | Andhra Pradesh |
| Postfix/ZIP: | 500 028 |
| Country: | India |
| Telephone: | +91- 40- 2337 6630, 2337 6631 |
| FAX: | +91- 40- 2332 2517 |
| E-Mail: | zenith@zenithenergy.com |
| URL: | www.zenithenergy.com |
| Represented by: | |
| Title: | Director |
| Salutation: | Mr. |
| Last Name: | Reddy |
| Middle Name: | Mohan |
| First Name: | Attipalli |
| Mobile | +91- 9849408485 |
| Direct Fax | +91- 40- 2332 2517 |
| Direct Telephone | +91- 40- 2337 6630, 2337 6631 |
| Personal E.mail | attipallimohan@gmail.com |

The above entity is not a project participant.

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

**C.1. Duration of the small-scale project activity:**

>>

**C.1.1. Starting date of the small-scale project activity:**

>>

01/02/2006

**C.1.2. Expected operational lifetime of the small-scale project activity:**

>>

30 years

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

>>

**C.2.1. Renewable crediting period:**

>>

Not chosen

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

>>

Not applicable

**C.2.1.2. Length of the first crediting period:**

>>

Not applicable

**C.2.2. Fixed crediting period:**

>>

**C.2.2.1. Starting date:**

>>

01/10/2007

**C.2.2.2. Length:**

>>

10y-0m

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

>>

**D.1. Name and reference of approved monitoring methodology applied to the small-scale project activity:**

>>

| | |
|---|---|
| Name of Methodology: | ***Metering the Electricity Generated by the Renewable Technology*** |
| Reference: | **Clause 13 of AMS ID Appendix B** of simplified modalities and Procedures for small-scale CDM project activities. |

**D.2. Justification of the choice of the methodology and why it is applicable to the small-scale project activity:**

>>

The project activity is generation of electricity using hydro potential and exporting the same to the grid system, which is also fed by both fuel sources such as fossil and non-fossil types. Emission reductions due to the project activity are considered to be equivalent to the emissions avoided in the baseline scenario by displacing the grid electricity. Emission reductions are related to the electricity exported by the project and the actual generation mix in the grid system.

Emission reductions due to the project activity are considered to be equivalent to the emissions avoided in the baseline scenario by displacing the grid electricity. Emission reductions are related to the electricity exported by the project and the actual generation mix in the grid system. The baseline emission factor is adopted from the "$CO_2$ Baseline Database" based on the weighted average emissions of the current generation mix for the fiscal year 2004/05 and will be updated ex-post during the crediting period. The data to be monitored to ascertain emission reductions out of the project activity is to measure the amount of electricity generated through energy meters and the emission factor each year based on data available from CEA. With this information, a reliable estimate of the amount of emission reduction can be made.

**D.3 Data to be monitored:**

>>

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? | Comment |
|---|---|---|---|---|---|---|---|---|---|
| D.3.1 | Power | Gross Generation* | kWh | M | Continuous | 100% | Electronic and Paper | Crediting period plus 2 years | Meter is Calibrated and Regularly inspected by HPSEB |
| D.3.2 | Power | Auxiliary Consumption* | kWh | M | Continuous | 100% | Electronic and Paper | Crediting period plus 2 years | Meter is Calibrated and Regularly inspected by HPSEB |
| D.3.3 | Power | Power Import* | kWh | M | Continuous | 100% | Electronic and Paper | Crediting period plus 2 years | Meter is Calibrated and Regularly inspected by HPSEB |
| D.3.4 | Power | Power Export* | kWh | M | Continuous | 100% | Electronic and Paper | Crediting period plus 2 years | Meter is Calibrated and Regularly inspected by HPSEB |
| D.3.5 | Emission Factor | Grid Emission Factor (EF) | tCO2/ GWh | ------ | ------ | 100% | Electronic and Paper | Crediting period plus 2 years | Data is based on "$CO_2$ Baseline Database" published by CEA. |

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

**D.4. Qualitative explanation of how quality control (QC) and quality assurance (QA) procedures are undertaken:**

>>

| Data | Uncertainty level of data (High/Medium/Low) | Explain QA/QC procedures planned for these data, or why such procedures are not necessary |
|---|---|---|
| D.3.1 & D.3.2 | Low | This data item will be recorded at the project site which is under the control of project proponent. The energy generated and consumed is measured using calibrated meters and recorded by project proponent. Records of measurements will be used for calculating net export to grid. |
| D.3.3 | Low | This data will be recorded at the project site and the energy imported is measured using HPSEB calibrated meter. Records of measurements will be used for calculating net export to grid. Sales bills/receipts may be compared as an alternative proof of the power imported from HPSEB grid. |
| D.3.4 | Low | This data item will be recorded at the grid substation, which is under the control of HPSEB. The energy measured using calibrated meters and recorded at HPSEB substation will be monitored. Records of measurements will be used for verification of emissions reductions. Sales bills / receipts may be compared as an alternative proof of the power exported to the grid |
| D.3.5 | Low | Based on "$CO_2$ Baseline Database" published by CEA. The project participant has no influence on quality control procedures. |

**D.5. Please describe briefly the operational and management structure that the project participant(s) will implement in order to monitor emission reductions and any leakage effects generated by the project activity:**

>>

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 monitoring the 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 Boards may delegate the same to a competent person identified for the purpose. The identified person will be the in charge of GHG monitoring activities and necessary reports will be submitted to the management or it's Committee for review.

*Monitoring Requirements*

The monitoring plan includes monitoring of single parameter i.e. the energy fed to the HPSEB grid system. Emission reductions resulted from the project activity will be calculated using the energy fed in accordance with the calculations illustrated in Section E of the PDD. Emission reductions generated by the project shall be monitored at regular intervals. The crediting period chosen for the project activity is 10 years.

Monitoring equipment comprises of energy meters, which will monitor the energy fed by the plant to HPSEB grid system by the proposed project. In accordance with the PPA, project proponents have to install two energy meters one is main meter and the other is check meter. Project proponent will calibrate both the meters according to the procedures laid down in PPA. Project proponent will appoint a

Designated Operational Entity (DOE) for verification of emission reductions resulted by the project activity at regular intervals.

Methodology adopted for determining base line emission factor is the weighted average emissions 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 is adopted from the "$CO_2$ Baseline Database" published by CEA for the latest available year for the Northern grid and the same is used for the future projections; although this will be reviewed each year based on data published by CEA. The monitored data will be presented to the verification agency or DOE to whom verification of emission reductions is assigned.

*Leakage Monitoring*

The proposed 10 MW bundled hydroelectric project is renewable energy type and it utilizes flowing water for power generation and it does not involve any GHG emission. No leakage is involved in the proposed activity.

*Data Recording and Storage*

The net energy fed to the grid system by the project activity 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. Both the representatives of 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 project, in safe storage. Supporting documents such as receipts for 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 by the project activity whichever occurs later.

**D.6. Name of person/entity determining the monitoring methodology:**

>>

The contact information of the entity, which has determined the monitoring methodology, is given below.

| | |
|---|---|
| Organization: | Zenith Energy Services (P) Limited |
| Street/P.O. Box, Building: | 10-5-6/B, My Home Plaza, Masabtank, |
| City: | Hyderabad |
| State/Region: | Andhra Pradesh |
| Postfix/ZIP: | 500 028 |
| Country: | India |
| Telephone: | +91- 40- 2337 6630, 2337 6631 |
| FAX: | +91- 40- 2332 2517 |
| E-Mail: | zenith@zenithenergy.com |
| URL: | www.zenithenergy.com |
| Represented by: | |

| | |
|---|---|
| Title: | Director |
| Salutation: | Mr. |
| Last Name: | Reddy |
| Middle Name: | Mohan |
| First Name: | Attipalli |
| Mobile | +91- 9849408485 |
| Direct Fax | +91- 40- 2332 2517 |
| Direct Telephone | +91- 40- 2337 6630, 2337 6631 |
| Personal E.mail | mohan@zenithenergy.com |

The above entity is not a project participant.

## SECTION E.: Estimation of GHG emissions by sources:

### E.1. Formulae used:

>>

### E.1.1 Selected formulae as provided in appendix B:

>>

AMS I.D does not provide explicit formulae for the calculation of emission reductions. Section E.1.2 describes the variables and formulae used for these project activities.

### E.1.2 Description of formulae when not provided in appendix B:

>>

### E.1.2.1 Describe the formulae used to estimate anthropogenic emissions by sources of GHGs due to the project activity within the project boundary:

>>

The proposed hydroelectric project is zero $CO_2$ emissions; no specific formulae are specified for the applicable project categories.

### E.1.2.2 Describe the formulae used to estimate leakage due to the project activity, where required, for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities

>>

No leakages are applicable for the project activities, hence no formulae are applicable.

### E.1.2.3 The sum of E.1.2.1 and E.1.2.2 represents the small-scale project activity emissions:

>>

The sum of E.1.2.1 and E.1.2.2 is Zero.

### E.1.2.4 Describe the formulae used to estimate the anthropogenic emissions by sources of GHGs in the baseline using the baseline methodology for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities:

>>

As explained in Section B.2, the baseline for the project activity is kWh produced by the hydroelectric project multiplied by an emission co-efficient calculated in a transparent and conservative manner as the weighted average emissions (in $kgCO_2/kWh$) of the current generation mix.

The emission reductions for a given year are calculated as baseline emissions minus the project emissions and leakage:

$$\mathbf{ER_y = BE_y – PE_y - L_y}$$

Since the project emissions ($PE_y$) as well as the leakage ($L_y$) are zero, the emission reductions are equal to the baseline emissions. These are calculated based on the monitored net amount of electricity supplied to the grid, and the baseline emission factor. The latter is monitored and hence determined ex post.

$$\mathbf{ER_y = BE_y = EF_y \times EG_y}$$

Where,

$ER_y$ - Emission reductions in the $y^{th}$ year

$BE_y$ - Baseline emissions in the $y^{th}$ year

$EF_y$ - Baseline emission factor for the project grid

$EG_y$ - Power Export to the Grid in the $y^{th}$ year.

Values obtained when applying the above formulae are provided in the following table.

| Sl.No | Year | Gross energy (GWh) | Auxilary Consumtion (GWh) | Export for Emission Reductions (GWh) | Emission Factor (t CO2/Gwh) | Baseline Emissions (t CO2) |
|---|---|---|---|---|---|---|
| 1 | 2007 | 54.90 | 4.39 | 50.51 | 713.32 | 36,031 |
| 2 | 2008 | 54.90 | 4.39 | 50.51 | 713.32 | 36,031 |
| 3 | 2009 | 54.90 | 4.39 | 50.51 | 713.32 | 36,031 |
| 4 | 2010 | 54.90 | 4.39 | 50.51 | 713.32 | 36,031 |
| 5 | 2011 | 54.90 | 4.39 | 50.51 | 713.32 | 36,031 |
| 6 | 2012 | 54.90 | 4.39 | 50.51 | 713.32 | 36,031 |
| 7 | 2013 | 54.90 | 4.39 | 50.51 | 713.32 | 36,031 |
| 8 | 2014 | 54.90 | 4.39 | 50.51 | 713.32 | 36,031 |
| 9 | 2015 | 54.90 | 4.39 | 50.51 | 713.32 | 36,031 |
| 10 | 2016 | 54.90 | 4.39 | 50.51 | 713.32 | 36,031 |
| **Total Emission Reductions** | | | | | | **360,310** |

**E.1.2.5 Difference between E.1.2.4 and E.1.2.3 represents the emission reductions due to the project activity during a given period:**

>>

| Year | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|
| Baseline emissions, **E.1.2.4**, $tCO_2$ | 36,031 | 36,031 | 36,031 | 36,031 | 36,031 | 36,031 | 36,031 | 36,031 | 36,031 | 36,031 |
| Project emissions, **E.1.2.3**, $tCO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Emissions Reductions, **E.1.2.4 – E.1.2.3,** $tCO_2$ | 36,031 | 36,031 | 36,031 | 36,031 | 36,031 | 36,031 | 36,031 | 36,031 | 36,031 | 36,031 |

**E.2 Table providing values obtained when applying formulae above:**

>>

| 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 |
| **Total Emission reductions** (Tonnes of $CO_2e$) | 36,031 |
| **Total number of crediting years** | **10** |
| **Annual average over the crediting period of estimated reductions** (tonnes of $CO_2$ e) | **360,031** |

**SECTION F.: Environmental impacts:**

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

>>

The total project cost is less than the prescribed cost for small-scale project US$ 21.74 millions. Hence in accordance with the Ministry of Environment and Forests, Government of India, Environmental Impact Assessment is not required for the proposed project.

Small-scale run-off hydropower project has a low impact on river flow volumes and all water diverted to the powerhouse is returned to main stream. Compared to thermal and nuclear establishment hazards, small hydropower hazard is almost zero. Project proponent has already achieved No Objection Certificate (NOC) from Irrigation and Public Health Department of Himachal Pradesh, Gram Panchayats etc. The proponent has already obtained clearance from Himachal Pradesh State Pollution Control Board for implementation of the project.

Proposed project will not result in resettlement and rehabilitation in project site, as it is not under human habitation area. The scheme does not involve any impounding of water and hence no submergence or rehabilitation activity is needed. The project shall not affect the aquatic life available in this stream, which at present is insignificant.

Beneficial impacts are envisaged on socio-economic conditions, as there will be rural and urban electrification. The industrial development may also take place, which will trigger the economic growth in the backward region of the state.

Soil conservation methods are also taken into account prior to implementation of the project, so the proposed project will not result in damage to soil profile in the construction phase. From the above discussions, it is evident that the proposed project is not likely to have any significant adverse environmental effects during execution or after commissioning.

## SECTION G. Stakeholders' comments:

### G.1. Brief description of how comments by local stakeholders have been invited and compiled:

>>

Govt. of Himachal Pradesh (GoHP) follows a stringent public consultation process for new projects in the state of Himachal Pradesh. Before issuing license for any new project, GoHP announces the proposed project scheme in the local press and invites for any objections/comments from the public. Period of public announcement will be 60 days. After reviewing the public comments if any, GoHP decides on whether the project to be sanctioned or with held.

Similarly, Electricity Regulatory Commission of Himachal Pradesh (ERCHP) also makes a public announcement in the local press in local language for public comments on the project before obtaining clearance for the tariff and export of power into the HPSEB grid. Announcement will be kept open for a period of 60 days. ERCHP considers public comments in its approval process before giving approval.

Apart from the above, as per the GoHP guidelines, the project proponents shall be required to obtain No Objection Certificate (NOC) from the Village Panchayat, an elected statutory body of the local population where the project is proposed.

Hence, any new electricity generation project proposed in the state of Himachal Pradesh shall pass through the above three public consultation processes. Until and unless they are cleared in the process, project proponents cannot proceed further with the implementation.

**Identification of Stakeholders**

| Stakeholder Name | Function of Stakeholder | Description of Involvement |
|---|---|---|
| HIMURJA | Policy implementation body in respect of renewable energy projects in Himachal Pradesh. HIMURJA reviews the project documentation and accords clearance for utilizing of renewable energy sources in the state | Issues clearance for setting up the project in Himachal Pradesh utilizing hydro potential available at the proposed site. |
| HPSEB | The state owned electricity utility company that manages the electricity generation and distribution in Himachal Pradesh state. Any electricity generation project proposed in Himachal Pradesh shall approach HPSEB for power evacuation arrangements. Both HPSEB and the project proponent shall sign a Power Purchase Agreement, before implementing the project. | Purchases power from the project proponent by executing Power Purchase Agreement to determine the tariff and other terms. |
| HPSPCB | A statutory body that oversees the pollution control aspects in the state. Any project activity shall obtain clearance from the HPSPCB before implementation. | Issues clearance for setting up of the project |
| Irrigation Department | A part of the Government that overseas utilization of water | Accords clearance for utilizing water resources in Himachal Pradesh state. |
| Revenue Department | A part of the Government which monitors utilization of land | Gives consent to establish the project and registers the project in revenue records of the Himachal Pradesh state. |

| | | |
|---|---|---|
| Forest Department | A Part of the Government responsible for overseeing utilization of forest land. | Provides permission for utilizing forestland for construction of the project. |
| Local Village Panchayat | Elected statutory body of the local populace | Accords permission for setting up of the project under the jurisdiction of the village |

All stakeholders have issued their approvals/consents/licenses for setting up the project and no negative comments were received on the project.

**G.2. Summary of the comments received:**

>>

So far no comments are received on the project.

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

>>

**No comments are received; hence, no action taken report is available.**

## Annex 1

### CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

***PROJECT PARTICIPANT – 1 (Upper Taraila HEP)***

| | |
|---|---|
| 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 |

***PROJECT PARTICIPANT – 2 (Taraila-II HEP)***

| | |
|---|---|
| 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 |

## Annex 2

## INFORMATION REGARDING PUBLIC FUNDING

No public funding from the parties included in Annex - I is involved in the project activity.

- - - - -

## Annex 3

## REFERENCES

***References for Base Line Data***

The methodology adopted for the calculation of the baseline is "Simple Weighted Average of the Current Generation Mix". The baseline emission factor has been adopted from the "$CO_2$ Baseline Database" published by CEA.
(http://www.cea.nic.in/planning/c%20and%20e/Govertment%20of%20India%20website.htm)

***References for completing the PDD.***

1. Website of United Nations Framework Convention on Climate Change (UNFCCC), http://unfccc.int
2. UNFCCC document: Clean Development Mechanism, Simplified Project Design Document For Small Scale Project Activities (SSC-PDD), Version 02
3. UNFCCC document: Simplified modalities and procedures for small–scale clean development mechanism project activities
4. UNFCCC document: Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories, Version 10, 23rd December 2006
5. Detailed project report of the project.

**Annex - 4**

Abbreviations

| | |
|---|---|
| HPSEB | Himachal Pradesh State Electricity Board |
| ERCHP | Electricity Regulatory Commission of Himachal Pradesh |
| HPSPCB | Himachal Pradesh State Pollution Control Board |
| CEA | Central Electricity Authority |
| $CO_2$ | Carbon dioxide |
| EIA | Environment Impact Assessment |
| GHG | Greenhouse gas |
| GWh | Giga Watt hour |
| IPCC | Inter Governmental Panel On Climate Change |
| kWh | Kilo watt hour |
| MW | Mega watt |
| MNES | Ministry of Non Conventional Energy Sources |
| PDD | Project design document |
| UNFCCC | United Nations Framework Convention on Climate Change |

## Annex - 5

**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.