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

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

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

>>
Title: 9 MW Neria Hydroelectric project, Karnataka, India
Version: 05
Date: 12/08/08

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

>>

- The purpose of the project activity is generation of electricity using hydro potential available in river Neria, a tributary of river Netravathi, for a grid system Karnataka Power Transmission Corporation Ltd. (KPTCL). The project is situated near Dharmasthala in Dakshina Kannada District of Karnataka, India. The project is conceived as a run of the river hydroelectric project and hence no storage facility such as dam is envisaged in the project design. The project is expected to export 21.74 GWh to the state grid in 90% dependable year.

- The project activity utilises potential energy available in flowing water for power generation. The process involved is converting the kinetic energy available in the water flow into mechanical energy using hydro turbines and then to electrical energy using alternators. Therefore, no fossil fuels are involved for power generation. The project operation will contribute to sustainable development substituting fossil fuel generated power, reducing emissions of GHGs while responding to increasing energy demand, contributing to stabilize the price of power to consumers, reducing the dependence on fossil fuels. Thus the power generation will be carried out in sustainable manner without causing any negative impact to the environment.

- ***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
4. Technological well being

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

Social well being

The project leads to alleviation of poverty by generating direct and indirect employment during construction of the project as well as during operation. The project provided direct and indirect employment opportunities for about 200 persons during the construction phase. The project provides additional source of income for the local poor people by providing employment, which otherwise would not happen in the absence of the project. In addition, the project creates direct employment on permanent roles for about 35 persons during the operational lifetime of the plant.

By setting up the project, the proponents are committed to create infrastructure such as roads and other basic civic amenities in a rural area.

Economic well being

The project has bought additional investment to the region to an extent of Rs.326.77 millions (US$ 7.10 millions) which otherwise would not happen in absence of the project.

More and more rural industries will set up and new opportunities for development will be created as a consequence to the hydroelectric project in the area. This will result in infrastructure development, which ultimately lead to the rural development and prevent the migration of rural poor to cities.

The promoters have taken important steps to improve the social infrastructure in the vicinity of the Nidle, Dharmasthala and Ujire villages near the project site. They have monetarily assisted in construction of proper school buildings, dispensaries/hospitals and other institutions.

The hydroelectric power generating plant facilitates the availability of continuous and sustained power to the local industries and agricultural farmers located in remote areas, there by avoiding the load shedding and low frequency of power.

Environmental well being

Since, the project utilizes hydro potential available in the river for power generation, which otherwise would have been a fossil fuel such as coal, lignite and gas, the project does not lead to any GHG emissions and cause no negative impact on the environment. The project also does not lead to degradation of any resources, health standards, etc. at the project area.

The project generates real, measurable and long-term emissions reductions.

The project conserves local resources, reduces pressure on the local environment to some extent, provides improved health and other environmental benefits.

Technological well being

The project leads to utilization of environmentally safe and sound technologies in small-scale power sector. Further the project demonstrates harnessing hydro potential in small rivers and encourages setting up such new projects in future.

A.3. Project participants:

>>

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:** Bhoruka Power Corporation Limited, Bangalore	No

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

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

>>

A.4.1.1. Host Party(ies):

>>

India

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

>>

State: Karnataka

A.4.1.3. City/Town/Community etc:

>>

District: Dakshina Kannada
Village: Dharmasthala

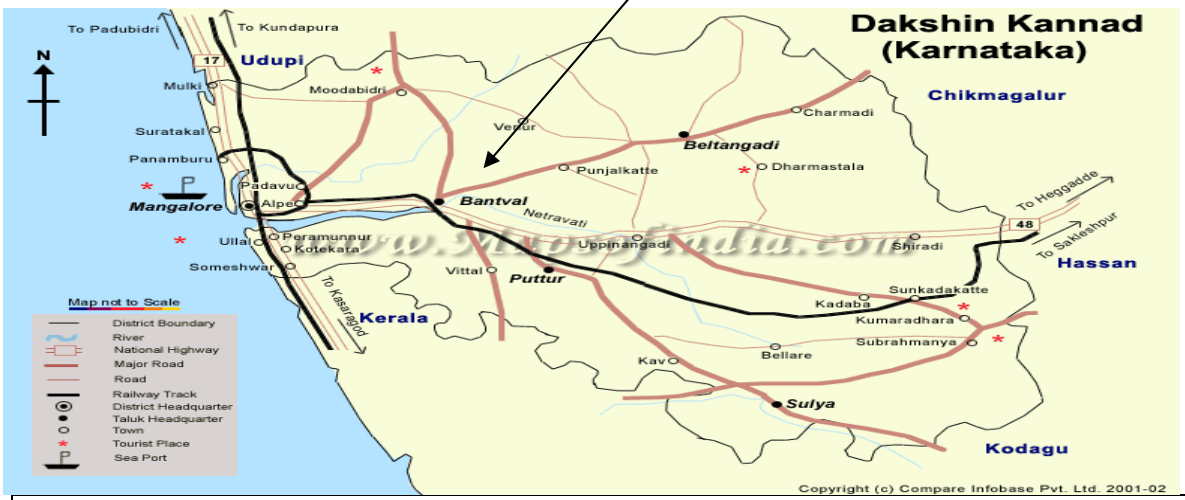
A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :

>>

The Neria hydel scheme is located downstream of the bridge called Nidle Bridge on the Kokkada Dharmasthala road across Neria River. The project site is located at a distance of 5 kms from Dharmasthala Village, 50 kms from Mangalore, the district headquarters and 295 kms from Bangalore, the state head quarters. The project location can be reached by road (National Highway 48) from Bangalore and taking a diversion to State Highway 37 towards Dharmasthala village through Kokkada.

The geographical coordinates are Latitude 12”56’07.20”N, longitude 75^0 22’53.87”E.

Physical location of the project is marked in the maps below.



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

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

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

The project activity utilizes renewable hydro potential for power generation and exports the generated power to the regional grid system. Accordingly, the applicable methodology for the project activity shall be AMS I.D/ Version 10,, which includes hydro for electricity generation for a grid system.

Application of environmentally sound and safe technology

The technology of power generation process using hydro resources is converting the kinetic 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 voltage of nearest grid sub-station for proper interconnection and smooth evacuation of power. In this process there are no greenhouse gas emissions or burning of any fossil fuels. Thus electricity is generated through sustainable means without causing any negative effect on the environment. Therefore the technology is environmentally safe and sound.

No technology transfer is envisaged for the CDM project activity.

Technical details of the project activity

The project is a run of the river scheme where there is no reservoir upstream and involves construction of a diversion structure, power canal, forebay, penstock, power house and power evacuation system. The project comprises two identical power-generating units of capacity 4.5 MW each. Power will be generated at 11 kV which will be stepped up to 33 kV for interfacing with the grid system at the nearest KPTCL's Pilakala substation. Brief technical details of the project design are stated below:

Hydrology
Rated Discharge : 30 cumecs / unit
Rated Head : 17.5 meters

Energy
Expected annual generation : 22.70 GWh
Expected annual export : 21.74 GWh
Generation voltage level : 11 kV
Grid transmission voltage : 33 kV

Plant Equipment
Hydro Turbine : Horizontal S type Full Kaplan
Type of generator : Horizontal Synchronous
No. of generating units : 2 Nos.
Capacity of generating units : 4.5 MW each

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

>>

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

Years	Estimation of annual emission reductions in tonnes of CO_2 e
2008	18,633
2009	18,633
2010	18,633
2011	18,633
2012	18,633
2013	18,633
2014	18,633
2015	18,633
2016	18,633
2017	18,633
Total estimated reductions (tonnes of CO_2 e)	**186,330**
Total number of crediting years	**10**
Annual average of the estimated reductions over the crediting period (tCO_2e)	**18,633**

In the above table the year 2008 corresponds to 01.03.2008 to 28.02.2009. Similar interpretation shall apply for remaining years.

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

>>

No public funding from Annex I parties are available in this project activity.

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

The project proponents hereby confirm that the project activity is not a debundled component of another larger project activity.

The project proponent further confirm that they have not registered any small scale CDM activity or applied to register another small scale CDM project activity within 1 km of the project boundary, in the same project category and technology/measure in the previous 2 years.

SECTION B. Application of a baseline and monitoring methodology

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

CDM – Executive Board

>>
Title: **Type I**, Renewable Energy projects,
Reference: Version 10 of **AMS I.D, Grid connected renewable electricity generation**

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

>>
The proposed project activity is a 9MW small hydro power project which generates and exports the renewable electricity to a grid system i.e. dominated by thermal energy sources. Therefore the project is eligible to use the approved methodology AMS.I.D i.e. 15MW. The capacity of the project activity is 9MW and is well below the qualifying limit to be treated as small scale project activity.

The Water and power studies carried out for this project as well as by keeping main parameters in view such as head and discharge available in the canal, the project participants declare that the project will be within the limits of the small scale project activity throughout the crediting period.

B.3. Description of the project boundary:

>>
Project boundary is as specified in the methodology AMS I.D., that encompasses the physical and geographical site of the renewable generation source.

The project boundary of the project activity will be consisting of the diversion structure, water conducting system, penstock, powerhouse, power evacuation system and tailrace canal.

B.4. Description of baseline and its development:

>>
As per the Para 9 of approved methodology I.D. Version 10, the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO2e/k**Wh) calculated in a** transparent and conservative manner as :

a) Combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the approved methodology ACM 0002.

OR

b) The weighted average emissions (in kg CO_2equ/kWh) of the current generation mix.

The project proponent has opted for approach 'a' i.e. combined margin emission factor and desired to keep the emission factor constant through out the crediting period for the sake of adopting more simple approach for calculation of emission reductions.

Key Parameter	Value	Data Source	Website
EF	Baseline emission factor for the southern region grid	CEA published baseline emission factor for southern region grid (CM)	www.cea.nic.in
EGy	Net power export to the grid	From Plant and KPTCL	------

	per annum	Records. Ex-post determination.	

The baseline emission factor has been considered from the "**CO2 Baseline Database**" **(Version 02 dt.21st June, 2007)**"published by CEA. The emission factor published by CEA for the latest year 2005-06 is 857 tCO2/GWh based on combined margin approach.

Actual emission reductions will be calculated ex post based on recorded generation which could be verifiable.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

The capacity of the CDM project is 9 MW and the project activity is generation of electricity for a grid system using hydro. 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.

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

Investment Barriers:

The project activity faces investment barrier with respect to return on investment, as the project IRR is worked out to be less than the benchmark and therefore is not financially an attractive proposition.

The project is a small scale project activity and has demonstrated the additionality through technological barrier and common practice analysis. Besides barrier analysis, the Project Proponent (PP) had chosen to demonstrate the additionality of the project through investment analysis also. For this purpose, PP used Additionality Tool (Version 04), the then latest version.

The project IRR is worked out for a period of 20 years. Though the PPA is applicable for 20 years, tariff is available only for 10 years. In respect of tariff from 11th year onwards the same is estimated based on cost of generation in the 11th year including return at 16% on equity and the same is taken as constant tariff for the next 10 years. This approach is considered as appropriate estimation since revised tariff may depend on situation prevailing at the time of revision with respect to power sources, technology, market etc.

Based on IRR analysis made for 20 years project IRR is working out to 11.71% compared to benchmark return of 14.75%. The project IRR improves to 14.36% only after consideration of revenue from CDM. The soft copy of Financial analysis and the assumptions supporting calculation of project IRR is furnished separately.

The project activity has chosen project IRR to demonstrate the Additionality of the project. Project IRR, being the return earned by the project during the reference period, has to be compared with a benchmark or cut-off rate to determine the adequacy of the return. The project activity has chosen Weighted Average Cost of Capital (WACC) as the benchmark.

Since the project is financed by *both* equity and loan, the appropriate bench mark will be the cost of funds which is equivalent to WACC. WACC represents the weighted average cost of debt and equity funds invested in the project. WACC, therefore, represents the minimum rate of return or the benchmark return which the project should earn to merit consideration.

The appropriateness of WACC as the benchmark is upheld by various publications on corporate finance. The most respected publication in financial management by James Van Horne while discussing the 'Acceptance criterion' (read as Additionality criterion) underlines the need to compare the IRR with a cut-off or hurdle rate. The author states,

> "*Acceptance criterion generally employed with the Internal-Rate-of- Return method is to compare the Internal Rate of Return with a required rate of return, known also as the cut-off or hurdle rate. If the internal rate of return exceeds the required rate, the project is accepted; if not it is rejected*" (Van Horne James C., Financial Management and Policy (sixth edition) Page 111)

WACC has been computed taking in to account cost of various sources of finance for the relevant period. The computation takes into account the rate of interest on term loan and working capital as envisaged at the time of conceptualization of the project (as assumed in the DPR). As regards equity, the project being new, project proponent has taken into account the post-tax return of 16% envisaged in the DPR as well as permitted by Karnataka Electricity Regulatory Commission.

WACC has been computed by taking into account the weightage of each sources of finance in the total capital structure multiplied by the appropriate cost to arrive at the WACC – a practice, which is followed universally[1].

An explanation is also provided down below to support the argument that the project activity would not have proceeded without the benefits of the CDM.

The Additionality Tool provides for the identification of a "…*relevant benchmark value, such as the required rate of return (RRR) on equity*". The Tool adds, "*the benchmark is to represent standard returns in the market, considering the specific risk of the project type, but not linked to the subjective profitability expectation or risk profile of a particular project developer*"[2]. Since the KERC recommended return of 16% meets with both the criteria specified in the Additionality Tool, viz.,

- it represents the standard returns in the market (as not only small hydro power projects, but every renewable source of energy project is assured of the return) and
- it is not linked to the subjective profitability expectation or risk profile of the project developer,

16% return was chosen as the Required Rate of Return (RRR) on Equity.

[1] see Van Horne James C., Financial Management and Policy (sixth edition) PP 221-7. Van Horne recommends using market value as opposed to book value weights. Since this project is new, the question of market value does not arise.

[2] Tool for the demonstration and assessment of Additionality (Ver 04), Page 5

Further the Additionality Tool – Ver. 05 released by EB 39[3], states that the benchmark shall be derived from, among others, "*Government/official approved benchmark where such benchmarks are used for investment decisions*". The Guidance on the Assessment of Investment Analysis released by EB 39, further clarifies that the "*…benchmark should be based on publicly avilable data sources, which can be validated by the DOE*"[4]. The Guidance cites three such sources, viz., "*local lending and borrowing rates, equity indices or benchmarks determined by relevant national authorities*"[5].

The ROE of 16% used fulfills the conditions stipulated in the Additionality Tool (Ver 05) as well as Guidance on the Assessment of Investment Analysis, in that

- it is Government / official approved benchmark
- the benchmark is used for investment decision, as KERC order clearly states, "*Since most of the renewable sources of energy projects that are coming up are through private sector, to promote investments in projects of renewable sources of energy, the Commission decides that the ROE shall be 16%*"[6].
- it is publicly available data source which can be verified by DOE, and
- it is determined by *relevant* national authority[7].

It could be appreciated that the a regulatory authority, which is invariably concerned with public good at large, would not have recommended a ROE of 16%, unless it was totally convinced that the private investment would not come forth if a return of even 16% is not assured. This is amply reflected in the wordings used by KERC in its order. In fact, a cursory glance at the Order would reveal that IREDA (India Renewable Energy Development Agency) recommended a return of 19 - 21% and KREDL (Karnataka Renewable Energy Development Limited) recommended a ROE of 18%[8]. Both IREDA and KREDL are Government agencies and are aimed to regulate and ensure proper implementation of the project hence are no way linked to any of the project developers. It can be confirmed that both the Government agencies have recommended a higher ROE after analyzing the inherent risks and the unwillingness on the part of project developers to venture into the project without sufficiently attractive return. Therefore, a project developer would not choose to invest in a small hydel power project, if it did not yield a return of at least 16% on the equity.

Besides benchmarks determined by relevant national authority, the Additionality Tool also suggests the use of lending and borrowing rate and the equity indices. In India, any investor can buy Nifty derivatives

[3] Tool for the demonstration and assessment of Additionality (Ver 05), Page 7

[4] Guidance on the Assessment of Investment Analysis, Page 3

[5] Op.cit, page 3

[6] KERC Order dated 18th January 2005, Page 5

[7] Relevant national authority for Small Hydro Power projects in India is the State Government as the development of such projects have been assigned to State Governments.

[8] "KPTCL/ESCOMs have suggested to follow CERC norms. SISMA, has favoured higher ROE. Most of the Biomass developers have favoured 16% ROE. IREDA has proposed 3-5% higher ROE over and above 16% and that the same should be at least 16%. KREDL has favoured 16% ROE for co-gen and Biomass and has favoured 2% higher rate for wind and mini-hydel. WIND developers have favoured 16% and REDAK have opined that 16% ROE is reasonable but higher ROE is advisable" (emphasis added), KERC Order dated 18th January 2005, page 4 & 5

(options or futures). This is most frequently traded derivative in the stock market. Nifty yielded a return of more than 80% in 2003-04 (from 984 to 1820). Therefore, in comparison with the returns offered by equity indices during the investment year for the project activity, the ROE of 16% was very conservative.

It is further stated that in general in any business no project developer would take the risk of investing in equity, if it is going to get the same rate of return as the least risky and highly secured loan. To expect the project developer to get contended with lending or borrowing rates tantamount to ignoring the difference in the risk attributes of loan and equity.

Therefore, the project developer would not have taken up this risk if the return had been less than even 16%, the minimum return to render the project economically viable.

It may be noted that the National and the State Governments in the country have been striving hard to promote the renewable energy projects in the country so as to bring down the GHG emission, as the present generation mix is heavily skewed in favour of thermal sources. Considering various barriers faced by the project developers in renewable energy power projects, the State Governments have decided to fix the tariff in such a way that it would yield a ROE of atleast 16%. A cursory glance at the orders of various Electricity Regulatory Commissions (ERCs) would reveal that the logic for recommending a 16% ROE stems from the fact that it would be well nigh impossible to promote and develop the renewable energy projects in the country, if they are not assured of a return of even 16%, which their less risky counterparts (thermal power projects) are assured by the Government. No project developer could be expected to take the risk and venture in the absence of even such a minimal return. It is against this background that almost all the ERCs have determined the tariff for renewable energy projects at a level, which would yield them a ROE of atleast 16%. The argument therefore boils down to the fact that 16% ROE is the minimum return (as per the Government) that would render the projects economically viable, which in turn would attract project developers to this sector.

Despite this, the projects do not achieve a return of 16%, which is considered necessary by the Government for the projects becoming economically viable. This is because of the conservative assumption made by ERCs while fixing the tariff and the dynamic scenario in which the project developers operate. The major differences between this project and the "typical" project that was the basis for determining the electricity price by KERC are furnished below:

Parameter	Basic value considered by KERC in its Order dt.18/01/2005	Value in project scenario
Energy export in MU	23.11	21.74
Interest on term loan (in %)	11	11.5
Operation & Maintenance exps	1.5%	2.5%

These factors are beyond the control of PP and this is what has rendered the tariff offered to Neria inadequate to achieve even the recommended return of 16%, necessary to make the project economically viable.

It is also submit that the ROE considered for proving the additionality of the project activity is conservative. This can be demonstrated by the approach stipulated by the latest version of the additionality tool, viz.,

- *Government bond rates, increased by a suitable risk premium*, where the suitable risk premium is determined based on the capital asset pricing model (CAPM).

That the ROE considered for proving the additionality of the project activity is conservative and this can be demonstrated by the approach stipulated by the latest version of the Additionality Tool (Ver. 05), Of the alternatives suggested by the Tool for benchmark/discount rates, one pertains to

- *Government bond rates, increased by a suitable risk premium*, where the suitable risk premium is determined based on the capital asset pricing model (CAPM).

CAPM is well accepted and much acclaimed method for estimating the required rate of return on equity. The reliability of CAPM to estimate the required return on equity has been advocated by many authors on security analysis[9]. As per CAPM, the required return on equity investment is the return of a risk-free security plus beta times the difference between the market return and the risk-free return. The weighted average yield of Government Securities has been taken to represent the risk free return. Stock index has been used to represent the market return. With a view to eliminating the unsystematic risks associated with the projects totally, index containing 500 companies [Standard & Poor's CNX500] has been taken to represent the market return. The market return has been arrived at based on the average annual return of the 500 listed securities forming part of Standard & Poor's CNX500 index over a three period[10] (01.04.2001 to 31.3.2004) prior to the investment decision. The relevant data on risk free return and the market return are as follows:

- Market return (based on S&P CNX 500)[11] - 25.37%
- Wt. Average Yield of Govt. Securities - 5.71%

Using the above data, it could be seen that even a beta value of 1, would yield an expected return of 25.37% on equity.[12] The 16% ROE assumed in the computation corresponds to a break-even beta value of 0.52. In contrast, the beta value of two hydro power companies presently listed in the Indian Stock exchanges is 1.080 (Tata Power Company Ltd.) and 1.195 (Jaiprakash Hydro Power Ltd.).[13] The conservativeness of the 16% benchmark should thus be evident, as based on the generally accepted CAPM approach a much higher benchmark of at least 25.37% can be justified for the required return on equity of the project activity.

---

[9] "The CAPM is also useful in capital budgeting decisions. For a firm considering a new project, the CAPM can provide the required rate of return that the project needs to yield, based on its beta, to be acceptable to investors. Managers can use the CAPM to obtain this cut off internal rate of return (IRR), or "hurdle rate" for the project", Kane, Bodie and Marcus; *Investments* (fifth edition) page 273.

See also Feldman Stanley, *Principles of Private Firm valuation* , Page 70-71

[10] A period of 3 years has been taken into account because "About one-fourth of share owners had been holding at least some of their shares for over 10 years and another one fourth for 5 to 10 years. Thus, about one half of our sample shareowners had held some of their shareholding for over 5 years. *About three fourths had shares which had been held for over 3 years"(emphasis added)* - L.C. Gupta, Indian Shareowners- A Survey, Society for Capital Market Research and Development, New Delhi (1991) P. 133

[11] The data can be accessed from www.nseindia.com and http://rbidocs.rbi.org.in/rdocs/AnnualReport/PDFs/56245.pdf

[12] Calculated as re = r_f + beta x (r_m – r_f), where r_f is the risk-free return (Gov. Security) and r_m is the market return.

[13] Source: Tata Power : http://www.bloomberg.com/apps/quote?ticker=TPWR:IN
Jaiprakash Hydro : http://www.bloomberg.com/apps/quote?ticker=JHPL:IN

It is thus demonstrated that the conservativeness of the 16% benchmark is evidenced by comparison with another generally accepted approach, viz, *Government bond rates, increased by a suitable risk premium based on the CAPM model*, which yields a benchmark ROE much above 16%;

The 16% thus represent a *necessary, but not necessarily sufficient* return to justify the investment. Clearly, the project activity would not have been taken up since the ROE is less than 16% with out CDM revenues.

A sensitivity analysis has been carried out on the scenarios such as variation in Generation,tariff and O&M cost, the results of which are furnished below:

	+5%	**Base case**	**-5%**
Generation	12.55%	11.71%	10.88%
Tariff	12.49%	11.71%	10.94%
O & M cost	11.57%	11.71%	11.85%

The PP has considered + or -5% variations for the sensitivity analysis as reasonable and appropriate due to the following reasons.

The O&M cost considered in the IRR analysis is 2.5% of the total project cost and is on the lower side as per the industry practices, which normally consider 5-10%. The O&M costs, in actual operation, are not likely to be lower than -5%. Increases in the O&M will only lead to a decrease in the IRR.

The tariff of the project activity used in the IRR analysis is as per the Power Purchase Agreement (PPA) signed between the project proponent and Karnataka Power Transmission Company Limited (KPTCL) on 4 November 2004. As per the PPA, the base tariff is INR 2.9/KWh with a yearly escalation of 2%. Even though the tariff is to be governed by the PPA, the tariff is changed
at the instance of KPTCL. The tariff has seen a reduction to Rs.2.80 without any escalation. Hence, a 5% increase in the tariff for sensitivity analysis is reasonable. The Project IRR will reach the benchmark only if the tariff increases by 20% and as explained above this is not a realistic scenario.

The PLF of the project activity has been taken at 31% considering a dependability of 90% and this information has been sourced from the Detailed Project Report (DPR). The plant load factor itself has been arrived at based on past hydrological data and is dependable. It has been evidenced that the project IRR will cross the benchmark only if the generation increases by 18.5%. However, a look at the actual generation at the project activity for the one year operating history would reveal that actual generation has been of the order of 19.6 GWh only compared to 22.7 GWh anticipated in the DPR, which is a decrease of 13.6% from the anticipated generation. As the generation is entirely dependent on the monsoons, not more than a 5% positive variation is considered reasonable.

It is evident from the above analysis that the project activity is unlikely to be the most financially attractive proposition in the absence of the CDM revenues.

Barrier due to prevailing practice

In the Indian power sector, the common practice is investing in only medium or large scale fossil fuel fired power projects. In order to demonstrate that project activity i.e. generation of electricity through a

small hydro project of 9 MW, is not a common practice reliance has been placed on the published statistics in respect of installations of small hydro projects in India, in the Southern region as well as in the state of Karnataka in relation to the total installed capacity of power generation.

Table B.3: Installed Capacity as on 31st March 2004 [14]

S. No	Region	Hydro	Thermal + Wind	Nuclear	Total	Small Hydro Installed Capacity (MW) [15, 16]	Percentage of SHP with total installed capacity (%)
1.	All India	29,500	79,838	2,720	**112,058**	1603.32	**1.43**
2.	Southern Region	10,328	17,661	700	**28,689**	538.66	**1.87**
3.	Karnataka	2,954	2,853	130	**5937**	213.38	**3.59**

As seen from the Table B.3 above, the total installed capacity of power projects in India is 112,058 MW as on 31st March 2004. Against this small hydro projects in operation in India is 1603.32 MW, giving an idea of the contribution of small hydro projects in the total power generation at 1.43%, which is negligible.

In the Southern region, the total installed capacity of power plants is 28,689 MW against small hydro installations of 538.66 MW indicating that small hydro projects account only to a negligible 1.87% of total generation in the Southern region.

Out of the total installations of small hydro in Southern region, the contribution of Karnataka is 213.38 MW and this accounts for 0.74 % of total capacity of power plants in Southern region.

The estimated small hydropower potential in the state of Karnataka is 1500 MW[17] and out of which only 213.38 MW has been commissioned so far over number of years. Thus, the penetration of small hydro power in Karnataka is hardly significant.

These percentages are only related to the installed capacities. It is a well known fact that plant load factor (PLF) of the small hydro projects is always less, sometimes as low as below 30%, compared to the thermal plants.

From the above it can be concluded that SHP projects is not a common practice. Moreover, SHP projects face higher risks due to natural vagaries. They are also accorded unfavorable power purchase tariffs by State Electricity Regulatory Commission (SERC) in comparison with other renewables like wind. They

[14] Map of India showing Installed Generation Capacity, Annual Report 2003-04, Ministry of Power, Govt. of India

[15] Page No: 3, Table 1.1, New and Renewable Sources of Energy Potential and Achievement as on 31st March 2004, Annual Report 2003-2004, Ministry of Non-Conventional Energy Sources, Govt. of India.

[16] Page No: 55, Table 5.13, State Wise Details of SHP Projects (Upto 25 MW) Setup & under Construction as on 31st March 2004, Annual Report 2003-2004, Ministry of Non-Conventional Energy Sources, Govt. of India.

[17] Karnataka Renewable Energy Development Limited, http://www.kredl.kar.nic.in/ProgressReport.htm

also do not get other fiscal benefits like accelerated depreciation, concessions in excise duties, sales tax etc. In view of this, the 9 MW Neria small hydro project is not a common practice project.

Other Barriers

a) ***Geology risks.***
The river has three major nallas joining from the left side and one stream joining from right side close to the diversion structure. It is essential to locate this diversion structure downstream of the above-mentioned confluences to ensure that the flows carried by the tributaries are also utilized for power generation. Since, the terrain is of loosely held rocks, the project site poses difficulties during construction of diversion structure and other civil constructions.

b) ***Transmission risks.***
Further, the substation is located at a distance of more than 15 kms from the project sites, which require construction of a long transmission system. This line to be constructed by the project participants passes through thick forest and is susceptible to failures. The substation voltage level is 33 kV which is high for the small capacity of the project but low for the purpose of transmission over long distances. The system faces outages due to distribution system overload. In the past some of the projects of BPCL have faced unforeseen trips due to no off-take by the transmission company. The long distance and high voltage level results in higher investments for transmission and also results in transmission & distribution losses affecting the revenue for the project. The contract executed with a third party agency indicating the distance of transmission lines is furnished for verification.

c) ***Lack of infrastructure***.
The project location is underdeveloped, hence no infrastructure such as roads, electricity, communication, transportation and proper civic amenities etc. are available. The project participant has developed these facilities before implementation of the project.

d) ***Institutional barriers:***
Often government policies keep changing from time to time in the Karnataka state. As for instance before 2 years the power purchase price from SHP power projects was at Rs.3.20 per kWh with 5% annual escalation. It is this price that was envisaged by the promoters at the time of project planning. The same has been revised twice since then; even a legally valid power purchase agreement is in place. Now the price stands at Rs.2.90 per kWh with 2% escalation. This impacts project viability adversely and also indicates inconsistency in government policies and no guarantee that the project receives the same tariff in future for the power fed to grid. This creates a significant barrier for the private sector investments in the power sector in Karnataka state.

Another critical issue is that the project proponents have to back down the generation whenever required by the utility company, KPTCL. A clear clause is built into the Power Purchase Agreement to this effect. Accordingly, a significant risk is existing for the project activity that demands shut down of the project in situations such as an emergency, surplus power situation, off-peak duration etc. This risk is already felt recently by some of the power developers in Karnataka when KPTCL issued orders to some of the power plant operators to stop generating power due to low demand for power across the state during a particular time. For seasonally operating small hydroelectric projects, risk associated with this PPA clause makes a significant barrier.

In view of the above, the proposed project is additional and not the same as the baseline scenario.

CDM – Executive Board

Early Consideration of CDM

The project proponent has seriously considered benefits of CDM for the project activity to overcome few of the barriers described above at the project planning stage. The project proponents have discussed about the CDM benefits for the project and passed the resolution in the management committee meeting for the same on 15th September, 2003, which is prior to the start date of the project activity. Accordingly, a CDM consultant has been engaged as a consultant for developing the project under CDM. The documentary evidence of the minutes of the management committee meeting and the agreement between the project proponent and consultant have been made available to the DOE during validation process.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>

The project activity is generation of electricity using hydro potential and exporting the same to the grid system, which is also fed by other 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.

Baseline

As the project activity does not modify or retrofit an existing electricity generation facility, the baseline scenario is electricity delivered to the grid by the project that would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources.

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 tCO2 /GWh).

$BE_y = EG_y * EF_y$

where,

EG_y = the net electricity exported to the grid system during the year *y*

EF_y = the emission factor of the grid to which the project exports electricity

Central Electricity Authority (CEA) (which is an official source of Ministry of Power, Government of India) have worked out baseline emission factor for various grids in India and made them publicly available i.e "**CO_2 Baseline Database**" at

http://www.cea.nic.in/planning/c%20and%20e/Govertment%20of%20India%20website.htm

The emission factor of the grid for the ex-ante approach is calculated in the following way:

Southern regional grid consists of independent state level electricity systems including public sector undertakings that exchange significant power within the region depending on the demand. The overall power flows are managed by the Southern Regional Load Despatch Centre. Other regions viz. Northern, Western, Eastern and North Eastern are connected with the Southern grid. The power inflows from and outflows to these regions would constitute imports and exports. The Southern region has considerable amount of imports in to the grid. The baseline Emission factor (including Imports) of southern region published by CEA is considered for calculation of Emission reductions due to displacement of electricity in accordance with the Baseline of ACM 0002.

According to the ACM 0002, grid emission factor is calculated as Combined Margin (CM), comprising the Operating Margin (OM) emission factor and the Build Margin (BM) emission factor. The following procedure was adopted for estimating the grid electricity emission factor:

Step 1 – Calculation of the Operating Margin
Step 2 – Calculation of the Build Margin
Step 3 – Calculation of the grid emission factor (Combined Margin)

Step 1 – Calculation of the Operating Margin

The approved consolidated methodology ACM 0002 recommends the use of dispatch data analysis as the first methodological choice. However, in India availability of accurate data on grid system dispatch order for each power plant in the system and the amount of power dispatched from all plants in the system during each hour is practically not possible. Also, still the merit order dispatch system has not become applicable and is not likely to be so during the crediting period. In view of this it is proposed to apply other choices as suggested in the ACM 0002. Since the power supplied by low cost must run power plants[18] to the southern grid during 2005-06 (26%) is clearly below 50%, it was decided to apply the **Simple OM method.**

In the Simple OM method, the emission factor is calculated as generation weighted average emissions per electricity unit (tCO_2/MWh) of all generating sources serving the system, not including low-operating cost and must-run power plants. The data vintage option selected is the *ex-ante* approach, where a 3 year average OM is calculated. The most recent three year CEA data published on the emission factor of southern region is considered,. The CEA baseline is derived using the following formulae to calculate simple OM.

$$EF_{OM,simple,y} = \frac{\sum F_{i,j,y} \times COEF_{i,j}}{\sum GEN_{j,y}} \qquad (1)$$

Where:

$EF_{OM,simple,y}$ is emission factor of the Operating Margin by Simple method, in tCO_2/MWh
$F_{i,j,y}$ is the quantity of fuel *i* consumed by plant j in year y in tonnes of fuel *i*
$COEF_{i,j}$ is the CO_2 emission coefficient of fuel *i* for relevant power plant *j* in the year in tCO_2/tonnes and
$GEN_{j,y}$ is the generation from power plant *j* in the year in MWh

The CEA data published on Baseline emission factor for different regions in Indian electricity system are provided in Annex 3.

Table 1: Operating Margin[19]

Most recent three years	2003/04	2004/05	2005/06
Operating Margin* (OM) in t CO_2 / GWh	1004.11	999.94	1007.33

[18] Defined as Hydro, geothermal, wind, low cost biomass, nuclear and solar generation plants in the ACM 0002. (ref foot note 3 page 4).

[19] CEA published CO2 data base, http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm

Average of 3 years	**1003.79**

* including imports

Source: CDM Carbon Dioxide Baseline Data base, Version 2, June 2007 (www.cea.nic.in)

Step 2 – Calculation of the Build Margin

ACM 0002 offers two options for determination of build margin emission factor: *ex ante* and *ex post* determination of the Build Margin (BM). Option 1 is selected wherein the build margin emission factor is calculated *ex- ante* based on most recent information available on plants already built for sample group *m* in southern Region. This simplifies the monitoring procedures, but also offers a conservative approach of BM calculation. The sample group *m* shall be the one having higher power generation between (a) five power plants that have been built most recently and (b) the capacity additions in the electricity system that comprises 20% of the system generation built most recently. It is found that the option (b) has higher generation compared to option (a). Hence option (b) is selected.

Build Margin emission factor[4] is determined as below:

Build Margin (BM)	**711.34**	tCO_2 / GWh

Step 3 – Calculation of the baseline emission factor (Combined Margin)

The baseline emission factor in year *y* is calculated as the simple average of the OM and BM emission factors, i.e. OM and BM are each weighted with 50%. As noted above, the resulting Combined Margin is fixed ex ante for the duration of the crediting period:

$$EF_y = w_{OM} \bullet EF_{OM,y} + w_{BM} \bullet EF_{BM,y}$$

Combined Margin (CM) Simple average of OM and BM	**857**	tCO_2 / GWh

Project emissions

No project emissions are applicable to the small scale hydro electric power project, since the electricity generation is based on hydro resources, which does not involve in combustion or generation of emissions from fossil fuels. However, as the project is equipped with diesel generator of capacity 80 kVA to meet the emergency requirements of power house etc., emissions out of usage of fossil fuel (diesel) will be accounted as project emissions based on the following equation as provided in the approved consolidated methodology.

$$PE_y = FF_{i,y} \cdot COEF_i$$

Where

PE_y Project emissions from combustion of fossil fuel (DG set) in the project activity during the year *y*

$F_{i,y}$ Quantity of fossil fuel type *i* combusted (DG set) during the year *y*

$COEF_i$ Carbon dioxide emission factor of the fuel type *i*

Leakage:

No leakage emissions are considered for the proposed project activity since no energy generating equipment is transferred from another activity and/or the existing equipment is transferred to another activity.

Emission Reductions:

Since the project emissions as well as the leakage 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.

$ER_y = BE_y - PE_y - L_y$

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

Data / Parameter:	EF_y
Data unit:	t CO2/GWh
Description:	CO_2 emission factor for the regional grid system
Source of data used:	CEA published grid emission factors
Value applied:	857 (2005-06) Average of 3 year OM and BM
Justification of the choice of data or description of measurement methods and procedures actually applied :	Central Electricity Authority (CEA) values have been used for authenticity of the data, available publicly by Govt of India with a view to obtain uniformity of approach in the country towards a common objective.
Any comment:	

Data / Parameter:	$COEF_i$
Data unit:	*kg CO_2/TJ*
Description:	CO_2 emission factor of fuel type i
Source of data used:	IPCC 2006 default values
Value applied:	Diesel : 74000
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC values have been used for diesel since no country specific data is available.
Any comment:	The project activity may combust only one type of fossil fuel i.e, diesel during the project operation to meet the emergency power requirement of

	the project. Hence only emission factor of diesel is provided in the parameter

B.6.3 Ex-ante calculation of emission reductions:

>>

Baseline emissions

Baseline emissions calculated as explained in section B.6.1 above are summarised as below.

BE_y = 21.74 * 857

BE_y = 18,633 tCO_2

Project emissions

The project emissions due to the combustion of diesel are considered as zero for estimation of ex-ante calculations of emission reductions. The corresponding emissions from the combustion of diesel for operation of DG set during emergency situation are considered negligible. However the quantity of diesel combusted in the project activity will be monitored during each year of crediting period (B.7.1) and deducted from baseline emissions, provision has been made in Section B.6.1 by providing formula to calculate project emissions. Since estimation of quantity of diesel consumption is unpredictable before actual operation of the project and also to simplify the ex-ante calculations of emission reductions, excluding project emissions is considered reasonable.

PE_y = 0 tonnes * 74000 kg CO_2/TJ

$PEFF_y$ = 0 tCO_2

Leakage

No leakage is applicable

Emission reductions

ER_y = BE_y - PE_y - L_y

ER_y = 18,633 - 0 - 0

ER_y = 18,633 tCO_2 (ER_y = BE_y)

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

>>

Summary of the ex ante estimation of emission reductions are furnished below.

Year	Estimation of project activity Emissions (tCO_2e)	Estimation of baseline emissions (tCO_2e)	Estimation of leakage (tCO_2e)	Estimation of overall emission reductions (tCO_2e)
2008	0	18,633	0	18,633

2009	0	18,633	0	18,633
2010	0	18,633	0	18,633
2011	0	18,633	0	18,633
2012	0	18,633	0	18,633
2013	0	18,633	0	18,633
2014	0	18,633	0	18,633
2015	0	18,633	0	18,633
2016	0	18,633	0	18,633
2017	0	18,633	0	18,633
Total	**0**	**186,330**	**0**	**186,330**

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

B.7.1 Data and parameters monitored:

Data / Parameter:	EG_y
Data unit:	GWh
Description:	Electricity supplied to the grid by the project
Source of data to be used:	On-site measurements
Value of data	21.74 GWh
Description of measurement methods and procedures to be applied:	Measured monthly using calibrated meters and aggregated annually.
QA/QC procedures to be applied:	Meters will be calibrated as per industry standards. Sales records to the grid and other records are used to ensure consistency.
Any comment:	Electric power sold to the grid will be measured by main meter and check meter by both BPCL and KPTCL as specified in the PPA and records maintained. To be cross-checked with monthly invoices or receipts of payments.

Data / Parameter:	EG_{grossy}
Data unit:	GWh
Description:	Total electricity generated by the project during the year *y*
Source of data to be used:	On-site measurements
Value of data	22.70 GWh
Description of measurement methods and procedures to be applied:	Measured monthly using calibrated meters and aggregated annually.
QA/QC procedures to be applied:	Meters will be calibrated as per industry standards.
Any comment:	

Data / Parameter:	$EG_{Auxiliaryy}$
Data unit:	GWh
Description:	Auxiliary electricity consumption of the project
Source of data to be used:	On-site measurements
Value of data	0.958 GWh
Description of measurement	Measured monthly using calibrated meters and aggregated annually or

methods and procedures to be applied:	the difference between the gross energy generation and the net electricity export to the grid system, can be arrived as auxiliary consumption of the project activity.
QA/QC procedures to be applied:	Meters will be calibrated as per industry standards. Sales records to the grid and other records are used to ensure consistency. If the data is calculated as the difference between gross and net power export, no QA/ QC procedures are applicable, since, both parameters are already underwent the QA/QC procedures.
Any comment:	

Data / Parameter:	$EG_{import,y}$
Data unit:	GWh
Description:	Grid electricity import to the project activity during the year y
Source of data to be used:	On-site measurements
Value of data	0 GWh
Description of measurement methods and procedures to be applied:	Measured monthly using calibrated meters and aggregated annually.
QA/QC procedures to be applied:	Meters will be calibrated as per the industry standards. Project proponent will pay to the KPTCL based on the meter reading recorded in the import meter. The maintenance and/or other quality control measures are taken by KPTCL, since any false reading in the meter is a financial loss to KPTCL. Hence, KPTCL give high priority in quality control of the import meter. Since, the data item is not under the control of project proponents, no QA/QC procedures are provided here.
Any comment:	

Data / Parameter:	$F_{i,y}$
Data unit:	*Tonnes/kilo liters*
Description:	Quantity of fossil fuel type *i* combusted in the project plant during year *y*
Source of data to be used:	On-site measurements
Value of data	0 (assumed value for ex-ante calculation of emission reductions)
Description of measurement methods and procedures to be applied:	The total number of operating hours of DG set and the corresponding quantity of diesel consumed for the purpose will be recorded in the log book maintained at the DG set room. The operating hours and the quantity of diesel consumption will be recorded.
QA/QC procedures to be applied:	The weigh bridge meter will under go calibration/maintenance subject to appropriate industrial standards. The data recorded can be cross checked against the fuel purchase receipts.
Any comment:	

B.7.2 Description of the monitoring plan:

>>

The company Bhoruka Power Corporation Ltd. is managed by a Board of Directors. The company is managed professionally with a full time Managing Director and other professional managing different disciplines.

The authority and responsibility for implementation, development and registration of the CDM Project activity 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 prepare necessary audit reports for review by the management i.e. Board of Directors or its Committee for review.

The identified person in charge will be assisted by a team of experienced personnel in disciplines such as mechanical and electrical with experience in plant operation, measurements and management. The primary responsibilities of the team is to collect, measure, monitor, record and report the information on various data items to the person in charge, in accordance with the applicable standards. Periodic calibration of various instruments used in the monitoring of the data and record keeping of the same also will be the responsibility of the team.

The responsibility of storage and archiving of information in good condition also lies with the designated person in charge. The person in charge will undertake periodic verifications and onsite inspections to ensure the quality of the data collected by the team and initiate steps in case of any abnormal conditions.

The company may introduce an internal audit system for the GHG compliance. Internal auditing will be carried out as per the monitoring plan and whenever necessary. An internal audit report will be prepared for review by the Board of Directors which will be later submitted for verification by an independent entity (DOE). Board of directors will examine the internal audit reports and will in particular take note of any deviations in data over the norms and monitor that the corrective actions have resulted in adherence to the standards.

As detailed in Section – B.7.1, the monitoring plan includes monitoring of energy parameters such as gross energy, auxiliary consumption, energy export to the KPTCL grid system, energy import to the project activity from grid and also consumption of diesel for DG set operation.. The project design employed latest microprocessor based high accuracy monitoring and control equipment that will measure, record, report, monitor and control of various key parameters like generation by the project and net energy exported to the grid. Necessary standby meters or check meters are installed, to operate in standby mode when the main meters are not working. All meters will be calibrated and sealed as per the industry practices at regular intervals. Hence, high quality is ensured for all the above parameters. Sales records will be used and kept for checking consistency of the recorded data.

The Power Purchase Agreement signed by the Project Participants and the KPTCL provides procedures for monitoring the energy fed to the grid, emergency preparedness, calibration of monitoring equipment, company’s operation and maintenance responsibilities etc. The same will be adopted for GHG audits and will form part of the monitoring plan. Hence, no separate procedures for QA/QC are provided in this monitoring plan.

The project has necessary provisions for emergency preparedness so that any unforeseen events such as fire etc. could be averted. The provisions include fire fighting systems, standby features for critical items etc.

All the data monitored under the monitoring plan will be kept in electronic form and hard copy format for 2 years after the end of crediting period or the last issuance of CERs for this project activity whichever occurs later. The monitored data will be presented to the verification agency or DOE to whom verification of emission reductions is assigned.

The monitoring plan will be integrated with the existing ISO procedures of the company.

B.8 Date of completion of the application of the baseline and monitoring methodology and the name of the responsible person(s)/entity(ies)

>>

Date of completion of Baseline: 14/07/2007

Name of the person / entity determining the baseline: Zenith Energy Services (P) Ltd., Hyderabad with contributions from Factor Consulting + Management AG (Switzerland).

Contact details are 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 C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>>

06/09/2004

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

>>

30 years

CDM – Executive Board

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

Fixed crediting period

C.2.1. Renewable crediting period

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

>>

Not chosen

C.2.1.2. Length of the first crediting period:

>>

Not applicable

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>

01/03/2008 or from the date of registration of project activity whichever is later

C.2.2.2. Length:

>>

10 y – 0 m

SECTION D. Environmental impacts

>>

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

>>

As per the prevailing regulations of the Host Party i.e. India represented by the Ministry of Environment and Forests (MoEF), Govt. of India and also the line ministry for environmental issues in India, Environmental Impact Assessment (EIA) studies need not to be conducted for the projects less than Rs. 1000 millions. Since the total cost of the project is only Rs.326.77 millions, the project activity doesn't call for EIA study.

Also, S.O. 1533[20], dated 14th September 2006, Ministry of Environment & Forests (MoEF), Govt. of India, states that the hydroelectric projects with less than 25 MW need not to get Prior Environmental Clearance (EC) either from State or Central Govt. authorities. However the project activity is required to get permission from Karnataka State Pollution Control Board for setting up of the project. The project proponents have obtained necessary clearance in this regard.

Due to the capacity of project being y 9 MW and run-of-the river type hydroelectric scheme, the project does not result in adverse impacts on socio-economic environment of the region. Displacement of local populace, disturbance in the local eco systems, deforestation etc. are not involved.

[20] Page No: 10, Section 1(c), River Valley Projects, Ministry of Environment & Forests (MoEF), Govt. of India, http://envfor.nic.in/legis/eia/so1533.pdf

Hence, in conclusion, the project does not cause any impacts on the environment or socio-economic situation in the region.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

>>

No significant environmental impacts considered due to implementation of project activity by the host party, Hence, no references or procedures specified here.

SECTION E. Stakeholders' comments

>>

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

>>

Before implementing any project, project investors / developers need to identify the stakeholders, prepare necessary documents, approach the identified stakeholders directly and obtain required clearances / approvals. The stakeholders after review of documents and investment profile, will accord approvals / licences or send comments in writing to project investors for further clarifications / corrections. In case they are not satisfied with the project design or they feel that the project impacts any of the local environment / social / economical environments, they will not issue clearances / approvals and stop the implementation of the project.

The project promoters have to conduct a stakeholders meeting for inviting comments from the all the stakeholders involved with respect to the project activity. For this the promoters have to publish in local vernacular and English dailies. The promoters have to ensure that the project addresses all the issues raised by the stakeholders.

Identification of the Stakeholders:

The project participants identified the following stakeholders for the project activity.

Table E.1. Identified Stakeholders and their Functions

Stakeholder Name	Stakeholder Functions
Karnataka Renewable Energy Development Limited (KREDL) (www.kredl.kar.nic.in)	Policy implementation body in respect of renewable energy projects in Karnataka. KREDL reviews the project documentation and accords clearance for utilizing renewable energy sources in the state
Karnataka Power Transmission	The state owned electricity utility company that manages the

Corporation Limited (KPTCL) (www.kptcl.com)	electricity transmission in Karnataka state. Any electricity generation project proposed in Karnataka shall approach KPTCL for power evacuation arrangements.
Karnataka State Pollution Control Board (KSPCB) (www.kspcb.kar.nic.in)	A statutory local body that oversees the pollution control aspects in the state. Any project activity shall obtain clearance from the KSPCB before implementation.
Irrigation Department (www.waterresources.kar.nic.in)	Is part of Government of Karnataka and overseas utilization of water in the state of Karnataka.
Local Village Panchayat	Elected statutory body of the local populace will issue NOC for implementing any project in the jurisdiction of the panchayat.

Stakeholders' Involvements

Department of Energy

- Initially the Department of Energy, Govt. of Karnataka accorded permission to implement 1 MW Mini hydel project to M/s Global Capital and Investments vide **G.O. No. DE 132 NCE 97 dated 20th April 1999.**

- The project got approval for enhancing the capacity from 1 MW to 9 MW from Department of Energy, Govt. of Karnataka vide **G.O. No. DE 145 NCE 2001 dated 12th September 2001.**

- Implementation Agreement is executed with Govt. of Karnataka on 10th May 1999.

KREDL
The KREDL has accorded permission for transfer of 1 MW Neria Mini Hydel scheme to M/s Bhoruka Power Corporation Limited vide **O.M. No. KRED/06/Neria/2001/506 dated 27th March 2001.**

KPTCL
The project got approval from KPTCL for evacuation of power vide **No. CEE(G)/SEE(PLG)/EE(PSS)/AEE-1/F98/CYS-1066 dated 1st March 2002.**

The project got Technical Clearance from KREDL vide No**. KRED/06/Neria/2002/1616** dated 25th November 2002.

Pollution Control Board
The Karnataka State Pollution Control Board (KSPCB) has issued 'Consent for Establishment' to the project vide **KSPCB/EO(MNG)/DK/AEO-2/LG/CFE/F-/2004-05/4482** dated 16th December 2004.

Forests Clearance
The project got approval from Forest, Ecology, Environment Department, Govt. of Karnataka for diversion of 3.308 Hectares of forests land for the project.

Fisheries Department
The project has obtained the clearance from Department of Fisheries, Govt. of Karnataka on 20th October 2003.

CDM – Executive Board

Stakeholders' Comments

The project participants already consulted and approached the above stakeholders for implementation of the project. No negative comments are received from them. Necessary clearances / approvals are already released in favour of the project , which is evident from the fact that the power plant is in operation from June 2006 onwards.

E.2. Summary of the comments received:

>>

No comments are received on the project.

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

>> No comments are received; hence, no action taken report is applicable

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Bhoruka Power Corporation Limited
Street/P.O.Box:	No: 48, Lavelle Road,
Building:	
City:	Bangalore
State/Region:	Karnataka
Postfix/ZIP:	
Country:	India
Telephone:	+91- 80- 2227 2271
FAX:	+91- 80- 2224 5246
E-Mail:	info@bhorukapower.com
URL:	www.bhorukapower.com
Represented by:	
Title:	Managing Director
Salutation:	Mr.
Last Name:	S.
Middle Name:	
First Name:	Chandrasekhar
Department:	--
Mobile:	--
Direct FAX:	+91- 80- 2224 5246
Direct tel:	+91- 80- 2227 2271
Personal E-Mail:	chandrasekar@bhorukapower.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

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

Annex 3

BASELINE INFORMATION

This project uses grid emission factor calculations officially published by the Central Electricity Authority (CEA) of India, following the approaches and rules defined in ACM0002. For details and further information on data please see CEA CO_2 data base from the following web link: http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm

➔ "CDM Carbon Dioxide Baseline Database, Version 2 (21st June 2007)"

Annex 4

MONITORING INFORMATION

All the parameters mentioned in the monitoring plan will be maintained 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.

The calibration of monitoring equipment is being maintained as per the requirement of KPTCL and the same is being done regularly. Power Generation, Export & Auxiliary Consumption, are being recorded daily and the same is being verified and approved by General Manager of the plant.

The Plant is equipped with energy meters/export meters for monitoring and control purpose. There are two energy meters at KPTCL sub station to measure the export power, namely main meter and check meter with 0.2 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 Karnataka 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 KPTCL. If any of the meters is found to be registered inaccurately, the affected meter will be immediately replaced. 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 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 sate 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 KPTCL the meter readings will be taken every month by KPTCL officials in presence of company representatives and readings will be jointly certified.

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

1. Turbine log
3. Electrical log

If both check meters fail to record or if any of the PT fuses are blown out, the export energy will be computed on a mutually agreeable basis for the point of defect. Power generation, export and auxiliary consumption, are being recorded at the plant daily and the same is being verified by 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. Plant emission levels are being monitored and the results are being sent to KSPCB. For this purpose, the service of external agency is being utilized.

The monitoring plan as above in parallel with the existing ISO procedures is being followed by the company.