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

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. • 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 : 13 MW Grid Connected Dandela Mini Hydel Scheme, Karnataka State, India.
Version: 02
Date : 16/10/2009

Revision History:
Version 03, 19/11~~27/09~~/2011: Revised version prior to First periodic verification.

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

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Sagar Power (Dandela) Private Limited utilises discharge of Dandela falls in Netravathi River to generate electrical power for supply to the state grid. The project with an installed capacity of 13.05 MW will generate an average annual energy of 38.20 GWh in which 37.63 GWh will be exported to Mangalore Electric Supply Company limited (MESCOM) under Power Purchase Agreement (PPA), thereby improving the quality and energy availability under the service area of the substation.

The River Netravathi is west flowing river having its origin in Kudremukh peak of Western Ghats at an elevation of 1720m. It joins the Arabian Sea near Mangalore in Dakshina Kannada Dist. The proposed project diversion structure across Netravathi River at Dandela falls. Dandela mini hydel scheme utilises discharge from Netravathi River. After utilisation of discharge for power generation, water is released back to river. Proposed site located on right bank of Netravathi River near Dandela village, about 4km from Dharmasthala pilgrim town.

The purpose of the proposed project activity is to produce clean electrical energy in a sustainable manner, optimising the utilization of renewable resource (water) in order to contribute to the local power demand from clean sources in a system already dominated by thermal power production plants utilizing fossil fuels.

The project activity utilises potential energy available in flowing water for power generation. The process involves 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.

View of project participant about the project activity's contribution to sustainable development

Ministry of Environment and Forests, Govt. of India has stipulated the following indicators for sustainable development in the interim approval guidelines for CDM project.

a) Social well-being
b) Economic well-being
c) Environmental well-being
d) Technological well-being

Project would contribute to the above indicators in the following manner

Social well-being:

- The project activity would increase the availability of power in the area.
- It would contribute to the creation of employment opportunities for the local people during the construction of the project and provide regular employment during project operation there by alleviation of poverty to the extent feasible.
- Creation of employment opportunities would partly prevent migration to urban areas and reduce urban congestion and destitution
- Availability of more stable power would provide impetus to profitable economic activities in the area and nearby, thereby contributing to further employment opportunities.

Economic well-being:

- The economy of the area is dependent on agricultural activities, in particular commercial crops. The power generation by the project activity would improve the local grid, enabling availability of power in a reliable manner for the agricultural activity.
- Project proponents would invest in the region about INR 572.10 millions, which would not have occurred in the absence of the project activity. This is a significant investment in the region.
- The power generation from the project area would stabilize the grid as well as quality of power in the local area. With rising hydro power generation and improving efficiencies in distribution of electricity, the project activity would be able to offer energy at stable prices for economic development in the surrounding rural areas.
- The project activity would result in diversification of the state grid, which is dominated by conventional fuel based generating units and improve the power quality by reducing the voltage fluctuations.
- Project activity would utilize potential water resources available in the area for exploitation of all possible resources for local development, thus demonstrating the effective utilization of renewable energy sources available in the area.

Environmental well-being:

- The scheme being a small hydro electric project, would not alter any environmental or biological attributes of the area.
- Further the project activity would not result in degradation of any natural resources, health standards, etc. at the project area.
- As the project is hydro based, it would generate clean energy and would result in real, measurable and long-term emissions reductions of green house gases.

Technological well-being:

- The project would utilise environmentally safe and sound technology in small-scale hydro-electric power sector.

- The project would demonstrate the feasibility of harnessing water discharges in the river under low head and encourage setting of similar projects in future.

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 the party involved ((Host) indicates a host party)	Private and/or public entity(ies) project participants	Kindly indicate if the party involved wishes to be considered as project participant (Yes/No)
India (Host)	Private Entity: Sagar Power (Dandela) Private Limited	No

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

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

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A.4.1.1. Host Party(ies):

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India

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

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State: Karnataka

A.4.1.3. City/Town/Community etc:

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District: Dakshina Kannada
Taluk : Beltangady
Village : Dandela

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

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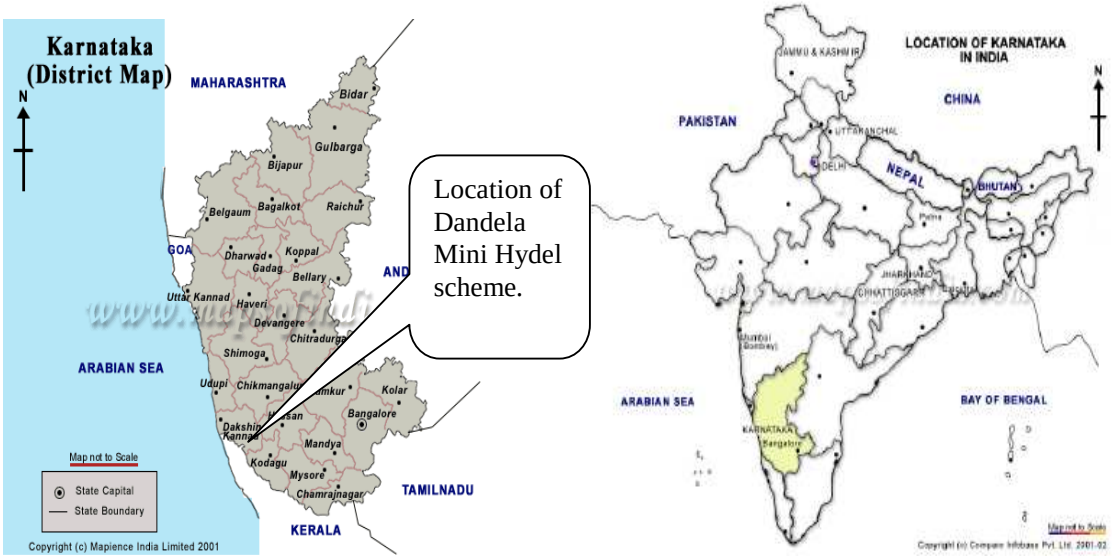
The proposed project activity is located at Survey No.182/P2 and 182/P3, Dandela village, Beltangady Taluk, Dakshina Kannada District in the State of Karnataka. The project site is located at a distance of 4 km. from the famous pilgrimage town of Dharmastala. Dharmastala is around 300km from Bangalore and

can be reached by road on National highway Nos. 7 & 48. A deviation of 20 km from NH 48 would lead to Dharmastala. The geographical co-ordinates are Latitude: 12^0 57' 17", Longitude: 75^0 21' 44"

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



Physical Location of the Project site

Sagar power (Dandela) private limited,
Survey No: 182 P/2 and P/3,Dandela village,
Beltangady Taluk, Dakshina Kannada Dist.
Karnataka State, India.

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

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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 13, EB 36, which includes hydro electric generation for a grid system.

Application of environmentally sound and safe technology

The technology of power generation process using hydro resources involves 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.

Technical details of the project activity:

The essential components of this power project consist of construction of a Power House with an installed capacity of 13.05 MW, Diversion structure across the river, an Approach Channel, Forebay, Penstock connected with forebay and power house, Intake structure, Intake pool with gates and trash rack, Tail Race Pool and Tail Channel. The water from the power house will be lead back to the Netravathi River through a tail channel of about 50 m length.

The project comprises 3 Horizontal synchronous generators of capacity 4.35 MW each, totalling 13.05 (4.35 x 3)~~13000~~ MW~~kW~~ coupled to Horizontal 'S' type full Kaplan type turbine. The generated voltage at the generator terminals will be 11 kV with a step up voltage of transformer 33 kV. The evacuation of power will be through 33kV double circuit transmission line to MESCOM 33kv sub station at Beltangady, which is at a distance of 18km.

Technical Details:

Hydrology

Design Flow	: ~~105m^3~~104.55 m^3/sec
Design Head	: 15 meters

Energy

Expected annual generation	: 38.20GWh
Auxiliary Consumption	: 0.57 GWh
Expected annual export	: 37.63 GWh
Generation voltage	: 11 kV, 3 phase
Transmission line voltage	: 33 kV with double circuit

Plant Equipment

Hydro Turbine	: Horizontal 'S' Full Kaplan type
No. of generating units	: Three
Frequency	: 50 Hz

Technology transfer

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

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

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The crediting period chosen for the proposed project activity is 10 years. The total emission reductions are estimated at 321 600 tCO_2 for the crediting period. The annual emission reductions are estimated at 32 160 tCO_2. Information on the emission reductions are furnished in the table below.

Years	Estimation of annual emission reductions in tonnes of CO_2 e
2010	32 160
2011	32 160
2012	32 160
2013	32 160
2014	32 160
2015	32 160
2016	32 160
2017	32 160
2018	32 160
2019	32 160
Total Emission reductions (tonnes of CO2e)	**321 600**
Total number of crediting years	**10**
Annual average of the estimated reductions over the crediting period (t CO2 e)	**32 160**

In the above table the year 2010 corresponds to the period starting from 01.06.2010 to 31.05.2010. Similar interpretation shall apply for remaining years.

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

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No public funding from Annex I Party is involved 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 activity is not a debundled component of a larger project activity as explained below.

There is no registered CDM project activity or an application to register another CDM project activity;

- with the same project participants
- in the project category and technology measure,
- in the project category and technology measure and
- whose boundary is within 1 km of the project boundary of the proposed small scale activity at the closest point.

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:

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Title: **Type I**, Renewable Energy project

Reference: **AMS-I.D.,** Grid connected renewable electricity generation, Version 13, EB 36

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

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The proposed project activity is a 13.05 MW, hydro electric based power project. The project activity is eligible to use the methodology indicated above, since project activity generates and exports the renewable electricity to a grid system, i.e., dominated by thermal energy sources. The capacity of the project activity is well below the qualifying limit project activities under the small scale methodology AMS-I.D. i.e. 15MW. Hence, AMS-I.D. 'Grid connected renewable electricity generation' is applied for the proposed 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 river, the project participants declare that the project will be within the limits of the small scale project activity throughout the crediting period. In addition the design parameters of turbine and generator vouch that the project will be within the small scale limit throughout the crediting period.

B.3. Description of the project boundary:

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In accordance with AMS-I.D., Version 13, EB 36, the project boundary encompasses the physical, geographical site of the renewable generation source.

The project boundary is therefore the physical boundary around the diversion structure across the river, Approach channel, forebay, Penstock, Intake Structure, powerhouse, tailrace pool, Tailrace channel and the transmission system till the evacuation point. The power generated from this project is metered and accurately quantifiable.

B.4. Description of baseline and its development:

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As the project activity is grid connected renewable electricity generation, eligible under AMS-I.D. Version 13, EB 36, the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO_2e/kWh) calculated in a transparent and conservative manner as:

(a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the 'Tool to calculate the emission factor for an electricity system'.

OR

(b) The weighted average emissions (in kg CO_2e/kWh) of the current generation mix.

The project proponent has selected approach 'a' i.e. combined margin emission factor with ex-ante approach where emission factor is fixed for the whole crediting period. The ex-ante approach is considered conservative since the grid system in future is expected to become more carbon intensive as the projects planned to establish in the region is mostly thermal energy based.

The baseline emission factor in year *y* for the Southern region is calculated as the simple average of the OM (3-year generation-weighted average) and BM emission factors, i.e. OM and BM are each weighted with 50%.

The key parameters and data sources are furnished below:

Key Parameter	Value	Data Source	Website
EF	Baseline emission factor for the southern region grid	CEA published baseline emission factor for southern region grid. (CO2 Baseline Database Ver.03 dt.15 Dec.2007" published by CEA)	http://www.cea.nic.in CDM - Carbon Dioxide baseline database
EGy	Net power export to the grid per annum	From Plant and MESCOM Records. Ex-post determination.	------

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:

Serious consideration of CDM:

Annex 46 of EB 41 requires project activities for which the start date is prior to the date of publication of the PDD for global stakeholder consultation, to demonstrate that serious consideration of CDM in the decision to implement the project activity. Such demonstration, as per the Annex requires the following elements to be satisfied with documentary evidence, viz.,

a) awareness of the CDM prior to the project activity start date, and that the benefits of the CDM were a decisive factor in the decision to proceed with the project; and
b) that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation.

PP was aware of the CDM benefits (through print and electronic media, information from other project developers). The first requirement stipulated by EB is satisfied by the resolution passed by the Board of Directors of the project activity in May 24, 2005. A copy of the resolution of the Board of Directors is submitted to the DOE for verification. The resolution was passed by the Board of Directors prior to the commencement of project activity start date. The contents of the resolution would reveal clearly that CDM benefit was a decisive factor in the decision to proceed with the project.

The second element relates to the demonstration, by means of reliable evidence, that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation. Evidence to support this, as per Annex 46 of EB 41 includes contracts with consultants for CDM services, appointment of DOE, among others. The chronology of events of the project activity is furnished below.

Consideration of CDM in a Board meeting : 24-05-2005
Work Order for Civil Works : 01-06-2005
Land lease agreement with Government of Karnataka : 16-12-2005
Term loan sanction from State Bank of India : 15-01-2006
Proceedings of Government of Karnataka sanctioning the Capacity of 13MW : 20-01-2006
Enquiry to appoint a CDM consultant : 25-01-2006
Placement of order for Electro-Mechanical equipment : 27-04-2006
Offer for CDM consultancy : 08-05-2006
Board discussion on delay in CDM process : 11-09-2006

Offer from APITCO	: 17-11-2006
Appointment of consultant for CDM	: 20-02-2007
Appointment of DOE	: 01-10-2007
PDD Web Hosted on UNFCCC for Public Comments	: 19-02-2008
HCA received from Indian DNA	: 21-07-2008
Commercial Operation Date	: 19-07-2009

As could be seen from the above the investment decision was taken by the project proponent in May 2005. However no steps could be initiated for the appointment of a consultant since the capacity enhancement approval from the Government was received only in the month of January 2006. Immediately after the approval is received, enquiries were floated for the appointment of consultants for CDM. The initial offer was received in May 2006. But it took time to negotiate, call for competitive offers and only in February 2007, the consultant was appointed. The relevant correspondence is furnished to the DOE for verification. The Board has also expressed concerns on the delay in their board meeting held in September 2006. As both the elements stipulated by Annex 46 of EB 41 are fulfilled, it is submitted that the CDM was seriously considered in the decision to implement the project activity.

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.

Project participants have undertaken the following analysis in support of additionality.

1. Investment barrier:

Low return on Investment:

IRR is the most commonly used financial indicator by the bankers and investors alike to asses the intrinsic viability of the project. The IRR thus computed, has to be compared with a benchmark indicator.

IRR has been computed for the project on post-tax basis and the same is computed for the life time of the project activity. The assumptions considered for financial analysis are based on the detailed project report and term loan sanction letters. In respect of tariff the project proponent has considered the tariff based on the PPA executed with the utility. The PPA is available only for 10 years and thereafter the same is subjected for review. Any assumption on tariff applicable from 11th year onwards is highly uncertain today and do not provide a reliable basis for investment decisions. However it is clear that the tariff from 11th year will be substantially lower for the following reasons.

- By that time there will not be any element of interest as the loans would have been fully paid

- In the absence of a liberalized electricity market, the PP will have a very weak negotiating position with the state utility who have a strong interest to minimize the tariff. This has been witnessed in the past when the tariff for hydro projects has been reduced from INR 2.25 per kWh with an escalation of 5% per annum with the base year as 1994-95, then revised to INR 2.90 per kWh with an escalation of 2% every year. Now the current tariff is INR 2.80 per kWh with out any escalation.

In the light of the above the tariff from 11 to 30th year is considered at INR 2.80 per kWh based on the present tariff policy followed by KERC

The PP has considered *Government bond rates, increased by a suitable risk premium* as benchmark for the purpose of comparison with Project IRR. The Benchmark is estimated at 15.37%.

The project IRR in baseline scenario is working out to 12.61%. The IRR is less compared with bench mark of 15.37%. IRR improves to 15.77% after considering CDM revenue.

The soft copy of financial analysis together with assumptions considered while estimating profitability and cash flows are provided to the DOE for verification.

Appropriateness of choosing benchmark:

The Additionality Tool – Ver. 5.2 released by EB 41, offers 5 benchmarks, from amongst which the PP can choose one to demonstrate the additionality of the project. One of the 5 benchmark/discount rates identified by the Additionality Tool relates to the use of *Government bond rates, increased by a suitable risk premium to reflect private investment and/or the project type, as substantiated by an independent (financial) expert or documented by official publicly available financial data*.

The yield on long term government dated securities is taken as government bond rate. The time horizon for this project activity is 30 years, therefore, recent 4-months average rate of return (as recommended by CERC)[1] on government securities having 30 years maturity term is taken as government bond rate. The project participant, took investment decision on 24/05/2005 and the latest published data by Reserve Bank of India, used to evaluate government bond rate.

No. 27 C : MONTH-END YIELD TO MATURITY OF SGL TRANSACTIONS IN CENTRAL GOVERNMENT DATED SECURITIES FOR VARIOUS RESIDUAL MATURITIES[2]	
Term to Maturity (in years)	2005
	February
30	7.1687%
Average	7.1687%

Hence, applicable government bond rate at the time of investment decision was 7.17%.

The risk premium is considered at 8.2% based on publicly available sources. Based on the above approach the benchmark has been estimated at 15.37% for the project activity.

Appropriateness of choosing the Country risk premium of 8.2%

Country risk premium of 8.2% was chosen because it was the most conservative of the risk premiums available at the time of decision making. In this context three published studies on risk premium for India were available, viz.,

i) Prof J.R. Verma (2006), Professor of Finance at Indian Institute of Management, Ahmedabad and former Full time Member of Securities and Exchange Board of India study, which have arrived at a risk premium of 8.75%[3].

[1] http://www.cercind.gov.in/rep1304.pdf , page 29

[2] http://www.rbi.org.in/scripts/BS_ViewBulletin.aspx?Id=6087

[3] Prof. Jayant R. Verma and Samir K. Barua, *A First Cut Estimate of the Equity Risk Premium in India* Indian Institute of Management, Ahmedabad, can be accessed at http://www.iimahd.ernet.in/~jrvarma/papers/WP2006-06-04.pdf

ii) Prof. Rajnish Mehra (2006), University of California, Santa Barbara and National Bureau of Economic Research, who has arrived at a risk premium of 9.7%[4].

iii) CRISIL (2000) study which has estimated the risk premium for Central sector Utilities at 8.2%[5].

Since of the three published studies, 8.2% is the *lowest*, the risk premium of 8.2% was chosen.

Using Prof. Verma's risk premium, the benchmark would be 15.92% and based on Prof. Mehra's risk premium, the benchmark would be 16.87% - and hence the chosen bench mark of 15.37% is conservative.

Sensitivity Analysis:

The robustness of the conclusion drawn above has been tested with reasonable variations in the critical assumptions. The Guidance on the Assessment of Investment Analysis issued by the EB in its 39th Meeting covers two aspects on sensitivity analysis, viz., subjecting only those variables which constitute more than 20% of project cost or total project revenue to sensitivity analysis and considering a +/- 10% variations in the selected variables. Accordingly, two sets of scenarios have been identified, viz., variation in project cost and revenue (generation) by 10% on either side. Sensitivity analysis for variation in tariff and O&M Cost also considered. Besides analysis is also carried out to indicate at what %age of change in the critical parameters IRR reaches the benchmark return.

Sensitivity analysis has been done for a variation by 10% on either side. The outcome of the sensitivity analysis is given below:

Sensitivity parameters	+10 %	Base Line Scenario%	– 10 %
Project cost	11.01%	12.61%	14.46%
Revenue (generation)	14.33%	12.61%	10.80%
Tariff	14.33%	12.61%	10.80%
O&M Cost	12.35%	12.61%	12.86%

The sensitivity analysis proves beyond doubt that the project is unlikely to be financially attractive even under the most unrealistic optimistic conditions of project cost going down by 10%, revenue (i.e generation) going up by 10% This proves with no uncertainty that the project activity is not a business-as-usual scenario. It was against this background that the PP, while taking a decision to invest in the project activity, considered the CDM benefits. The minutes of the meeting of the board of directors where the essentiality of the CDM benefits was discussed is furnished to the DOE for verification. CDM benefits go to improve the financial attractiveness of the project activity, as evident from the fact that with CDM benefits, the project IRR in the baseline scenario improves to 15.77% in contrast the benchmark return of 15.37%, thus crossing the benchmark. Hence, the project requires CDM benefits to make it financially attractive.

[4] *The Equity Premium in India*, Prof. Rajnish Mehra, can be accessed at http://www.academicwebpages.com/preview/mehra/pdf/Equity%20Premium%20in%20India.pdf

[5] Risk Premium- Cost of Capital for Central Sector Utilities, CRISIL Advisory Services can be accessed at Page No.37 in http://cercind.gov.in/rep1304.pdf

The project IRR reaches benchmark only if the cost of project is reduced by 14.35%. Revenue (generation) goes up by 16.30% and tariff increases by 16.30%. Even if the O&M cost coming down by 100% the IRR of the project activity does not reach the benchmark. However these scenarios are not possible since in the project cost civil works and plant and machinery constitute 31.0 % and 58.00% of the project cost respectively. With the increase in the cost of cement and steel there is no possibility that the cost of project would come down. Since maximum plausible generation has been considered, generation going beyond what has been assumed is highly unrealistic. As already explained in previous paragraphs, the chances of increasing in tariff is highly uncertain than assumed from 11th year onwards.

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

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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The baseline emission factor reflects the carbon intensity of the displaced amount of grid electricity.

In order to facilitate adoption of authentic baseline emissions data and also to ensure uniformity in the calculations of CO_2 emission reductions by CDM project developers, Central Electricity Authority (CEA), in cooperation with GTZ CDM-India, has compiled a database containing the necessary data on CO_2 emissions for all grid-connected power stations in India.

This baseline emission factor is derived from the data provided in the CO_2 Baseline Database, Version 03, December, 2007.

The CO_2 Baseline Database Ver.03 dt.15 Dec.2007 adapted calculations to ensure consistency with Tool to Calculate the Emission Factor for an Electricity System (Version 01, EB 35 Annex 12)

As the project activity is grid connected renewable electricity generation eligible under AMS I.D. /Version 13, EB 36 the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO_2e/kWh) calculated in a transparent and conservative manner as:

a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the 'Tool to calculate the emission factor for an electricity system'.

OR

b) The weighted average emissions (in kg CO_2e/kWh) of the current generation mix.

The project proponent has selected approach 'a' i.e., combined margin emission factor with ex-ante approach.

According to the procedures prescribed in the 'Tool to calculate the emission factor for an electricity system (Version 01), adopted by EB 35 (Annex 12)' the project activity shall apply the following six steps:

Step 1. Identify the relevant electric system

Step 2. Select an operating margin (OM) method
Step 3. Calculate the operating margin emission factor according to the selected method
Step 4. Identify the cohort of power units to be included in the build margin (BM)
Step 5. Calculate the build margin emission factor
Step 6. Calculate the combined margin (CM) emission factor

Step 1. Identify the relevant electric system

As the project activity is located in Karnataka State, the project electricity system identified as Southern regional grid where the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity and can be dispatched without significant transmission constraints.

Step 2. Select an operating margin (OM) method

The project activity has selected **simple OM method** (option a of the Tool) since the power supplied by low cost must run power plants[6] to the southern grid during 2006-07 (28.3%) is clearly below 50%.

Step 3. Calculate the operating margin emission factor according to the selected method

The simple OM emission factor is calculated as per Option A of the Tool as detailed below:

$$EF_{grid,OMsimple,y} = \frac{\sum_{i,m} FC_{i,m,y} * NCV_{i,y} * EF_{CO2,i,y}}{\sum_{m} EG_{my}} \quad (1)$$

Where:

$EF_{grid,OM,simple,y}$ is simple operating margin CO_2 emission factor in year y (tCO2/MWh)

$FC_{i,m,y}$ is amount of fossil fuel type *i* consumed by power plant / unit m in year *y* (mass or volume unit)

$NCV_{i,y}$ is net calorific value (energy content) of fossil fuel type *i* in year *y* (GJ /mass or volume unit)

$EFco_{2,I,y}$ is CO_2 emission factor of fossil fuel type *i* in year *y* (tCO_2/GJ)

$EG_{m,y}$ is net electricity generated and delivered to the grid by power plant / unit m in year *y* (MWh)

m is all power plants / units serving the grid in year *y* except low-cost / must-run power plants / units

i is all fossil fuel types combusted in power plant /unit m in year y

y is either the three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation (ex-ante)

The simple OM emission factor is calculated Ex ante, a 3-year generation-weighted average, based on the most recent data available from CO_2 Baseline Database, Version 03, December, 2007.

[6] Defined as power plants with low marginal generation costs or power plants that are dispatched independently of the daily or seasonal load of the grid. They include hydro, geothermal, wind, low-cost biomass, nuclear and solar generation.

Table 1: Operating Margin

Most recent three years	2004/05	2005/06	2006/07
Operating Margin* (OM) in t CO_2 / GWh	1000.88	1007.90	1003.03
Average of 3 years	**1003.93**		
* including imports			

Step 4. Identify the cohort of power units to be included in the build margin (BM)

Tool to calculate the emission factor for an electricity system 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.

The build margin is calculated in the data base (CO_2 Baseline Database, Version 03, December, 2007) as the average emissions intensity of the 20% most recent capacity additions in the grid based on net generation.

Step 5. Calculate the build margin emission factor

The build margin emission factor is calculated as follows:

$$EF_{grid,BM,y} = \frac{\sum_{m} EG_{m,y} \times EF_{EL,m,y}}{\sum_{m} EG_{m,y}}$$

Where:

$EF_{grid,BM,y}$ –Build margin CO_2 emission factor in year y (tCO_2/MWh)

$EG_{m,y}$ –Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)

$EF_{EL,m,y}$ –CO_2 emission factor of power unit m in year y (tCO_2/MWh)

m –Power units included in the build margin

y –Most recent historical year for which power generation data is available

Build Margin (BM)	**705.46**	tCO_2 / GWh

Step 6. Calculate the combined margin (CM) emission factor

The combined margin is a weighted average of the simple operating margin and the build margin.

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$$

Where:

$EF_{grid,BM,y}$ –Build margin CO_2 emission factor in year y (tCO_2/MWh)
$EF_{grid,OM,y}$ –Operating margin CO_2 emission factor in year y (tCO_2/MWh)
w_{OM} –Weighting of operating margin emission emissions factor(%)
w_{BM} –Weighting of build margin emission emissions factor(%)

OM and BM are each weighted with 50%.

Combined Margin (CM) = Simple average of OM and BM	**854.70**	tCO_2 / GWh

Project emissions

No project emissions are applicable to the proposed small scale hydro electric power project, since the electricity generation is based on hydro resources, which does not involve combustion or generation of emissions from fossil fuels. However, when the project is equipped with diesel generator of 160 KVA capacity 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.

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

Where

PEy Project emissions from combustion of fossil fuel (diesel for DG set) in the project activity during the year y

Fi,y Quantity of fossil fuel type i combusted (DG set) during the year y

COEFi Carbon dioxide emission coefficient of the fuel type i

The CO_2 emission coefficient COEFi fuel i (tCO2 / mass or volume unit of the fuel), is obtained as

$$COEFi = NCVi \cdot EFCO_2,i \cdot OXIDi$$

where:
NCVi is the net calorific value (energy content) per mass or volume unit of a fuel i(43 TJ/Gg as per IPCC2006 default values)
OXIDi is the oxidation factor of the fuel (1 as per IPCC 2006 default Values),
$EFCO_2$,i is the CO_2 emission factor per unit of energy of the fuel i(74.1 tCO_2/TJ as per IPCC 2006 default values)
Where available, local values of NCVi and $EFCO_{2,i}$ should be used. If no such values are available, Country-specific values (see e.g. IPCC Good Practice Guidance) are preferable to IPCC world-wide default values.

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 CO_2/GWh
Description:	CO_2 emission factor for the regional grid system
Source of data used:	CEA published grid emission factors
Value applied:	854.7 (2006-07) - ex-ante approach 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:	COEFi
Data unit:	kg CO_2/mass
Description:	CO2 emission factor of fuel type i
Source of data used:	IPCC 2006 default values
Value applied:	Diesel : 3.1863
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.

$BE_y = EG_y * EF_y$

BE_y = 37.63 GWh * 854.7 tCO_2e

BE_y = 32 160 tCO_2/GWh

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, if any, 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.

PEy = 0 tones * 3.1863 tCO2/TJ

PEy = 0 tCO2

Leakage

No leakage is applicable

Emission reductions

$ER_y = BE_y - PE_y - L_y$

ER_y = 32 160 - 0 - 0

ER_y = 32 160 tCO_2/GWh ($ER_y = BE_y$)

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 (t CO_2 e)	Estimation of baseline Emissions (t CO_2 e)	Estimation of Leakage (t CO_2 e)	Estimation of overall emission Reductions (t CO_2 e)
2010	0	32 160	0	32 160
2011	0	32 160	0	32 160
2012	0	32 160	0	32 160

2013	0	32 160	0	32 160
2014	0	32 160	0	32 160
2015	0	32 160	0	32 160
2016	0	32 160	0	32 160
2017	0	32 160	0	32 160
2018	0	32 160	0	32 160
2019	0	32 160	0	32 160
Total (tonnes of CO_2e)	**0**	321 600	0	321 600

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

B.7.1 Data and parameters monitored:

Data / Parameter:	$EG_{gross,y}$
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	38.20 ~~GWh~~
Description of measurement methods and procedures to be applied:	Continuously measured by calibrated meters, recorded daily and aggregated monthly. ~~Measured monthly using calibrated meters and aggregated annually.~~
QA/QC procedures to be applied:	The Meters used for measuring the Gross electricity generation will be calibrated by third party as per national standards but at least once in three years as per SSC-CDM guidelines, Version 17. The installed meters will have accuracy of 0.5 class.~~Meters will be calibrated as per industry standards.~~
Any comment:	Though the parameter is not used for the calculation of emissions reductions, the same is used for internal purpose. The data will be kept during the crediting period plus 2 years or the last issuance of CERs for this project activity, whichever occurs later.~~The main and check energy meters will be of 0.2 accuracy class. The meters are tested for accuracy every calendar quarter.~~

Data / Parameter:	$EG_{Auxiliary}$
Data unit:	GWh
Description:	Auxiliary electricity consumption of the project
Source of data to be used:	On-site measurements
Value of data	0.56~~GWh~~
Description of measurement methods and procedures to be applied:	Continuously measured by calibrated meters, recorded daily and aggregated monthly. ~~Measured monthly using calibrated meters and aggregated annually or 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:	Meter~~s~~ will be calibrated as per industry standards but at least once in three years as per SSC-CDM guidelines, Version 17. The installed meter will have accuracy of 0.5 class.~~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, the both parameters are already underwent the QA/QC procedures.~~
Any comment:	Though the parameter is not used for the calculation of emissions reductions, the same is used for internal purpose. The data will be kept during the crediting period plus 2 years or the last issuance of CERs for this project activity, whichever occurs later.~~The main and check energy meters will be of 0.2% accuracy class. The meters are tested for accuracy every calendar quarter.~~

Data / Parameter:	$EG_{export, y}$
Data unit:	GWh
Description:	Electricity exported (to grid) by the project activity during the year *y*~~Electricity supplied to the grid by the project~~
Source of data to be used:	Measurement at grid inter-connection point~~On-site measurements~~
Value of data	37.63 ~~GWh~~
Description of measurement methods and procedures to be applied:	Measured continuously ~~monthly~~ using calibrated meters and aggregated ~~annually~~monthly.
QA/QC procedures to be applied:	Main and check meters will be of 0.2 accuracy class and are calibrated as mentioned in valid PPA. Sales records/bills to the grid are used to ensure consistency.~~Meters will be calibrated as per industry standards. Sales records to the grid and other records are used to ensure consistency.~~
Any comment:	Data will be archived electronically and on paper. Archived data will be kept during the crediting period plus 2 years or the last issuance of CERs for this project activity, whichever occurs later.~~Electric power sold to the grid will be measured by main meter and check meter by both SPPL and MESCOM as specified in the PPA and records maintained. To be cross-checked with monthly invoices or receipts of payments.~~

Data / Parameter:	$EG_{import,y}$
Data unit:	GWh
Description:	Electricity imported (from grid) by the project activity during the year y ~~Grid electricity import to the project activity during the year y~~
Source of data to be used:	Measurement at grid inter-connection point ~~On-site measurements~~
Value of data	0 ~~GWh~~
Description of measurement methods and procedures to be applied:	Measured continuously ~~monthly~~ using calibrated meters and aggregated ~~annually~~monthly.
QA/QC procedures to be applied:	Main and check meters will be of 0.2 accuracy class and are calibrated as mentioned in valid PPA. Sales records/bills to the grid are used to ensure consistency.~~Meters will be calibrated as per the industry standards. Project proponent will pay to the MESCOM based on the meter reading recorded in the import meter. The maintenance and/or other quality control measures are taken by MESCOM, since any false~~

	~~reading in the meter is a financial loss to MESCOM. Hence, MESCOM 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 will be archived electronically and on paper. Archived data will be kept during the crediting period plus 2 years or the last issuance of CERs for this project activity, whichever occurs later.~~The main and check energy meters will be of 0.2% accuracy class. The meters are tested for accuracy every calendar quarter.~~

Data / Parameter:	$EG_{,y}$
Data unit:	GWh
Description:	Net Electricity supplied (to grid) by the project activity during the year y
Source of data to be used:	Calculated (as the difference of "$EG_{export,y}$" and "$EG_{import,y}$")
Value of data	37.63
Description of measurement methods and procedures to be applied:	Not applicable as it is calculated from the measured values of "$EG_{export,y}$" and "$EG_{import,y}$"
QA/QC procedures to be applied:	The parameter will be cross checked with the records of sales.
Any comment:	Data will be archived electronically and on paper. Archived data will be kept during the crediting period plus 2 years or the last issuance of CERs for this project activity, whichever occurs later.

Data / Parameter:	$F_{i,y}$
Data unit:	Tones/ kilo litres
Description:	Quantity of fossil fuel type i combusted in the project plant during year y
Source of data to be used:	Plant records~~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 data recorded can be cross checked against the fuel purchase receipts.
Any comment:	Data archived: Crediting period + two years.~~–~~

B.7.2 Description of the monitoring plan:

>>

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 Karnataka state in India. The monitoring plan, which will be implemented by the project proponent, describes about the monitoring organisation, parameters to be monitored, monitoring practices, QA and QC procedures, data storage and archiving.

Training procedures for the plant operators:

The project proponent formulated necessary training procedures for the plant operators/ engineers. The equipment suppliers confirmed to impart necessary training to the plant operators as part of equipment supply and installation.

The schedule of training by the equipment supplier is as given below:

(a)	Main level valve	At site
(b)	Turbine	At site
(c)	Governor shop inspection and test	At site
(d)	Generator & Excitation system	At site
(e)	Transformer	At site
(f)	Switchgear	At site
(g)	Computerized control system	At site

The total training period at the plant and design office including visit to important hydro power stations where similar equipment have been installed is four weeks for plant operators/engineers.

Procedures for training of monitoring personnel

The project will employ qualified and experience persons for plant operation. Basic personnel to deal with monitoring of parameters are plant operators. The project maintains standard log sheets and formats to record the monitoring parameters. The persons will be given proper training to maintain the plant records. The plant manager is the designated person to verify, compile and archive all the monitored data. The parameters to be monitored during the crediting period will be provided in a table format to the designated person. The person will be provided training for one month by GHG auditors, for the subsequent period he will be given with all the necessary formats for monitoring to deal the monitoring independently. The training will be provided to the monitoring personnel for the monitoring of the following parameters:

- Gross Electricity generated by the project activity
- Auxiliary Electricity consumed by the project activity
- ~~Gross energy generated~~ Electricity
- ~~Auxiliary consumption~~
- ~~Energy~~ Export to the Grid
- Electricity ~~Energy~~ Import from the Grid
- Net Electricity supply to the Grid
- Quantity of diesel used in diesel generator set
- ~~Periodical Calibration of monitoring equipment.~~

Further, any uncertainties in monitoring procedure will be cleared by external GHG Auditors.

Procedures for documentation and storage:

The Plant operators will record the parameters every day during the operation of the plant. The frequency of monitoring is similar to all types of parameter to be monitored, since the project is a hydro based project, needs to be monitored only the energy related data.

~~Gross Energy generation, Auxiliary consumption, Energy Export and import:~~ The Energy meter readings are taken during a particular time of every day to ensure constant recording frequency of parameter. The recorded parameters are documented every day in the standard log books maintained at the plant.

The day to day records will be verified by plant manager, compiled and documented for preparation of internal audit reports.

The company may introduce an internal audit system for documentation and safe storage of data. 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. The internal auditor could be an outside entity or one of the senior managers of the plant. The internal auditor is required to verify the records independently with reference to the power exported and imported. The reports are submitted periodically to the board of directors.

Internal audit reports are the basic documents for the monitoring and storage of plant operational data.

Procedures for Corrective actions

The parameters to be monitored during a crediting period will be compiled as internal audit report for every quarter of each crediting year and submitted to the board of directors for review. The parameters include the Gross generation, Auxiliary consumption, Electricity export to grid, Electricity import form grid, Net Electricity supplied to the grid & quantity of diesel used in the DG set. Based on the audit report submitted by ~~plant manager~~Sr. Vice ~~board~~President Board will asses the performance of plant. Board will discuss and recommend necessary mechanism to improve the operational efficiency of the plant and directs the respective person to rectify the problem.

The report will also cover comments on variations in the records with reference to the above parameters compared to the bills submitted to the utility or records maintained. The board will consider these variations in their review meeting and instruct the concern person of the plant to rectify the variations and report the action taken in the next review meeting.

Monitoring Organisation

The board of Directors will appoint a full time Managing Director, who in turn will be assisted by Sr. Vice President (Tech). The ~~authority and~~ responsibility for registration, monitoring, measurement, reporting and reviewing of the data rests with Sr. Vice President (Tech). ~~the Board of Directors. The Board may delegate the same to a competent person identified from one of the four proponents for the purpose. The identified person, in the rank of General Manager, will be the in charge of GHG monitoring activities.~~ A team of experienced personnel in various disciplines will assist the Sr. Vice President ~~General Manager~~ with experience in plant operation, measurements and management. The primary responsibility of the team is to measure, monitor, record and report the information on various data items to the Sr. Vice President~~General Manager~~, in accordance with the applicable standards. Periodic calibration of various instruments used in the monitoring of GHG related data and record keeping of the same will also be the responsibility of the team.

The responsibility of review, storage and archiving of information in good condition lies with the Sr. Vice President~~General Manager~~. ~~General Manager~~He 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 Sr. Vice President ~~General Manager~~ will review the data collected by the team and suggest corrective actions wherever required. An internal audit report will be prepared for review by the Managing Director and 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.

~~The team including the General Manager will be appointed by the Boards of Directors of the companies, in advance before the start of project operations. The General Manager will report to the boards of directors and seek guidance in case of conflicts or difficulties in order to maintain the monitoring organisation in good spirit.~~

Parameters Requiring Monitoring

This monitoring plan requires monitoring of all parameters indicated in section B.7. Necessary documents required for verification of the data will be maintained for later archiving. Using the power exported to the grid, emission reductions will be estimated as illustrated in Section E. Emission reductions generated by the project will be monitored at regular intervals and will be reported to the board of directors.

QA & QC Procedures

The project activity will install good quality, ~~s employ latest state of art microprocessor based~~ high accuracy monitoring and control equipments that will measure, record~~, report, monitor~~ and control of various key parameters of the plants. These monitoring and controls will be the part of the Control Systems of hydroelectric plant. The Gross and Auxiliary meters installed at project site will be accuracy of 0.5 class and these meters are calibrated as per industry standards but at least once in three years.

The main and check meters will be electronic trivector of accuracy class 0.2% and tested for accuracy every calendar quarter.

The main and check meters will be deemed to be working satisfactorily if the errors are within specifications for meters of 0.2% accuracy class.

If during the quarterly tests, the main meter is found to be within the permissible limit of error and the corresponding check meter is beyond the permissible limits, then billing will be as per the main meter as usual. The check meter however, will be calibrated immediately.

If the main meter is found to be beyond permissible limits of error, but the corresponding check meter is found to be within permissible limits of error, then the billing for the month upto the date and time of such test will be as per the check meter. The main meter will be calibrated immediately and billing for the period thereafter till the next monthly meter reading will be as per the calibrated main meter.

If during any of the monthly meter readings, the variation between the main meter and the check meter is more than that permissible for meters of 0.2% accuracy class, all the meters will be re-tested and calibrated immediately.

Records of calibration certificates will be maintained for verification. Hence, high quality is ensured with the above parameters. Sales records will be used and kept for checking the consistency of the recorded data.

Data Storage & Archiving

All the data items monitored under the monitoring plan will be kept for 2 years after the end of crediting period or till the last issuance of CERs for this project activity whichever occurs later.

~~Methodology adopted for determining base line emission factor is the weighted average emissions of the generating mix in the Southern 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 southern grid and the same is used for the future projection and will be reviewed each year based on data published by CEA. The monitored data will be presented to an independent verification agency or DOE to whom verification of emission reductions is assigned.~~

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 the baseline: 31/12/2007

Name of the person / entity determining the baseline: Zenith Energy Services (P) Ltd., Hyderabad, India,

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:	500028
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:

>>

01/06/2005 (Work Order of Civil works)

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

>>

CDM – Executive Board

30 years

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

Fixed crediting period

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:

The project proponent wishes to select the fixed crediting period.

C.2.2.1. Starting date:

>>
01/06/2010 or from the date of registration of project activity whichever occurs later

C.2.2.2. Length:

>>
10 years – 0m

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 done for the projects less than INR 1000 millions. Since the total cost of the proposed project is only INR 572.10 millions and also comes under the small scale category of CDM projects as per UNFCCC guidelines, doesn't call for EIA study. However prior to implementation, the project should notify to the Karnataka State Pollution Control Board (KSPCB) for necessary evaluation and approval, which has been done by the project proponent and approval has already been obtained. As required for implementation of the project activity, project participants had studied the possibility of environmental impact and concluded that no negative impacts are possible due to the project activity. Furthermore, the project involves no displacement of people living near the project area and hence rehabilitation and re-settlement are not called for. All care would be

exercised during construction and subsequently such that the existing flora and fauna are not affected adversely. Hence, no documentation or summary is provided here.

The project activity is not likely to have any impact on the environment either during construction phase or post project implementation. During the construction as well operation phase it would be ensured that air quality is not effected, noise levels are maintained within the approved limits and there is no adverse effect on water resources, land and ecology.

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 conducted stakeholders meeting at the project site at Dharmastala Village, Dakshina Kannada District, Karnataka on 2nd May, 2008. The stakeholders are invited through a notice published in the local news papers in English and Kannada language (22nd April, 2008). The meeting was attended by 26 participants including village Sarpanch and Committee members. There were no comments from the village populace and the committee members. The copy of the minutes of the stakeholder meeting is furnished to the DOE for verification.

The following stakeholders have been identified for the proposed project activity

Stakeholder Name	Function of Stakeholder	Description of Involvement
KREDL	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	Issues clearance for setting up the project in Karnataka utilizing hydro potential available at the proposed site.
MESCOM	The state owned electricity utility company that manages the electricity transmission and distribution in Karnataka state. Any electricity generation	Purchase power from the project proponent by executing Power Purchase Agreement to determine the tariff and other terms.

	project proposed in Karnataka shall approach MESCOM for power evacuation arrangements. Both MESCOM and the project proponent shall sign a Power Purchase Agreement, before implementing the project.	
KSPCB	A statutory local body that oversees the pollution control aspects in the state. Any project activity shall obtain clearance from the KSPCB before implementation.	Issues clearance for setting up of the project
Revenue Department	Is part of Government and monitors utilization of land	Gives consent to establish the project and registers the project in revenue records of the Karnataka state.
Local Village Panchayat	Elected statutory body of the local populace	Accords permission for setting up of the project under the jurisdiction of the village

The process of obtaining stakeholder comments is either through public announcements or directly approaching the stakeholders as required.

Stakeholders Involvement:

Technical Clearance from Karnataka Renewable Energy Development Limited vide its Official Memorandum No.KRED/06/Dandella MHS/2001/1551 dt.05.12.2001

Proceedings of Government of Karnataka dt.20th January, 2006 to implement the 13MW hydro project.

Irrigation permission dt.28th June, 2007

The project has executed Power Purchase Agreement with Karnataka Power Transmission Corporation Limited on 9th June, 2005

Approval of evacuation Scheme from Karnataka Power Transmission Corporation Limited vide its letter No.CEE (P&C)/SEE (PLG)/EE (PSS)/AEE-1/F-68 CYS-37 dt.25.07.2006

Lease Agreement with Government of Karnataka, Forest Department dt.16th December, 2005

The Karnataka State Pollution Control Board (KSPCB) has issued 'Consent for Establishment' to the project Letter No.58/**KSPCB/RO (MNG) EO/DEO/AEO/LG/INR/2005-06/3148 dt.03.01.2006**.

Environmental Clearance from Government of Karnataka, Forest, Ecology & Environment Department vide its letter No.FEE 192 ECO 2005 dt.1st September, 2006.

Local Village Panchayat:
The project has got approval from local village panchayat Letter no.05/06 dated December 2005

Stakeholder's comments:

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

E.2. Summary of the comments received:

>>

No negative comments are received on the project.

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

>>

Not applicable

Annex-1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Sagar Power (Dandela) Private Limited
Street/P.O.Box:	48, Lavelle Road~~Road No.1, Banjara Hills~~
Building:	~~4th Floor, Bhaskar Plaza~~
City:	Bangalore~~Hyderabad~~
State/Region:	Karnataka~~Andhra Pradesh~~
Postcode/ZIP:	560 001~~500 034~~
Country:	India
Telephone:	+ 91 80 2227 2271 – 72~~+91-040-2339 2631 / 66610489~~
Fax:	+ 91 80 2224 5246~~+91-040 - 66662480~~
E-Mail:	sekhar@bhorukapower.com~~tridentpower@rediffmail.com~~
URL:	
Represented by	
Title	Managing Director
Salutation:	Mr.
Last Name:	Chandrasekhar~~Reddy~~
Middle Name:	~~Pavan~~
First Name:	~~J.C.~~S.
Department	
Direct tel:	+ 91 80 22273285~~+91-040- 66610489~~
Direct FAX	
Personal E-Mail:	sekhar@bhorukapower.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

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

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Annex-3

Baseline information

The project activity adopted CO_2 Baseline Database Ver.03 dt.15 Dec.2007 officially published by the Central Electricity Authority (CEA) of India in consistency with Tool to Calculate the Emission Factor for an Electricity System (Version 01, EB 35 Annex 12).

(Source: http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm)

Annex 4

Monitoring information

Monitoring information is already provided in section B.7.1