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

CONTENTS

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>.

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

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

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2x5 Radhanagari Hydro Electric Project.
Version: 03
Date: 20/04/06

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

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The Radhanagari Hydro Electric Project (hereafter, the Project) developed by R. M. Mohite Textiles Ltd. (hereafter referred to as the Project Developer) is a small hydroelectric project in the Kolhapur district of Maharashtra State, India (hereafter referred to as the "Host Country"). This hydroelectric project will be developed on the existing Radhanagari dam, 5 km from the village of Fegiwade, on the Kolhapur – Goa highway. The Radhanagari dam was constructed in 1954 across the river Bhogavati in the Fegiwade village, Radhanagari taluka of the Kolhapur district.

The project will involve the addition of two hydropower generation units of 5MW capacity each, with total installed capacity of 10MW.

The proposed power plant is for captive consumption purpose and power shall be utilized at the textile unit of the project developer located at Vadgaon, in the Kolhapur District.
The power produced by the Radhanagari Hydro Electric Project will be wheeled (taken to) to the RMMTL's textile unit using the MAHADISCOM (Maharashtra State Electricity Distribution Company Limited) infrastructure i.e, transmission lines.The annual electricity generation is proposed to be 26,939 MWh/year for the project. Annual emission reductions for the project are expected to be 21,173 tons CO_2.

The project aims to contribute to the sustainable socio-economic development of the host country and reduce the dependence on fossil fuels that currently dominates the energy composition of the national grid.

Specifically, the project:

- Uses clean and efficient technologies, and conserves natural resources, thus meeting the sustainable development guidelines provided by the Ministry of Environment and Forests.
- Increases employment opportunities in the area where the project is located meeting the recommendations from the Ministry of Non-conventional Energy Sources to help improve quality of life and reduce poverty.
- Is built on an existing dam thus does not does not involve the creation of any water storage or additional submergence of land or forest cutting.
- Does not cause damage to railways, roads or to the existing communication network, or displacement of people.
- Optimises the use of natural resources acting as a clean technology project thus avoiding emissions of harmful gases or effluents to pollute the atmosphere, water etc.

A.3. Project participants:

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Table: 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)	R. M. Mohite Textiles Ltd.	NO
UK	EcoSecurities Ltd	NO

(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party (country) involved may or may not have provided its approval. At the time requesting registration, the approval by the Party(ies) involved is required.

- Project Developer: R. M. Mohite Textiles Ltd.
- Annex 1 Participant and Carbon Advisor: EcoSecurities Ltd.

Further contact information of project participants is provided in Annex 1.

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

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The project activity will add two 5MW turbines to the existing Radhanagari dam. The proposed project will be developed using an indigenous turbine technology. The Radhanagari dam is based on an existing irrigation scheme. The hydroelectric project uses the irrigation discharges & spillage (only in the monsoon season) for power generation. The amount of water to be discharged for the irrigation purposes is determined or decided by the Irrigation Department, Government of Maharshtra. Based on the previous discharge data available with the Irrigation Department and the available head data, the actual generation of the plant was calculated. Subsequently the Plant Load factor was calculated to be 30.13%.

PLF (%) = (Actual Generation (MKWh) / Installed Capacity (KW) x Hours of Operation per annum) *100

A main power house 46.5 meters in length and 19.0 meters wide will be built to accommodate the two generating units. Of the 5 existing sluices, 2 will be used and converted as power outlets with suitable sized steel lining with baffle. These will be connected to 2 penstocks to feed water to 2 vertical Francis hydro turbines (5MW each) through main inlet valves. The water will be released though an open channeled tail-race into the river. The penstock is designed for a peak discharge of 25 cubic meters of fluid per second. The diameter of the penstock varies between 2.35 meters to 4.0 meters.

Penstock

One steel penstock of grade IS: 2062 of 3250 mm diameter is available for each machine of plate thickness 12 mm. Suitable anchoring against hydraulic thrust is also provided at the power house. Power House

The powerhouse will be built on the right bank of the sluice canal. The size of the powerhouse is based on the center to center spacing of the two units and is proposed to be of size 46.5 m x 19 m. The powerhouse considers a vertical orientation of the machine. The service bay is located at the generator floor and the control room is located over the draft tube outlet and tailrace.

Nominal Data

Installed Capacity	10 MW
Design Head	28 meters
Number of Units	2 Francis turbines
Generator voltage	6.6 kV
Powerline	33 kV

Radhanagari is a well-established reservoir that has been operating for use and thus, there is no necessity of a screen upstream of the turbines. Surge protection has been accommodated by providing adequately sized air valves in the machine hall and in the distribution pipe system of the turbine.

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

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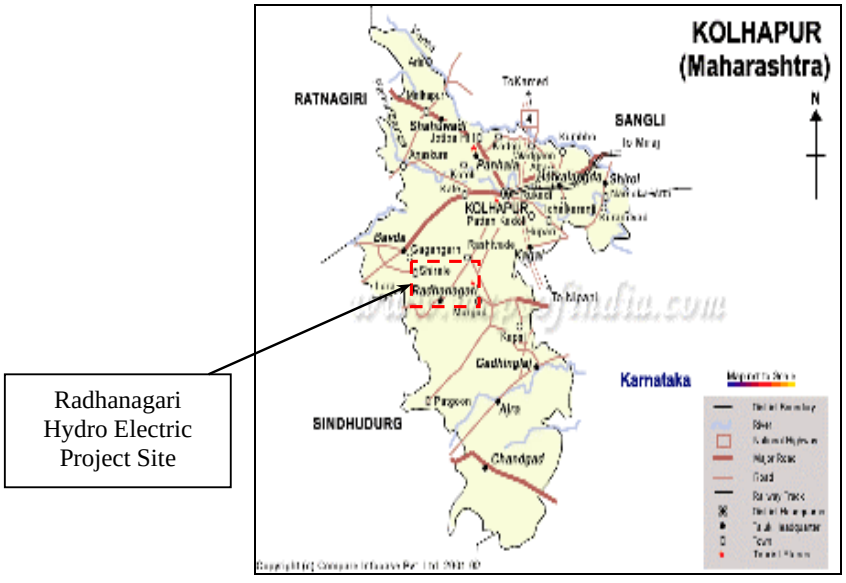
The project is located 5 km from Fejiwade village, Taluka Radhanagari. Radhanagari is on the Kolhapur – Goa State Highway. The dam site is connected to the village by an asphalt road. The area of the Project activity is shown in Figure 1 below.

Figure 1 - Location of Project Activity



A.4.1.1. Host Party(ies):

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India

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

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Maharashtra

A.4.1.3. City/Town/Community etc:

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District: Kolhapur
Taluka: Radhanagari
Village: Fejiwade

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

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The project is situated at 16^0-05'00" (N) latitude and 73^0-05'40" (E) longitude in the western region of Maharashtra.

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

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According to Annex A of the Kyoto Protocol, this project fits in Type 1D Renewable Electricity production for a grid.

This category comprises renewable energy, including hydroelectric power, which supplies electricity to an electricity distribution system (grid). The proposed project will generate 10MW of electricity from a renewable source (hydro electric); this electricity will be supplied to the Maharashtra state electricity grid, where the major part of electricity comes from non-renewable electricity generation. As the proposed project will be supplying electricity from a renewable source to the state grid, the application of Type 1D is justified.

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

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The project activity reduces CO_2 by displacing carbon-intensive electricity generation with a renewable energy generation alternative. In the absence of the proposed project activity electricity generation would be produced by the continued use of a mix of mainly fossil fuel based electricity generators currently operating in the Maharashtra state grid.

For the baseline emissions calculation the Maharashtra state grid generation mix has been considered. This is because the current generation mix of the state grid (785.96 tCO_2/GWh) is less than that of the Western Regional Grid (981.98 tCO_2/GWh). Thus to be conservative, the state grid has been taken into consideration for the calculations of the CERs.

The approval and registration of the project as a CDM activity, and the benefits and incentives derived from the project activity, will help overcome the discussed barriers enabling the project to be undertaken. The financial benefit from the revenue obtained by selling the 148,211 tonnes of CO_2 project emissions reductions is one of the key issues that have encouraged the developer to invest in the proposed project activity. Small-scale hydroelectric projects are subject to numerous barriers in India, including difficulty in accessing finance, and barriers due to exposure to the hydrological regime. Furthermore small privately funded small scale hydro projects such as Radhanagari remain subject to much greater barriers than government supported schemes. The numerous barriers and risks associated with the implementation of the proposed project activity are identified in detail in section B.3 below.

A.4.3.1 Estimated amount of emission reductions over the chosen crediting period:

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The proposed hydroelectric power project will reduce emissions by 148,211 tonnes of CO_2 over the crediting period of 7 years.

The following table provides the details on the generation of emission reductions and cumulative emission reductions during the selected crediting period.

Table: Estimated emissions reductions from the project.

Year	Estimation of emission reductions (tonnes of CO_2e)
2007	21,173
2008	21,173
2009	21,173
2010	21,173
2011	21,173
2012	21,173
2013	21,173

Total estimated reductions (tonnes of CO2 e)	148,211
Total number of crediting years	**7**
Annual average over the crediting period of estimated reductions (tonnes of CO2 e)	21,173

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

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The project will not receive any public funding from Parties included in Annex I of the UNFCCC.

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

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According to Appendix C of the simplified modalities and procedures for small-scale CDM project activities, the ESL small-scale renewable energy projects are not part of a larger emission-reduction project. This is based on the information that the project participants have not registered or operated another project in the region surrounding the project boundary.

SECTION B. Application of a baseline methodology:

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

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Project activity I.D. “Renewable electricity generation for the grid”. Version 07, 28 November 2005

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

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The project conforms to the project category since the nominal installed capacity of the project is below the 15MW threshold.

Appendix B of the simplified modalities and procedures for CDM small-scale project activities offers the following two choices for preparing the baseline calculation for this type of project activity:

(a) The average of the “approximate operating margin” and the “build margin”

OR

(b) The weighted average emissions (in $kgCO_2/kWh$) of the current generation mix.

Option B is selected for this project, since detailed data on the fuel consumption of specific plants is not available. The grid system is fed by both fossil fuel and non-fossil fuel based generating plants.

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

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The proposed project will displace existing and future generation facilities in the Maharashtra State Electricity Board Grid that use fossil fuel. Under the business as usual scenario there would be continuing growth in fossil fuel based electricity.

The following table indicates monitored capacity of the Maharashtra State Electricity Board (MSEB), of which coal makes up the majority.

Table: Monitored Capacity of MSEB Grid

Source	Monitored Capacity (MW) in 2003-04
Coal	9,385
Gas	2,355
Hydro	2,780
Nuclear	315
Total	14,834

Source- CEA, includes central plants supplying to MSEB

Additionality

According to Attachment A to Appendix B of the simplified modalities and procedures for CDM small-scale project activities, evidence to why the proposed project is additional is offered under the following categories of barriers: (a) investment barrier, (b) technological barrier, and (c) prevailing practice.

The construction of the project activity started in September 2005 and will be commissioned by July 2007. The construction date is after November 18 2004 (date of registration of first CDM project), thus the crediting period will start at the point of registration of the project. CDM revenue was considered from the early stages of development of the project, and it is an integral part of the financial package of the project. The Developer took the decision to move ahead with the project after carrying out a detailed appraisal report, which included the consideration of CDM benefits.

Barrier Analysis

Investment barriers

A private party such as R. M. Mohite Textiles Ltd. (RMMTL) has to go through a tedious tender and bidding process before being allowed to set up a hydro power plant in Maharastra. The Government of Maharashtra decided to permit the participation of the private sector in the generation of electricity for captive use via the Government Resolution No. HEP (7/2002) dated 28th November 2002. RMMTL is the first private player to have been allotted a site for development of Captive Power Production for 100% self consumption under the above mentioned policy of Government of Maharashtra, Irrigation Department. The developer submitted a Bid in May 2004 requesting Irrigation Department, Government of

Maharashtra (GOMID) to grant permission to develop a 100% Captive hydro electric project. Subsequently, the Project Development Agreement was signed in September 2004 between GOMID and RMMTL.

The tender and bid process includes the following steps:

1. Publication of an advertisement by the Irrigation Department, Government of Maharashtra (GoM) inviting expression of interest for development of Radhanagari Hydro Power Project & Installation Of Captive Power Plant (CPP)
2. Purchase of a Bid Document from the Government of Maharashtra.
3. Submission of a technical bid
4. Screening of technical bids
5. Invitation of financial bids from the selected promoters (as it is a competitive bidding process, the company who quotes the highest price gets the project)
6. Issuance of the Letter of Allotment.
7. Signing of the Project Development Agreement (PDA) between the Irrigation Department, Government of Maharashtra and the project developer.

This process is time consuming as well as expensive for a new promoter like RMMTL entering the power sector due to their lack of technical expertise and experience in the hydro sector. In order to prepare the technical and financial bid, technical and financial consultants had to be hired. The Plant will be operated on a BOOT basis, which means Build, Own, Operate and Transfer (BOOT). The site has been leased to RMMTL for a period of 30 years. Any renewal of this would be at the sole discretion of Government of Maharashtra.

As a part of the above process, the project developer has to achieve certain milestones within a timeframe as stipulated by the Government of Maharashtra once the Letter of Intent (LOI) has been issued. If they fail to do so it is considered a default under section 3.6.2 of the proposal document. In case of default, the allotment of the site can also be cancelled. One of the milestones that RMMTL had to achieve is to secure financial closure within 6 months of receipt of LOI. Due to this time constraint, the project developer could not exercise different options to secure the financial closure. Thus in order to achieve this milestone, a 70 % loan of the total project cost of 33.7 crores was secure at a high interest rate of 9%. If this constraint of achieving the financial closure within the time limits did not exist, the promoter could have exercised different financial options instead of settling for the financial organisations that could provide quick debt.

The state of Maharshtra is reeling under huge power shortage. As per the latest statistics available with Maharashtra State Electricity Distribution Co. Ltd., the peak demand for power in the state during 2004-05 was 12749 MW as compared to the generation capacity of 9300 MW. So, there was a peak gap of 3449 MW during 2004-05.

In 2005-06, the peak demand recorded in May 05 was 12987 MW, which is again a jump of 238 MW over the previous year. This had resulted in a shortage (load shedding) of 3687 MW in May 05.

The power from the grid under these circumstances has become unreliable, with frequent power cuts. This has affected the business of RMMTL in the past few years. RMMTL is a hundred percent export oriented process industry in an extremely competitive the market. Thus in order to compete in the market

while at the same time maintaining their production capacity, they decided to set up an Hydro Electric Project.

The Hydro Power Plant would provide RMMTL with reliable power. However the process involved in setting the plant up is very tedious. The developer does not have any expertise in the hydro sector and have had to seek the service of a third party at every stage of the process (for example the preparation of Technical Bid, Financial Bid, Detailed Project Report and Detailed Appraisal Report, as well as achieving Financial Closure). Even once the project has been secured, a third party will need to be contracted for activities such as Operation and Maintenance. This eventually adds to the cost of the project. Coordinating among various agencies for timely completion of the project is also extremely time consuming.

Thus the financial benefit from the revenue obtained by selling the CO_2 emissions reductions is one of the key factors that have encouraged R.M Mohite Textiles Ltd. to invest in the proposed 10 MW small scale hydro project. R.M Mohite Textiles Ltd. did not succeed in its attempt to secure long-term project finance with a low interest rate. Instead, out of the project cost of 7.6 million US $, RMMTL could secure a 70% loan from the State Bank of India at a high interest rate of 9%, with the remaining funds being obtained from equity investments. Carbon financing over the 7-year crediting period, as one of the cash in flows of the project, has added more credibility to R.M Mohite Textiles Ltd. loan repayment capability.

The CDM revenues will go towards hiring people and training them for the operation and maintenance of the project. In order to meet the training needs, the project developer will hire a third party who will operate, maintain the plant for the first two years and during this time also train the RMMTL manpower.

This additional revenue would also aid in decreasing the risk factors associated with the project and act as a cushion in the event of any unexpected reductions in electricity generation. Furthermore, the CDM revenue will be gained in Euros, and as such is less subject to currency fluctuation risk. Thus CDM has been considered from an early stage (as mentioned in the Detailed Project Report) and is an integral part of the financial package of the proposed project activity.

Technological barriers

The lack of available knowledge and confidence in the technology involved in small privately built hydroelectric projects makes small scale hydro electric plants difficult to establish. Moreover, R.M Mohite Textiles Ltd is a relatively inexperienced small scale hydro power entrepreneur and subsequently lacks trained manpower for such a project. This has posed additional perceived risks for investors lending to the project, and has necessitated that Mohite Textiles Ltd must meet additional costs for third party technical expertise.

RMMTL plans to build up a team of 15 people who will be responsible for operation and maintenance of the plant. The expertise required will be as follows:

- Electrical and Mechanical Site Engineers
- Electrical and Mechanical Foremen
- Switchyard and Control Panel Electrical Supervisors

Barriers due to prevailing practice

Privately financed, built and operated small hydro plants are not common practice in Indian power sector. The common practice is investing in medium or large scale fossil fuel fired power projects, which is evident from a host of planned projects that comprises mostly large-scale fossil fuel based power generation projects. This is mainly due to the assured return on investment, economies of scale and easy availability of finances for these projects. Furthermore, the rapid pace of industrialisation in India has required huge amounts of power and necessitated the installation of large multi-purpose power projects vis-à-vis small hydro projects. Thus the pace of growth in the small-scale hydro sector has been slow.

The share of electricity from small hydroelectric projects in India's total installed capacity is small. According to the statistics published by the Ministry of Non-conventional Energy Sources (MNES) the total installed capacity of small hydroelectric projects is only 1,693 MW (as of 2005), (including projects under construction) whereas India's total installed capacity is around 122,275 MW in 2005[1]. Thus the small scale hydro sector contributes to only 1.4% of the total installed capacity in India. This percentage has actually decreased by 0.4% from 1.8% in 2001 (MNES). If one takes into consideration that India categorises small scale hydro power plants as installed capacity of up to 25 MW, the percentage of small scale hydro power plants of installed capacity less than 15 MW would be even lower than 1.4%.[2]

Currently, India has 514 small hydro power projects with an aggregate capacity of 1,693 MW. The Ministry of Non-conventional Energy Sources indicates that an estimated potential of about 15,000 MW of small hydro power projects exists in India. In addition, 4,233 potential sites around India with an aggregate capacity of 10,071 MW have already been identified by MNES. However, the percentage of installed capacity small scale hydro power in India is still only 11% of the potential. This indicates that investing in small hydroelectric power plants is still not a common practice despite efforts by MNES to promote small scale hydro power in India.[3]

In Maharashtra state, only 27 out of the 234 possible hydro electric sites identified by the MNES have been developed. This indicates that there is a lot scope to develop small hydro electric power within the state of Maharashtra that is not being realised.[4]

RMMTL is the first private player to have been allotted a site for development of Captive power production for 100% self-consumption by the Government of Maharashtra, Irrigation Department.

One of the main reasons for the investor reluctance to develop government identified small hydro electric sites is that the bidding process involved for these sites is highly time consuming. In addition, there is often an inordinate delay in obtaining government clearances once the bidding process is complete.

Summary

[1] Ministry of Power, Government of India

[2] Reference for all figures the Annual Report 2005 Ministry of Non-conventional Energy Sources

[3] Reference for all figures in Annual Report 2005 Ministry of Non-conventional Energy Sources

[4] Reference for all figures in Annual Report 2005 Ministry of Non-conventional Energy Sources

The primary barriers within the Indian institutional and regulatory framework are the unclear process, and timing for completing licenses and permits, as well as the real and perceived risks in investing in renewable energy projects, in particular small scale hydro. All these issues amount to enough uncertainty to deter many project developers from starting small scale hydro power projects and financial institutions from supporting projects that choose to do so. These prohibitive barriers are confirmed by the low share of small hydro electric plants in the total installed capacity of the country. The approval and registration of the project as a CDM activity, and the benefits and incentives derived from the project activity, will help overcome the discussed barriers enabling the project to be undertaken.

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

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As referred to in Appendix B for small-scale project activities, the project boundary for a small-scale hydropower project that provides electricity to a grid encompasses the physical, geographical site of the renewable generation source, plus the grid to which the project will be connected and all the electricity generating units connected to it.

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

B.5.1 Specify the baseline for the proposed project activity using a methodology specified in the applicable project category for small-scale CDM project activities contained in appendix B of the simplified M&P for small-scale CDM project activities:

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The baseline to be used in calculating the emission reductions from this project is that outlined in the relevant paragraphs of Appendix B (simplified modalities and procedures for small-scale CDM project activities). These are option (b) of paragraph 29 for the grid electricity component.

B.5.2 Date of completing the final draft of this baseline section:

>>

24/01/2006

B.5.3 Name of person/entity determining the baseline:

EcoSecurities Ltd
21 Beaumont Street
Oxford OX1 2NH
United Kingdom

EcoSecurities is a project participant

MITCON Consultancy Services Ltd.,
Pune,
Maharashtra,

India.

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

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

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

>>

17/09/2005

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

>>

28 years

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

C.2.1. Renewable crediting period:

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The Renewable Crediting Period has been opted for the proposed project.

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

>>

01/07/2007

C.2.1.2. Length of the first crediting period:

>>

7 years

C.2.2. Fixed crediting period:

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The Fixed Crediting Period has not been opted for the proposed project.

C.2.2.1. Starting date:

>>

Not Applicable

C.2.2.2. Length:

>>

Not Applicable

SECTION D. Application of a monitoring methodology and plan:

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

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The project will use the approved small scale monitoring methodology AMS-1.D Renewable electricity generation for a grid

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

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The project activity is a grid-connected run of river hydropower project, where the grid's geography and system boundaries are explicit and characteristics are readily available, and the installed capacity will be less than 15MW. On this basis the conditions for applying AMS-1.D are met.

D.3 Data to be monitored:

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Table: Data to be collected in order to monitor emissions from the project activity, and how this data will be archived

ID n°	Data type	Data variable	Data unit	calculated (c) indicated (I)or Measured (m), estimated (e)	Recording frequency	Proportion of data to be monitored	be archived? (electronic/ paper) How will the data	is archived data to be For how long kept?	Comment
D.3.1	Electricity	Electricity Generation of the Project delivered to the Grid	MWh	M	Continuous	100%	Electronic and paper	During the whole crediting period + 2 years	Monitored by meters and through the electricity bill by the distribution company

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

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Once implemented, the relevant data report will be submitted to a designated operational entity contracted to verify the emission reductions achieved during the crediting period. Any revisions requiring improved accuracy and/or completeness of information will be justified and will be submitted to a designated operational entity for validation. The plan is designed to collect and archive all data needed to:

• Estimate or measure anthropogenic emissions by sources of greenhouse gases occurring within the project boundary during the crediting period as specified in appendix B for the Type/Categories I.D.

• Determine the baseline of anthropogenic emissions by sources of greenhouse gases occurring within the project boundary during the crediting period, as specified in appendix B for the Type/Category I.D.

The plan does not include monitoring of any variable regarding leakage since no leakage is expected.

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

>>

The Project Developer will have a designated engineer on site that will be responsible for monitoring emissions reductions of the project activity. No leakage is expected.

- The proven and qualified monitoring equipment (electricity meter) will be installed in place. The systems will allow automated and continuous recording and reporting of data. These readings will be checked for any anomalies before being filed for future reference.

- The data will be monitored and recorded by qualified technicians according to the monitoring plan. Electricity records will be double checked with the Maharashtra state electricity board records.

- The data will be electronically archived. Receipts of electricity sales will be obtained.

Proper management process and routine procedures will be put in place to ensure the quality of reports required by verification audits.
The following are the main personnel responsible for the monitoring of the project:

- Chairman & Managing Director -- Responsible for Offsite Management
- General Management (Works) -- Rsponsible for monitoring/Supervising the Project
- Site Manager -- Responsible for on-site monitoring of the project

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

>>

Completed 24.01.06

EcoSecurities Ltd
21 Beaumont Street
Oxford OX1 2NH
United Kingdom

EcoSecurities is a project participant

MITCON Consultancy Services Ltd.,
Pune, Maharashtra,
India.

SECTION E.: Estimation of GHG emissions by sources:

E.1. Formulae used:

E.1.1 Selected formulae as provided in appendix B:

>>

Not applicable

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

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Formulae are described below in section E.1.2.4

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

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As the hydro electric projects use renewable sources/technology of energy for electricity generation, the project emissions are taken as zero.

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

>>

No leakage estimation is required.

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

>>

The project emissions are zero.

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

>>

Baseline emissions are calculated as the KWh produced by the renewable generating unit multiplied by an emission coefficient for the Maharashtra State grid, calculated as the weighted average emissions (in kg CO_2equ/kWh) of the current generation mix. The baseline CEF was determined ex-ante for the entire crediting period,

$$BE = EGy * CEF_{grid}$$

Where EGy is the net quantity of electricity generated by the project in year y, and CEF_{grid} is the carbon emissions factor of the Maharshtra state grid.

As per the Electricity Act 2003, the Maharashtra State Government restructured the MSEB into four companies with effect from 06/06/2005. Due to this restructuring, the MSEB have put a hold on all requests for data. Thus the fuel consumption data for the power plants on the MSEB grid could not be obtained.

As an alternative for this data, the Net Heat Rate (tC/TJ), the measure of the power plant efficiency, has been used to calculate the baseline emissions as shown below:

Emission estimation from each plant using fossil fuel resource:

Emission = Net Generation x CEF for Fuel x Net Heat Rate x Conversion Factor
(tCO_2) (GWh) (tC/TJ) (TJ/GWh) (44/12)

Using the above formulae, emissions from each of the power plants in table 3 are determined. For those power plants using non-fossil fuels, the GHG emission calculations are not required.

Table: Summary of Data used For Calculation of Baseline Emission Reductions

Power Plant Fuel	Monitored Capacity (MW)	Generation for Maharashtra Grid (GWh)[5]	Net Heat Rate (TJ/GWh) [6]	Fuel Coefficient (tC/TJ)[7]
Hydro	1215	1791	-	-
Coal	2170	10962	11.357	25.8
Gas	800	482	8.615	15.3
Nuclear	550	1604	-	-
Total	N/A	15,281	N/A	N/A

The total baseline emissions are estimated by summing up the emissions of all the fossil fuel operated plants.

Baseline emission coefficient calculation:

Baseline emission coefficient (tCO_2 / GWh) = Total baseline emissions (tCO_2) / Total net generation (GWh)

= 12010219.37 / 15,281

= 785.96 tCO_2/GWh.

Estimation of baseline emissions:

Baseline emissions or CERs generated by the project are then estimated as follows:

Baseline emissions (tCO_2) = Emission coefficient (tCO_2/GWh) x Power generated from the project (GWh/year)

= 785.96 x 26.939

= 21,173 tCO_2/year

[5] Maharashtra State Electricity Board 2004/2005

[6] Central Electricity Authority of India 2004

[7] IPCCC

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

>>

The emissions reductions due to the project activity are 21,173 tCO_2e/year.

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

>>

Table: Values Obtained When Formulae Applied in Section E

Electricity Generated Emissions Reductions	**Per Year**	**Crediting Period (7 years)**
Baseline Emission Coefficient (tCO_2/GWh)	785.96	-
Electricity generated by Project (GWh)	26.939	188.573
Baseline Emissions (tCO_2)	**21,173**	**148,211**

SECTION F.: Environmental impacts:

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

>>

The Hydel power station does not emit any pollutants. The project also does not involves creation of any fore bay, submergence of land, and forest cutting.In addition, no diversion will be caused to railway or road routes thus the communication network will not be disrupted by the project. No other of the hydro project will adversely affect the ecological balance of the area. Thus the project is environmentally sustainable.

SECTION G. Stakeholders' comments:

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

>>

A public meeting was held with key stakeholders to explain the environmental and social impacts and benefits of the project, including how it will be developed and operated. The number of public groups that exist around the project area was established in order to identify the key stakeholders. Next these groups were analysed from an institutional and social perspective. Once a comprehensive list of stakeholders was identified, they were invited to attend the public meeting to assert their opinions on the project.

The stakeholders that were identified for the project and invited are as follows:

1. Dr. Y. B. Sontakke, Regional Officer, Maharashtra Pollution Control Board, Kolhapur.
2. Mr. K. H. Ansari, Sangali Irrigation Circle. (Irrigation Department)
3. Mr. G. K. Shinde, Executive Engineer, Kolhapur (Irrigation Department)
4. Mr. Jagtap, Chief Engineer (Pune Zone) (MSEB).
5. Mr. K. B. Sanjay, Superintending Engineer , Kolhapur (MSEB)
6. Mr. Ravi Mane, Exec. Engineer (Rural Division), Kolhapur (MSEB).
7. Mr. Pravin Darade, District Collector, Kolhapur.
8. S. D. O., Radhanagari
9. Mr. Rajendra Borkar, Tahsildar, Radhanagari
10. Mr. Vikash Desmukh, Chief Ex. Officer, Zilla Parishad, Kolhapur.
11. Mr. D. C. Patil, President Zillla Parishad, Kolhapur.
12. MR. Dattatraya B. Ghatge, Vice President, Zilla Parishad, Kolhapur.
13. Mr. Basheer Raut, Sarpanch, Fejiwade Grampanchayat, Radhanagari
14. B. D. O., Taluka Panchayat Samiti Radhanagari
15. Mr. Uday Gaikwad, Vidnayan Prabodhini, Kolhapur (NGO)

G.2. Summary of the comments received:

>>

Once the project and process was explained, including the local job creation and benefits, the local stakeholders had no objections or negative comments relating to the project.

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

>>

There were no negative comments received therefore it was not necessary to incorporate the comments into the project design or alter the project in any way.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Project Annex 1 sponsor and Carbon Advisor:

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

This project will not receive any public funding.

Annex 3

BASELINE INFORMATION

Table: Database used for weighted average emissions (in kg CO_2equ/kWh) of the current generation mix calculation.

Power Plant Fuel Type	Monitored Capacity (MW)	Generation for Maharashtra Grid (GWh)	Net Heat Rate (TJ/GWh) (Central Electricity Authority of India)	IPCC Fuel Coefficient (tC/TJ)	Emission Factor (tCO_2)
Hydro	1215	1791	-	-	-
Coal	2170	10962	11.357	25.8	11777268
Gas	800	482	8.615	15.3	232951.323
Nuclear	550	1604	-	-	-
Total	N/A	15,281	N/A	N/A	12010219.38