



VALIDATION REPORT

“Sonna Mini Hydel Scheme in Karnataka State, India”

REPORT No. 2008-1054

REVISION No. 02

DET NORSKE VERITAS



VALIDATION REPORT

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CERTIFICATION AS

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Date of first issue: 28-07-2008	Project No.: PRJC-117681-CCS-IND
Approved by: Hendrik W. Brinks	Organisational unit: Climate Change Service
Client: M/s Jasper Energy Private Limited	Client ref.: Mr.Tirumala Raju

Project Name: Sonna mini hydel scheme in Karnataka state, India
Country: India
Methodology: AMS-I.D
Version: 13
GHG reducing Measure/Technology: Grid connected electricity generation from hydro sources
ER estimate: 23 387 tCO₂ per year
Size
☐ Large Scale
☒ Small Scale
Validation Phases:
☒ Desk Review
☒ Follow up interviews
☒ Resolution of outstanding issues
Validation Status
☐ Corrective Actions Requested
☐ Clarifications Requested
☒ Full Approval and submission for registration
☐ Rejected
 In summary, it is DNV's opinion that the "Sonna mini hydel scheme in Karnataka state, India" project in India, as described in the PDD of version 03 dated 25 March 2009, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology AMS-I.D version 13. DNV thus requests the registration of the project as a CDM project activity.

Report No.: 2008-1054	Date of this revision: 11-06-2009	Rev. No. 02
Report title: "Sonna mini hydel scheme in Karnataka state, India"		
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Key words:

Climate Change

Kyoto Protocol

Validation

Clean Development Mechanism

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- ☐ Unrestricted distribution



VALIDATION REPORT

Abbreviations

BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central electricity Authority
CER	Certified Emission Reduction
CERC	Central Electricity Regulatory Commission
CL	Clarification request
CM	Combined Margin
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CRISIL	Credit Rating Information Services of India limited
DG	Diesel Generator
DNV	Det Norske Veritas
DNA	Designated National Authority
DPR	Detailed Project Report
EF	Emission Factor
EIA	Environmental Impact Assessment
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
KPTCL	Karnataka Power Transmission Corporation Limited
KSPCB	Karnataka State Pollution Control Board
KREDL	Karnataka Renewable Energy Development Ltd
LoA	Letter of Approval
MoEF	Ministry of Environment & Forest
MP	Monitoring Plan
NCV	Net Calorific Value
NGO	Non-governmental Organisation
ODA	Official Development Assistance
OM	Operating Margin
PPA	Power Purchase Agreement
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change



VALIDATION REPORT

TABLE OF CONTENTS

1	EXECUTIVE SUMMARY – VALIDATION OPINION	1
2	INTRODUCTION	2
2.1	Objective	2
2.2	Scope	2
3	METHODOLOGY	3
3.1	Desk Review of the Project Design Documentation	3
3.2	Follow-up Interviews with Project Stakeholders	4
3.3	Resolution of Outstanding Issues	5
3.4	Internal Quality Control	7
3.5	Validation Team	7
4	VALIDATION FINDINGS	8
4.1	Participation Requirements	8
4.2	Project Design	8
4.3	Baseline Determination	8
4.4	Additionality	9
4.5	Monitoring	12
4.6	Estimate of GHG Emissions	12
4.7	Environmental Impacts	13
4.8	Comments by Local Stakeholders	13
4.9	Comments by Parties, Stakeholders and NGOs	14
	No comments are received	14

Appendix A: Validation Protocol

Appendix B: Certificates of Competence



VALIDATION REPORT

1 EXECUTIVE SUMMARY – VALIDATION OPINION

Det Norske Veritas Certification AS (DNV) has performed a validation of the “Sonna mini hydel scheme in Karnataka state, India”, project in India on the basis of UNFCCC criteria for the Clean Development Mechanism and host country criteria as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures and the subsequent decisions by the CDM Executive Board.

The review of the project design documentation and the subsequent follow-up interviews have provided DNV with sufficient evidence to determine the fulfillment of the stated criteria.

The project participant is M/s Jasper Energy Private Limited from India. The host Party India meets all participation requirements and the DNA of India has approved the project on 26 May 2008 and confirmed that the project assists in achieving sustainable development /2/.

Having an installed capacity of less than 15 MW, the project is eligible as type I small-scale CDM project activity. It has also been demonstrated that the project is not a de-bundled component of a large scale project. The validation has confirmed that the project is eligible as category I.D small-scale CDM project activity and correctly applies the simplified baseline and monitoring methodology AMS-I.D, version 13 /4/. The determination of the baseline is well elaborated, transparent and sufficiently supported with facts. The selected baseline scenario is reasonable for the selected 10 year crediting period. Moreover, an analysis of the barriers facing the project demonstrates that the project is not a likely baseline scenario.

The validation did not reveal any information indicating that the project can be seen as a diversion of ODA funding towards India.

The project results in the reduction of GHG emissions those are real, measurable and give long-term benefits and that are additional to what would have occurred in the absence of the project. The total emission reductions from the project are estimated to be on the average 23 387 tCO₂e per year over the selected 10 year crediting period. The emission reduction forecast has been checked and is deemed likely that the stated amount is achieved given that the underlying assumptions do not change. Adequate training and monitoring procedures have been defined.

The monitoring plan makes sufficient provision for monitoring relevant project and baseline emission indicators. Responsibilities and authorities for project management, monitoring and reporting and QA/QC procedures have also been addressed.

A local stakeholder consultation process has been carried out by the project participant. DNV published the PDD on the DNV climate change web site and comments by Parties, stakeholders and UNFCCC accredited NGOs were invited through the CDM web site. No comments were received.

In summary, it is DNV’s opinion that the “Sonna mini hydel scheme in Karnataka state, India”, as described in the PDD of 25 March 2009, meets all relevant UNFCCC requirement for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology AMS-I.D, version 13 /4/. DNV thus requests the registration of the project as a CDM project activity.



VALIDATION REPORT

2 INTRODUCTION

Jasper Energy Private Limited has commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of the “*Sonna mini hydel scheme in Karnataka state, India*” project in India (hereafter called “the project”). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, and the subsequent decisions by the CDM Executive Board.

2.1 Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant UNFCCC and host Party criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

2.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords, the simplified modalities and procedures for small-scale CDM project activities and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology *AMS-I.D.*, version 13 /4/. The validation team has, based on the recommendations in the Validation and Verification Manual /3/ employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.



VALIDATION REPORT

3 METHODOLOGY

The validation consisted of the following three phases:

- I a desk review of the project design documents
- II follow-up interviews with project stakeholders
- III the resolution of outstanding issues and the issuance of the final validation report and opinion.

The following sections outline each step in more detail.

3.1 Desk Review of the Project Design Documentation

The following table lists the documentation that was reviewed during the validation:

- /1/ CDM PDD: Project Design Document for “Sonna mini hydel scheme in Karnataka State, India” Project, Version 01 dated 16 May 2008, & final version 3 dated 25 March 2009.
- /2/ Letter of Approval by DNA of India dated 26 May 2008.
- /3/ CDM Executive Board: *Validation and Verification Manual*. Version 01
- /4/ CDM Executive Board *AMS-I.D.*, version 13 *Grid connected renewable electricity generation*
- /5/ CDM Carbon Dioxide Baseline Data base, version 3.0, dated 15 December 2007. (www.cca.nic.in)
- /6/ Approved Detailed Project Report, 19 November 2005, prepared by Design Group project consultants PVT. LTD. Bangalore.
- /7/ CDM India Designated National Authority: <http://cdmindia.nic.in/cdmindia/projectList.jsp?search=search>
- /8/ Agreement for civil construction of the project activity signed between Jasper Energy Private Limited & PWD Class –I contracted dated 12 February 2007.
- /9/ Power Purchase Agreement, signed between M/s Jasper Energy Private Limited and Karnataka Power Transmission Corporation Limited dated 1 February 2007.
- /10/ Order placed for electro-mechanical equipments dated 10 April 2007.
- /11/ Consultant appointment agreement signed between Jasper Energy Private Limited (project proponent) & Zenith Energy Services (consultant for the project activity) dated 5 December 2006.
- /12/ Minutes of meeting of the board of directors of M/s Jasper Energy Private Limited dated 2 November 2006.
- /13/ E-mail correspondence with TUV Nord dated 22 March 2007 for quotations for validation of the project activity.



VALIDATION REPORT

- /14/ Contract for appointment of DNV as DOE for the project activity in November 2007.
- /15/ PDD submission to Ministry of Environment & Forest, DNA India requesting Host Country Approval dated 18 February 2008.
- /16/ Copy of invitation letter sent by Ministry of Environment & Forest, DNA India to give a presentation on the project activity dated 25 April 2008.
- /17/ Copy of local news papers dated 25 March 2008, inviting comments on the project.
- /18/ Minutes of meeting of stakeholder consultation process dated 2 April 2008.
- /19/ <http://cdm.unfccc.int/Projects/Validation/DB/3PZQQIBNXIX2N5XBH32OXYICCTUIHO/view.html>
- /20/ The weighted average yield rate of Government security bond as per Reserve Bank of India
http://www.rbi.org.in/scripts/BS_ViewBulletin.aspx?Id=7923
- /21/ Compound Annual Growth Rate (CAGR) calculated for the period from 03 November 2003 to 31 October 2006 sourced from National Stock Exchange Limited (S&P CNX 500 indices):
<http://www.nse-india.com/>
- /22/ <http://www.nse-india.com/>
Levered beta value of all the conventional and non conventional power plants listed in the National Stock Exchange.
- /23/ Debt Equity Ratio of all the conventional and non conventional power plants listed in the National Stock Exchange for the period of one year (October 2005 to October 2006) sourced from:
<http://www.moneycontrol.com/india/stockpricequote/powergenerationdistribution/jaiprakashhydropower/13/21/balancesheet/marketprice/JHP01>
<http://www.moneycontrol.com/india/stockpricequote/powergenerationdistribution/ntpc/13/16/balancesheet/marketprice/NTPC>
<http://www.moneycontrol.com/india/stockpricequote/powergenerationdistribution/tatapowercompany/13/27/balancesheet/marketprice/TPC>
<http://www.moneycontrol.com/india/stockpricequote/powergenerationdistribution/neeyvelilignitecorporation/14/55/balancesheet/marketprice/NLC>
<http://www.moneycontrol.com/india/stockpricequote/powergenerationdistribution/relianceinfrastructure/13/29/balancesheet/marketprice/RI38>
- /24/ Corporate tax applicable for all the conventional and non conventional power plants listed in the National Stock Exchange for the period of one year (October 2005 to October 2006) sourced from:
<http://www.moneycontrol.com/india/stockpricequote/powergenerationdistribution/jaiprakashhydropower/13/21/profitloss/marketprice/JHP01>
<http://www.moneycontrol.com/india/stockpricequote/powergenerationdistribution/ntpc/13/16/profitloss/marketprice/NTPC>
<http://www.moneycontrol.com/india/stockpricequote/powergenerationdistribution/neeyvelilignitecorporation/14/55/profitloss/marketprice/NLC>



VALIDATION REPORT

- elilignitecorporation/14/55/profitloss/marketprice/NLC
- <http://www.moneycontrol.com/india/stockpricequote/powergenerationdistribution/tatapowercompany/13/27/profitloss/marketprice/TPC>
- <http://www.moneycontrol.com/india/stockpricequote/powergenerationdistribution/relianceinfrastructure/13/29/profitloss/marketprice/RI38>
- /25/ Chartered Accountant, Nageswara Rao, certificate for project cost, dated 29 September 2008.
 - /26/ Independent financial expert certificate for appropriateness of applied benchmark, assumptions and project IRR calculation dated 10 June 2009.
 - /27/ Project IRR and Benchmark calculation Spreadsheet.
 - /28/ Increasing prices trend for cement :
http://eaindustry.nic.in/asp2/list_d.asp?Fcomm_code=1309030001&Fyear1=2006&Fopt_wmy=Y
 - /29/ Increasing prices trend for Steel:
http://eaindustry.nic.in/asp2/list_d.asp?Fcomm_code=1310010100&Fyear1=2006&Fopt_wmy=Y
 - /30/ Consent to establish from Karnataka State Pollution Control Board dated 30 September 2005.
 - /31/ Approval of DPR from Karnataka Renewable Energy Development Ltd (KREDL) 19 November 2005.
 - /32/ No Objection Certification from Gram Panchayat dated 18 April 2005.
 - /33/ Approval from KNNL dated 25 January 2007.
 - /34/ Density of diesel consumed in the Diesel generator as per Society of Indian Automobile Manufacturers (SIAM)
<http://www.siamindia.com/scripts/Diesel.aspx>
 - /35/ CRISIL Advisory Services Report on Cost of Capital for Central Sector Utilities dated 13 April 2000.
 - /36/ Page No.133, Indian Shareowners- A Survey, by L.C. Gupta (Society for Capital Market Research and Development, New Delhi).

3.2 Follow-up Interviews with Project Stakeholders

On 8 July 2008 DNV performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. The interview was carried out at project site. The interviews were carried out by A. Vidyacharan (qualified validator for the technical area) of DNV, India. Representatives of the project proponent and the consultant Zenith Energy were interviewed. The main topics of the interviews are summarized below:



VALIDATION REPORT

	Date	Name	Organization	Topic
/37/	2008/07/08	Mr. M. Keshav Reddy	Jasper Energy Private Limited	<ul style="list-style-type: none"> ➤ Financials of the project ➤ Environmental compliance ➤ Estimated emission reductions ➤ Project additionality ➤ Stakeholders consultation process ➤ Technology applied and operational lifetime. ➤ Baseline data. ➤ Monitoring and reporting procedures. ➤ Calibration, internal audit and corrective action procedures. ➤ Provisions for training, operation and maintenance
		Mr. S.K.S. Rambabu	Zenith Energy Services (P) Limited	

3.3 Resolution of Outstanding Issues

The objective of this phase of the validation is to resolve any outstanding issues which need be clarified prior to DNV's positive conclusion on the project design. In order to ensure transparency a validation protocol was customised for the project. The protocol shows in a transparent manner the criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The validation protocol consists of three tables. The different columns in these tables are described in the figure below. The completed validation protocol for the "Sonna mini hydel scheme in Karnataka State, India" project is enclosed in Appendix A to this report.

Findings established during the validation can either be seen as a non-fulfilment of CDM criteria or where a risk to the fulfilment of project objectives is identified. Corrective action requests (CAR) are issued, where:

- i) mistakes have been made with a direct influence on project results;
- ii) CDM and/or methodology specific requirements have not been met; or
- iii) there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

A request for clarification (CL) may be used where additional information is needed to fully clarify an issue.



VALIDATION REPORT

Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities				
Requirement	Reference	Conclusion		
<i>The requirements the project must meet.</i>	<i>Gives reference to the legislation or agreement where the requirement is found.</i>	This is either acceptable based on evidence provided (OK), a Corrective Action Request (CAR) of risk or non-compliance with stated requirements or a request for Clarification (CL) where further clarifications are needed.		

Validation Protocol Table 2: Requirement checklist				
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
<i>The various requirements in Table 2 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the large-scale PDD template, version 03 - in effect as of: 28 July 2006. Each section is then further sub-divided.</i>	<i>Gives reference to documents where the answer to the checklist question or item is found.</i>	<i>Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.</i>	<i>The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.</i>	<i>This is either acceptable based on evidence provided (OK), or a corrective action request (CAR) due to non-compliance with the checklist question (See below). A request for clarification (CL) is used when the validation team has identified a need for further clarification.</i>

Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests			
Draft report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Validation conclusion
<i>If the conclusions from the draft Validation are either a CAR or a CL, these should be listed in this section.</i>	<i>Reference to the checklist question number in Table 2 where the CAR or CL is explained.</i>	<i>The responses given by the project participants during the communications with the validation team should be summarised in this section.</i>	<i>This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".</i>

Figure 1: Validation protocol tables



VALIDATION REPORT

3.4 Internal Quality Control

The draft validation report including the initial validation findings underwent a technical review before being submitted to the project participants. The final validation report underwent another technical review before requesting registration of the project activity. The technical reviews were performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

3.5 Validation Team

<i>Role/Qualification</i>	<i>Last Name</i>	<i>First Name</i>	<i>Country</i>	<i>Type of involvement</i>					
				Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	Expert input
CDM validator / technical team leader	Astakala	Vidyacharan	India		√		√		
GHG auditor (Trainee)	Srivastava	Gaurav	India	√		√			
Technical reviewer (Draft report)	Ramachandran	Ramesh	India					√	
Technical reviewer (Final report)	Kakaraparthi	Venkata Raman	India					√	

The qualification of each individual validation team member is detailed in Appendix B to this report.



VALIDATION REPORT

4 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

The final validation findings relate to the project design document version 3 dated 25 March 2009.

4.1 Participation Requirements

The project has been developed as a unilateral project with the sole project participant being Jasper Energy Private Limited from the host Party India. India ratified the Kyoto Protocol on 22 August 2002 and Ministry of Environment and Forests is the Designated National Authority of India. The DNA of India has approved the project on 26 May 2008 and also confirmed that the project contributes to sustainable development /2/. The issuance of Letter of Approval by DNA of India for the proposed project activity has been further verified by DNV from the Ministry of Environment and Forest, CDM India, Designated National Authority's website /7/.

The validation did not reveal any information that indicates that the project can be seen as a diversion of official development assistance (ODA) funding towards India.

4.2 Project Design

The "Sonna mini hydel scheme in Karnataka state, India" by Jasper Energy Private Limited is a run of the river hydroelectric power plant which is being constructed to utilise the water discharges from Sonna Barrage, which is under construction by the state government for irrigation purposes, on the Bhima River.

The project consists of construction of intake pool with gates and trash rack, a by-pass weir (on Sonna Barrage) with manual gates, tail race pool and a tail channel to discharge water back into the river. The project envisages the installation of three turbines of rated capacity of 3.5 MW each, in total 10.5 MW. The predicted power generation is 27.64 GWh per year at a plant load factor of 30%. The project capacity has been evidenced from the from the electro mechanical specifications of the equipment /10/. The plant is connected to the Southern Grid of India and is expected to export 27.36 GWh to Hubli Electricity Supply Company Limited (HESCOM) a distribution wing of Karnataka Power Transmission Corporation Limited (KPTCL) grid that is part of southern grid. The project design reflects good practice.

The starting date of the project activity has been verified to be 12 February 2007 from the date of agreement for civil construction from the civil construction agreement /8/.

The project activity is currently under construction and is expected to be commissioned by July 2009. The expected operational lifetime of the project activity is 25 years and a fixed crediting period has been chosen, with the start date of the first crediting period to be 1 September 2009 or from the date of registration, whichever is later. The project is expected to result in 23 387 tCO₂e emission reductions per annum over the crediting period.



VALIDATION REPORT

4.3 Baseline Determination

In view of the fact that the project capacity is less than 15 MW, the project is eligible as type I small-scale CDM project activity and can apply a simplified baseline methodology. The project applies the baseline methodology stipulated for category I.D of the “simplified modalities and procedure for small scale CDM project activity” The simplified baseline methodology AMS-I.D, version 13 is applicable for grid connected renewable electricity generation projects. The application of AMS-I.D, version 13 is justified as:

- The project generates electricity using hydro resource and it displaces the grid electricity and has been verified by DNV from power purchase agreement, signed between M/s Jasper Energy Private Limited and Karnataka Power Transmission Corporation Limited dated 1 February 2007 /9/.
- The project activity is a run of the river power plant with a total installed capacity of 10.5 MW. This has been verified from the electro mechanical specifications provided by the technology supplier dated 10 April 2007 /7/.

As the project activity supplies electricity to the Karnataka state electricity grid which forms a part of the southern region electricity grid, the baseline for this project activity is a function of the generation mix of the southern region grid. The selection of the southern region grid as the grid system boundary for the project activity is in line with the EB guidance for large countries such as India. An *ex-ante* fixed emission factor of 0.85469 tCO₂e/MWh is used.

	GHGs involved	Description
Baseline emissions	CO ₂	The major emission source. The GHG emission reduction is achieved by replacing the electricity generated by fossil fuel based power plants in the southern regional grid of India.
Project emissions	CO ₂	Project activity will be equipped with diesel generator to meet the emergency requirements of power house; hence emissions due to usage of diesel will be accounted as project emissions.
Leakage	No Leakage	NA

4.4 Additionality

The additionality of the project activity has been demonstrated as per the Attachment A to Appendix B of simplified modalities and procedures for small-scale CDM project activities. The project activity primarily demonstrates additionality through investment analysis and other barrier.

4.4.1 CDM consideration and continued action to secure CDM status:

The starting date of the project activity is 12 February 2007, which is the date of agreement for civil construction signed for the project activity and is confirmed to be the earliest among all financial commitments. This has been concluded based on verification of the date of purchase order placed for supply of electromechanical equipment the project activity issued on M/s HPP Energy (India) Pvt. Ltd, New Delhi, dated 10 April 2007. Thus 12 February 2007



VALIDATION REPORT

is considered as the starting date of the project activity & has been verified by from the civil construction agreement /8/. The project activity is currently under construction and is expected to be commissioned by July 2009.

Prior to the starting date, the DPR for the project activity was prepared in September 2005 by Design Group project consultants private limited which recommended the project activity as economically viable with CDM benefits. The Board and Directors on 02 November 2006 to considered CDM benefits for the project activity to overcome the financial difficulties for the project. The MOM of the board of director's /12/ has been evidenced. On 19 November the DPR was approved by Karnataka Renewable Energy Development Limited (KREDL) /31/. On 5 December 2006, a CDM consultant for the project activity was appointed as verified by the agreement signed between Jasper Energy Private Limited (project proponent) & Zenith Energy Services (consultant for the project activity) /11/. CDM was therefore seriously considered in the decision to proceed with the project activity.

After the starting date of 12 February 2007, the project participant started the process of identification and appointment of DOE as verified by DNV from mail correspondence with TUV Nord dated 22 March 2007 /13/ and appointment of DNV as DOE for the project activity /14/ in November 2007. On 18 February 2008 project proponent approached DNA for Host country Approval and this has been verified from letter from project consultant to DNA of India for Host Country Approval /15/. On 25 April 2008 project proponent was invited by National CDM Authority of India (Ministry of Environment & Forest) to give a presentation on the project activity /16/.

The PDD for the project activity was web hosted on 17 May 2008 for global stakeholder consultation process /19/. The project is expected to be commissioned in July 2009.

The above sequence of events establishes that real actions were taken to secure CDM status for the project in parallel with its implementation.

4.4.2 Investment analysis: Choice of approach:

Since the project activity generates revenue without CDM and the alternative to the project does not involve investments, a benchmark analysis was selected to compare the project activity with the generation of electricity by other grid-connected power plant.

4.4.3 Investment analysis: Benchmark selection:

Appropriateness of benchmark: The project proponent has calculated a project-IRR benchmark (weighted average cost of capital) for the power sector in India. An interest rate of 11% applicable for the project activity at the time of DPR preparation as the cost of debt (sourced from the approved DPR) whereas the cost of equity has been determined by using the Capital Asset Pricing Model (CAPM). The key parameters of the CAPM model have been calculated as follows:

- A risk free rate of 8.41% has been considered as per the weighted average yield rate of Government security bond, with maturity period ranging up to 25 years, applicable at the time of investment decision. The weighted average yield rate of Government security bond has been verified from the website of Reserve Bank of India /20/.



VALIDATION REPORT

- Market return or Compound Annual Growth Rate (CAGR) is calculated for the period from 3 November 2003 to 31 October 2006 (3 year prior to investment decision by board of directors meeting). The period of 3 years considered to calculate market return is appropriate as one-fourth of share owners had been holding at least some of their shares for over 10 years and another one fourth for 5 to 10 years. Thus, about one half of sample shareowners had held some of their shareholding for over 5 years and about three fourths shares had been held for over 3 years and same approach has been elaborated by Prof L.C. Gupta, Financial Expert (Society for Capital Market Research and Development, New Delhi) in his book Indian Shareowners (pageno-133)/36/. DNV has also confirmed from an independent financial expert that the period considered for market return is appropriate and in line with common approach used by investors to calculate market return on investment /26/. The data for the same has been sourced and verified from National Stock Exchange Limited (S&P CNX 500 indices) /21/.
- The average un-levered beta value 0.604 among all the conventional and non conventional power plants listed in the National Stock Exchange for the period of one year (October 2005 to October 2006) /22//23//24/, available at the time of investment decision has been applied for the calculation of cost of equity of the project activity has been considered. The time period of one year considered for beta value calculation is justified as per Credit Rating Information Services of India limited (CRISIL) recommendations to CERC and it was recommended by financial experts in the report /35/ that, for such economies, and for companies whose capital structure and operating environment has been changing, the time period over which beta is calculated should be small, preferably a year as in case of power sector in India which went significant restructuring after electricity act 2003. This ensures that the risk profile of the company vis-à-vis the market is relatively stable over the term over which beta is being calculated.
- The minimum expected return of equity based on the CAPM Model worked out to be 25.34%.

Based on CAPM model and cost of debt the weighted average cost of capital works out to be 14.70% /27/ which has been considered as a benchmark for the project activity. DNV has verified all the various inputs used in the working of the benchmark, and is of the opinion that the benchmark selected at 14.70% is reasonable.

4.4.4 Investment analysis: Input parameters:

The financial worksheets have been evidenced and verified to be correct. The DPR for the project activity was prepared in September 2005 whereas the civil construction agreement & purchase order for the proposed project activity was placed in mid 2007. The envisaged cost as per the DPR approved by Karnataka Renewable Energy Development Limited (KREDL) /31/ a nodal agency for renewable energy sector for Ministry of New and renewable energy (MNRE), prior to the starting date has been used for the financial calculations /25/. The assumptions used, base documents and the financial workings have also been verified and certified by third party chartered accountants /26/.

a) The assessment period for the financial calculation of IRR has been taken at 25 years (lifetime of project activity) in line with the EB guidelines on investment analysis.



VALIDATION REPORT

b) A salvage value of 10% of initial project cost at the end of the assessment period (lifetime of project activity) has been also considered for financial analysis and is reasonable based on the CERC guidelines.

c) A depreciation of 90% over the period of 25 years on civil works, plant and machineries & electrical works has been calculated based on the CERC guidelines.

d) Electricity tariff from power purchase agreement signed between Hubli Electricity Supply Company Ltd. and the project participant on 4 November 2006 /9/.

The input values of the project cost (390.61 million INR), debt (273.43 million INR), equity (117.18 million INR), interest on term loan (11%), interest on working capital (15%), O & M costs (2.2% including service tax @ 10.2% of the total project cost), insurance charges (0.55% of the project cost), total electricity generation 27.64 GWh (calculated based on past data on daily discharge by the regulator from 1991 – 2004), auxiliary power consumption (1% of total generation) have been sourced from approved detailed project report of 19 November 2005 by Karnataka Renewable Energy Development Limited (KREDL) /31/ a nodal agency for renewable energy sector for Ministry of New and renewable energy (MNRE) prepared by Design Group project consultants Pvt. Limited, Bangalore. DNV has compared the Investment cost per MW of installed capacity and possible auxiliary power consumption for the project activity with values proposed by KERC in its tariff order dated 18 January 2005 and has found to be in acceptable range. The O & M cost of 2.2% of total project cost considered in case of project activity is also found to be in range of O & M costs considered by various hydro power projects in state of Karnataka particularly which are registered as CDM projects and this has been accepted by DNV as the O & M costs vary based on remoteness of project, technology etc. All the taxes and incentives are confirmed to be applied correctly and as per the Indian Income Tax Act 1961.

4.4.5 Investment analysis: Calculation and conclusion:

The calculations were provided in an Excel spreadsheet and verified. The assumptions used in the calculations were deemed to be correct and verified by DNV. The project IRR of the activity without CDM revenues is worked out at 12.55% and is less than the benchmark of 14.70%. It has also been demonstrated that the project-IRR improves to above the benchmark on considering CDM revenues.

4.4.6 Investment analysis: Sensitivity analysis:

A sensitivity analysis has been preformed to demonstrate the influence of the following parameters on the project IRR.

a) Project cost: The project IRR touches the benchmark if the project cost decreases by 10.6% /18/. Considering the fact that the project construction & commissioning has already been delayed due to delay in completion of Sonna barrage on which the project activity is constructed and increasing trend of building material and equipment costs in India /28/ /29/ resulted in increase in total project cost which has been verified by DNV from certificate from an independent Chartered Accountant /25/. Hence a 10.6% decrease in the project cost is considered unrealistic.

b) Plant load factor: The project IRR touches the benchmark if the electricity generation increases by 12.35% /18/. DNV was able to confirm that the total electricity generation (27.64 GWh at 30.05% PLF) in approved DPR has been calculated based on the historical



VALIDATION REPORT

statistical data (1991 to 2004) of the mean annual discharge in the river measured at Afzalpur station by Central Water Commission & Water Resource Development Commission (Government of Karnataka). The maximum power generation potential reported for this period (1991-2004) is 34.18 GWh and the minimum power generation potential reported for this period (1991-2004) is 17.63 GWh but on the average level, the average power generation is calculated at 27.64 GWh for the period from 1991 to 2004 /6/. It was also demonstrated that KERC (Karnataka Electricity Regulatory Commission) also considers a maximum PLF of 30% in its tariff order for small hydro power plants in Karnataka. Based on these facts, an increase of 12.35% in electricity generation is deemed not to be likely.

c) Electricity Tariff: The project IRR touches the benchmark if the electricity tariff increases by 12.35% /18/. However the tariff of the generated electricity has been fixed for a period of 10 years as per the Karnataka Electricity Regulatory Commission, Tariff order dated 18 January 2005 and the PPA /9/ signed on 04 November 2006. As per the tariff order, the tariff is applicable only for 10 years for the present project. It is clearly stated in the tariff order that the tariff is subject to revision at the end of the period, therefore, any assumption on the tariff applicable from 11th year onwards is uncertain today. Thus, increase of tariff by 12.35% is unlikely.

d) Operation and maintenance cost: It has been demonstrated that if the operation and maintenance cost is reduced by 80% the project-IRR remains below than the benchmark of 14.70%. Hence, the project IRR is not sensitive to reduction in operation and maintenance costs.

e) Salvage value: Even after considering total project cost as salvage value the IRR for the project activity is lower than the benchmark return hence this parameter has not been considered for the sensitivity analysis and this is deemed reasonable.

4.5 Monitoring

The monitoring methodology selected complies with requirements of AMS-I.D, version 13 “Grid connected renewable electricity generation”.

Baseline Emissions: This involves the metering of the electricity generated, onsite electricity consumption, electricity imported from the grid, net electricity supplied to the grid (after deducting auxiliary power consumption & electricity imported from grid) will be measured through 0.2S accuracy level meters. The electricity exported & imported to grid will be jointly read by the project participant and the grid company once in a month through an electronic meter installed at the grid interconnection points. Data collected can be cross-checked with monthly electricity generation notes issued by the grid company. The energy supplied to the grid by the power plant will be multiplied by the combined margin emission coefficient for the grid to estimate the baseline emissions. These meters will be calibrated on annual basis.

Details of the data collection and frequency of data recording and associated formats are described and found to be adequate.

Project Emissions: this involves the measurement of amount of diesel consumed in the DG set (during emergency requirements of power house) will be measured on daily basis and will be cross checked with purchase receipt.

The authority and responsibility for project management, monitoring, measurement, review and reporting has been established. Data monitored will be archived for a period of two years after the crediting period.



VALIDATION REPORT

4.5.1 Parameters determined ex-ante

The following parameters have been determined by *ex-ante* basis by Jasper Energy Private Limited:

- Emission factor has been sourced from Central Electricity Authority (CEA) baseline carbon dioxide emissions from power sector and the value has been fixed to 0.85469 tCO₂/MWh for southern regional electricity grid.
- NCV of Diesel has been fixed from 2006 IPCC guidelines, and the value is 43 TJ/Gg.
- Oxidation factor (OX) of diesel has been fixed from 2006 IPCC guidelines, and the value is 1.
- Density of diesel consumed in the Diesel generator has been sourced from Society of Indian Automobile Manufacturers (SIAM) and the value is 0.82 kg/l /34/.

In line with the methodology, the combined margin emission factor (50:50) for the southern grid of India has been calculated to be 0.85469 tCO₂e/MWh, which has been sourced from Central Electricity Authority CO₂ Baseline Database. Central electricity Authority (CEA) (which is an official source of Ministry of Power, Government of India) have worked out baseline emission factor for various grids in India and made them publicly available ("Baseline CO₂ Emission Database Version 3.0."). This database i.e. the CO₂ baseline database provides information about the OM and BM factors of the regional electricity grids in India /5/. DNV confirms that the database is an official publication of the Government of India for the purpose of CDM baselines and the OM in the CEA database is calculated *ex ante* using the simple OM approach based on the generation weighted average emissions per electricity unit of all fossil-fuelled generating sources serving the system over a three year period of 2004-2005, 2005-2006 and 2006-2007 /5/. BM is calculated *ex ante* based on the 20% most recent capacity additions in the grid based on net generation for the year 2006-07 as described in ACM0002.

4.5.2 Parameters monitored ex-post

The parameters monitored *ex-post* are:

- Total electricity generated by the project activity on a monthly basis.
- Auxiliary electricity consumption of the project activity on a monthly basis.
- Electricity supplied to the grid by the project activity on a monthly basis.
- Electricity imported by the project activity on a monthly basis.
- Quantity of diesel used in DG set on daily basis.

4.5.3 Management system and quality assurance

The monitoring involves the metering of the electricity generated, onsite electricity consumption, electricity imported from the grid, net electricity supplied to the grid and quantity of Diesel consumed in the DG set (during emergency requirements of power house). Details of the data collection and frequency of data recording and associated formats are described and found to be adequate. The electricity exported to grid will be jointly read by the project participant and the grid company once in a month through an electronic meter installed at the grid interconnection points. Data collected can be cross-checked with monthly



VALIDATION REPORT

electricity generation notes issued by the grid company. The energy supplied to the grid by the power plant will be multiplied by the combined margin emission coefficient for the grid to estimate baseline emissions.

Project emissions: project emissions due to will be due to usage of Diesel (during emergency requirements of power house) will be accounted as project emissions.

The responsibilities and authorities for project management, procedures for monitoring and reporting, and QA/QC procedures have been systematically established and formalised.

4.6 Estimate of GHG Emissions

Baseline Emission (BE_y): The baseline emissions has been estimated based on 27.36 GWh/year power generation (after deducting auxiliary consumption & electricity imported from grid) from the hydro power plant that replaces fossil fuel based electricity generation in the southern regional electricity grid. The grid emission factor for the southern electricity grid has been sourced from Central Electricity Authority CO₂ Baseline Database. Central electricity Authority (CEA) and is 0.85469 tCO₂e/MWh.

Project Emission (PE_y): the project activity will be equipped with diesel generator to meet the emergency requirements of the power house; hence emissions due to usage of diesel will be accounted as project emissions. The project proponent will monitor the amount of diesel consumed throughout the crediting period on daily basis whereas the NCV, density & oxidation factor of diesel has been fixed *ex ante*.

Leakage: no sources of emissions were identified. The electricity generating equipment is not transferred from any other activity.

$$ER = BE_y - PE_y$$

The project is expected to result in emission reductions of approximately 233 870 tCO₂e yearly over its 10 years fixed crediting period.

4.7 Environmental Impacts

The proposed project is a run-off-river hydropower plant and the environmental impacts of the project are not considered significant. As per the requirement of Ministry of Environment and Forests, government of India, EIA is not required for small hydroelectric projects so the proposed project does not need to conduct Environmental Impact Assessment. "Consent to Establish" has been issued on 30 September 2005 /30/ and "Consent to operate" will be provided annually and this will form part of the monitoring procedures.

4.8 Comments by Local Stakeholders

The project proponent has conducted stakeholders meeting at the project site at Devangaon Village, Sindigi Taluk, Bijapur District, Karnataka on 2 April 2008 /18/. Additionally, the project proponent also made a public announcement in the local newspapers, on 25 March 2008 inviting comments on the project /17/. Local stakeholders identified are Karnataka Renewable Energy Development Ltd (KREDL), Karnataka Power Transmission Corporation Limited (KPTCL), Karnataka state Pollution Board (KSPCB), representatives of Village Panchayat. Letter of consent from the identified stakeholders have been provided for verification /31/ 32/ 33/. The project has not received any adverse comments.



VALIDATION REPORT

4.9 Comments by Parties, Stakeholders and NGOs

The PDD of version 01 dated 16 May 2008 was made publicly available on DNV's climate change website and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 17 May 2008 to 15 June 2008.

No comments were received.

APPENDIX A

CDM VALIDATION PROTOCOL

Table 1 Mandatory Requirements for Clean Development Mechanism (CDM) Project Activities

Requirement	Reference	Conclusion
About Parties		
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3.	Kyoto Protocol Art.12.2	The project is being developed as a unilateral project.
2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	OK
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	CAR-1 OK
4. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.	Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §40a	CAR-1 OK
5. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	OK It has been confirmed that the project does not involve any ODA from any Annex I Parties.
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	OK
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	OK
8. The participating Annex I Party's assigned amount shall have been calculated and	CDM Modalities and	NA

Requirement	Reference	Conclusion
recorded.	Procedures §31b	
9. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedures §31b	NA
About additionality		
10. Reduction in GHG emissions shall be additional to any that would occur in the absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	Clarifications Pending on Additionalty. CAR-3 OK
About forecast emission reductions and environmental impacts		
11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	OK
About small-scale project activities (if applicable)		
12. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakech Accords and shall not be a debundled component of a larger project activity.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	OK
13. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and use the simplified baseline and monitoring methodology for that project category.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	OK
14. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented.	Simplified Modalities and Procedures for Small Scale CDM Project Activities	OK

Requirement	Reference	Conclusion
	§22c	
About stakeholder involvement		
15. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	CL 5 OK
16. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	OK
Other		
17. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
18. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures §45c,d	OK
19. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.	CDM Modalities and Procedures §47	OK
20. The project design document shall be in conformance with the UNFCCC CDM-PDD format.	CDM Modalities and Procedures Appendix B, EB Decision	OK
21. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP.	CDM Modalities and Procedures §37f	OK

Table 2 Requirements Checklist

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A. General Description of Project Activity <i>The project design is assessed.</i>					
A.1. Project Boundaries <i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i>					
A.1.1. Are the project's spatial boundaries (geographical) clearly defined?	/1/	DR/I	The project site is located in Devangaon village of Bijapur district, in Karnataka state, India. The geographical coordinates of project site are 17° 10' 02" Latitude and 76°19' 21" Longitude.		OK
A.1.2. Are the project's system boundaries (components and facilities used to mitigate GHGs) clearly defined?	/1/ /5/	DR/I	The project activity is a 10.5 MW grid connected mini hydro project, being planned on right bank of Sonna barrage that is being constructed with the main purpose of irrigation. The project's system boundaries cover one horizontal full Kaplan type turbines and 3 synchronous with the rated output of 3.5 MW each. The other structures comprise of approach channel, penstocks, tail race pool, power house, transformer system and switch yard for evacuation of power. The spatial boundary of the project includes the project site up to the evacuation point of electricity to state grid.		OK
A.2. Participation Requirements <i>Referring to Part A, Annex 1 and 2 of the PDD as well as the CDM glossary with respect to the terms Party,</i>					

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<i>Letter of Approval, Authorization and Project Participant.</i>					
A.2.1. Which Parties and project participants are participating in the project?	/1/ /2/	DR/I	India is the host party and M/s Jasper Energy Private Limited is the Project participant. No Annex I country is identified yet for the project activity.		OK
A.2.2. Have all involved Parties provided a valid and complete letter of approval and have all private/public project participants been authorized by an involved Party?	/1/ /2/	DR/I	The LoA from the DNA of India need to be provided for verification.	CAR-1	OK
A.2.3. Do all participating Parties fulfil the participation requirements as follows: - Ratification of the Kyoto Protocol - Voluntary participation - Designated a National Authority	/1/ /2/	DR/I	The Designated National Authority of India is Ministry of Environmental and Forests. India ratified the Kyoto Protocol on 22 August 2002. The LOA from the DNA of India need to be provided for verification.	CAR-1	OK
A.2.4. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance.	/1/	DR/I	It has been confirmed that, there is no Public funding is involved in the project activity.		OK
A.3. Technology to be employed <i>Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is</i>					

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<i>used.</i>					
A.3.1. Does the project design engineering reflect current good practices?	/1/	DR/I	Yes, the project design does reflect good engineering practices as the project utilizes equipments and design that are standard and available in the India and is widely used for power generation in host country.		OK
A.3.2. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/1/	DR/I	Yes. The technology used for the project is available in the host country.		OK
A.3.3. Does the project make provisions for meeting training and maintenance needs?	/1/	DR/I	No special training for plant personnel is required as the project proponent has an agreement with equipment suppliers on training of operating personnel during commissioning of the project activity,		OK
A.4. Contribution to Sustainable Development <i>The project's contribution to sustainable development is assessed.</i>					
A.4.1. Has the host country confirmed that the project assists it in achieving sustainable development?	/1/ /2/	DR/I	The host country LOA needs to be provided.	CAR-1	OK
A.4.2. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR/I	The project will help to decrease the dependence on fossil fuels for power generation. The project is expected to improve basic living condition and will create employment opportunities in the region. The implementation of the project activity will result in the economic development of the region.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.5. Small scale project activity <i>It is assessed whether the project qualifies as small-scale CDM project activity</i>					
A.5.1. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?	/1/ /4/	DR/I	Yes, the project qualifies as a small scale CDM project activity, since the installed capacity of 10.5 MW of the project activity is less than 15 MW and is in line with the simplified modalities and procedures for small-scale CDM project activities respectively.		OK
A.5.2. Is the small scale project activity not a debundled component of a larger project activity?	/1/	DR/I	The project activity is not a debundled component of a larger project activity since there is no registered CDM project activity or request to register another CDM project by project participant in the last two years and within 1 km radius from the project activity.		OK
B. Project Baseline <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i>					
B.1. Baseline Methodology <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
B.1.1. Does the project apply an approved methodology and the correct version thereof?	/1/ /4/	DR/I	The project correctly applies the approved baseline methodology "Grid connected renewable electricity generation" type I. D, Version 13 as per Appendix-B of simplified modalities and procedures for small scale CDM projects.		OK
B.1.2. Are the applicability criteria in the baseline methodology all fulfilled?	/1/ /4/	DR/I	The project is a grid connected Hydro power plant and will displace fossil fuel based electricity		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
	/5/		that would otherwise be provided by the operation and expansion of the generating sources in Southern grid. The geographical and system boundary of relevant electricity grid-southern regional grid are clearly identified.		
B.2. Baseline Scenario Determination <i>The choice of the baseline scenario will be validated with focus on whether the baseline is a likely scenario, and whether the methodology to define the baseline scenario has been followed in a complete and transparent manner.</i>					
B.2.1. What is the baseline scenario?	/1/ /4/	DR/I	The baseline scenario as per methodology is the net kWh supplied by the renewable generating unit multiplied by an emission factor of the respective grid (measured in kg CO ₂ e/ kWh) calculated in a transparent and conservative manner. The project activity considers southern India electricity grid as a baseline scenario.		OK
B.2.2. What other alternative scenarios have been considered and why is the selected scenario the most likely one?	/1/ /4/ /5/	DR/I	The only baseline alternative is that in the absence of the project activity, equivalent amount of energy would have been generated from the existing plants or new capacity additions using the fossil fuels in the Southern Grid to which the project activity is connected. Hence it has been accepted.		OK
B.2.3. Has the baseline scenario been determined according to the methodology?	/1/ /4/	DR/I	Yes, the baseline scenario has been determined in line with requirement of the applied small scale methodology AMS I.D		OK
B.2.4. Has the baseline scenario been determined using conservative assumptions where possible?	/1/ /4/	DR/I	Yes. It is considered conservative since project being connected to Karnataka state grid which forms part of Southern Indian grid and as		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			suggested by methodology, combined margin approach has been selected to estimate the baseline emission factor.		
B.2.5. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR/I	Yes. All relevant national and sectoral policies, regulations and department rules and disciplines are considered.		OK
B.2.6. Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/ /5/	DR/I	Yes. The Baseline emission factor has been chosen from official web site of Central Electricity Authority which is publicly available data.		OK
B.2.7. Have the major risks to the baseline been identified?	/1/	DR/I	Yes, the baseline scenario has been determined using conservative assumptions.		OK
B.3. Additionality Determination <i>The assessment of additionality will be validated with focus on whether the project itself is not a likely baseline scenario.</i>					
B.3.1. Is the project additionality assessed according to the methodology?	/1/ /8/ /9/ /10/ /11/ /12/ /13/ /14/ /15/ /16/	DR/I	As per the decision 17/cp.7 Para 43, a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity. To demonstrate the additionality of the project activity project proponent has chosen Investment Barrier and other barriers as per the requirement of Attachment A to Appendix B for small scale project activities.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
	/20/ /21/ /22/ /23/ /24/ /25/ /26/ /27/ /28/ /29/		<p>investment barrier-</p> <ul style="list-style-type: none"> To demonstrate the investment barrier to the project proponent have chosen Benchmark analysis. Benchmark Analysis- It has been argued that the project IRR for the project activity is 11.52% without CDM revenue which is below than the benchmark of 17.33%. The project proponent has chosen Weighted Average cost of capital (WACC) as a benchmark for the project activity. <p>Project proponent is requested to respond to the following with respect to Investment barrier:</p> <ul style="list-style-type: none"> The applicability of choice of benchmark used for the project activity needs to be justified. Copy of financial analysis sheet for the project activity and references for all the assumptions made. Copy of PPA Loan document and interest rate proof need to be provided for verification. Third party verified copy for Total static investment need to be provided for verification. All statutory clearances need to be provided for verification. What are the incentives offered by the 	CAR-2	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>Government of Karnataka? Have these been considered in the financial analysis</p> <ul style="list-style-type: none"> • Copy of DPR. <p><i>Sensitivity analysis</i> has also been carried out to analyse the effect of $\pm 5\%$ variation in PLF and electricity tariff, it has demonstrated that even after $\pm 5\%$ variation in PLF and electricity tariff, the project IRR remains below than the applied benchmark.</p> <p>However The Project proponent is requested to demonstrate at which level of deviation of the sensitivity parameters the IRR of the project will touch the benchmark and the likelihood of that being achieved.</p> <p>The project developer is also requested to justify (along with the documentary evidence) the PLF assumed for the proposed project. The same needs to be clearly.</p> <p>Other Barriers-</p> <ul style="list-style-type: none"> • Uncertainty of project commissioning- Since the completion of project activity is dependent on completion of Sonna barrage any delay in construction of Barrage will result in delay in commissioning of the plant which in turn will effect the Project cost as well as revenue loss has been discussed, the project has already got delayed due to 		

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>delay in completion of barrage has already been witnessed. Construction of Sonna barrage is under control of Government of Karnataka.</p> <ul style="list-style-type: none"> Hydrology Risks: - the project activity receives water after utilization of water for the two irrigation canal for agricultural process and as per the approval from Irrigation department irrigation department has total control to regulate the flow of water and in case of off season or low water flow first preference will be given to irrigation department and resulting in uncertainty of water availability for power generation has been discussed. <p>Copy of Approval from need to be provided for verification. However it is not explained in PDD, on how these barriers would prevent implementation of the project activity and also revenues from CDM would alleviate these barriers.</p>	<p>CAR-3</p> <p>CAR-4</p>	
B.3.2. Are all assumptions stated in a transparent and conservative manner?	/1/ /25/ /26/ /27/ /28/ /29/	DR/I	Clarifications Pending from B.3.1	<p>CAR-1</p> <p>CAR-2</p> <p>CAR-3</p>	OK
B.3.3. Is sufficient evidence provided to support the	/1/	DR/I	Clarifications Pending from B.3.1	CAR-1	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
relevance of the arguments made?	/8/ /9/ /10/ /11/ /12/ /13/ /14/ /15/ /16/			CAR 2 CAR 3	
B.3.4. If the starting date of the project activity is before the date of validation, has sufficient evidence been provided that the incentive from the CDM was seriously considered in the decision to proceed with the project activity?	/1/ /8/	DR/I	The starting date of the project activity is February 12th 2007(Start Date of Civil Construction Agreement) and it is before the start date of validation. Since start date of the project activity is prior to the start of validation, evidence on serious consideration of revenues from CDM activity in the decision to proceed with the project activity need to be furnished for verification.	CL 4	OK
B.4. Calculation of GHG Emission Reductions – Project emissions <i>It is assessed whether the project emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.4.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	PDD	DR I	Since the project activity involves generation of electricity using hydro resources, no project emissions are envisaged. However the project activity is equipped with		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			fossil fuel based DG set for emergencies/startup and emissions due to diesel consumption will be accounted as project emissions.		
B.4.2. Have conservative assumptions been used when calculating the project emissions?	/1/	DR/I	Yes.		OK
B.4.3. Are uncertainties in the project emission estimates properly addressed?	/1/	DR/I	Yes.		OK
B.5. Calculation of GHG Emission Reductions – Baseline emissions <i>It is assessed whether the baseline emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.5.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /5/ /6/	DR/I	<p>Baseline emissions have been estimated as the product of net electricity generated in the project activity per year and grid emission factor of the Southern regional grid, which have been estimated based on the official CEA CO2 Baseline Database for the Indian Power Sector User Guide - Version 3.0 data.</p> <p>Combined margin approach has been adopted and the baseline emission factor is estimated ex-ante for the project activity at the start of validation activity and fixed for entire crediting period. This is deemed appropriate as per the small scale methodology AMS.I.D. The Emission factor is fixed at 854.69 tCO₂ / GWh</p>		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>The installed capacity of project plant is 10.5 MW and the plant is expected to export an average of 27.36GWh electricity to the Southern Regional Grid per year.</p> <p>Emission reduction calculations need to be included in the PDD.</p>		
B.5.2. Have conservative assumptions been used when calculating the baseline emissions?	/1/	DR/I	Yes.		OK
B.5.3. Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR/I	Yes.		OK
B.6. Calculation of GHG Emission Reductions – Leakage <i>It is assessed whether leakage emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.6.1. Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR/I	According to the simplified baseline and monitoring methodology for category I.D small-scale projects, leakage shall be considered, only if the project involves transfer of energy equipment from or to another activity. Since this is not the case in this project, no leakage needs to be considered.		OK
B.6.2. Have conservative assumptions been used when calculating the leakage emissions?	/1/	DR/I	Same as B.6.1		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.6.3. Are uncertainties in the leakage emission estimates properly addressed?	/1/	DR/I	Same as B.6.1		OK
B.7. Emission Reductions <i>The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.</i>					
B.7.1. Are the emission reductions real, measurable and give long-term benefits related to the mitigation of climate change.	/1/ /5/ /6/	DR/I	The project activity is expected to result in emission reduction of 23387 tCO ₂ e annually through out the fixed crediting period of ten years.		OK
B.8. Monitoring Methodology <i>It is assessed whether the project applies an appropriate monitoring methodology.</i>					
B.8.1. Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	/1/ /5/	DR/I	Yes, the monitoring plan documented according to the approved methodology AMS ID and is complete and transparent.		OK
B.8.2. Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?	/1/ /5/	DR/I	Yes, all monitored data required for verification and issuance will be kept for two years after end of the crediting period.		OK
B.9. Monitoring of Project Emissions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
B.9.1. Does the monitoring plan provide for the collection and archiving of all relevant data	/1/	DR/I	Yes the monitoring plan provide for the collection and archiving of all relevant data		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/4/		necessary for estimation or measuring the greenhouse gas emission within the project boundary during the crediting period.		
B.9.2. Are the choices of project GHG indicators reasonable and conservative?	/1/ /4/	DR/I	Yes, the choice of baseline GHG indicator of CO2 is reasonable.		OK
B.9.3. Is the measurement method clearly stated for each GHG value to be monitored and deemed appropriate?	/1/ /4/	DR/I	<p>The project activity is equipped with fossil fuel based DG set for emergencies/startup and emissions due to diesel consumption will be accounted as project emissions.</p> <p>The only parameter need to monitor to calculate project emission is the diesel consumption since the emission factor of diesel has already been fixed ex ante based on default value provided in IPCC 2006.</p>		OK
B.9.4. Is the measurement equipment described and deemed appropriate?	/1/	DR/I	The quantity of diesel used in DG set will be measured by level gauge/dip stick and this data can be cross checked against sales receipt.		OK
B.9.5. Is the measurement accuracy addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/1/	DR/I	NA		OK
B.9.6. Is the measurement <i>interval</i> identified and deemed appropriate?	/1/	DR/I	Yes.		OK
B.9.7. Is the <i>registration, monitoring, measurement</i> and	/1/	DR/I	Yes, registration, monitoring, measurement and		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<i>reporting procedure defined?</i>			reporting procedure are defined in the PDD.		
B.9.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR/I	Yes.		OK
B.9.9. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR/I	Yes. All the day-to-day records handling including what records to keep, storage area of records and how to process performance documentation is identified in the PDD.		OK
B.10. Monitoring of Baseline Emissions <i>It is established whether the monitoring plan provides for reliable and complete baseline emission data over time.</i>					
B.10.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/ /4/	DR/I	Yes the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emission within the project boundary during the crediting period. The monitoring plan provides for the monitoring of the following parameters- <ul style="list-style-type: none"> a. Gross electricity generated by the project activity. b. Auxiliary power consumption of the project activity c. Net electricity exported to the grid 		OK
B.10.2. Are the choices of baseline GHG indicators reasonable and conservative?	/1/	DR/I	The choice of CO2 as GHG indicator is reasonable and conservative.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.10.3. Is the measurement method clearly stated for each baseline indicator to be monitored and also deemed appropriate?	/1/	DR/I	Yes. The project uses the ex-ante determination of emission factor for grid electricity. Emission reduction calculation will be on the basis of net electricity supplied to the grid. Gross electricity generation and auxiliary electricity consumption will be monitored and can be cross checked with the check meter.		OK
B.10.4. Is the measurement <i>equipment</i> described and deemed appropriate?	/1/	DR/I	The measurement equipment for electricity generated and exported would be measured by energy meters. Accuracy class of energy meter and frequency of calibration of meters need to be included in the PDD.	CL 2	OK
B.10.5. Is the measurement <i>accuracy</i> addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/1/	DR/I	The measurement accuracy needs to be addressed in the PDD.	CL 5	OK
B.10.6. Is the measurement <i>interval</i> for baseline data identified and deemed appropriate?	/1/	DR/I	Yes.		OK
B.10.7. Is the registration, <i>monitoring, measurement</i> and <i>reporting</i> procedure defined?	/1/	DR/I	Yes.		OK
B.10.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR/I	Procedures for maintenance of monitoring equipment and installations need to be addressed in the PDD.	CL 3	OK
B.10.9. Are procedures identified for day-to-day records	/1/	DR/I	Procedures are required to be identified for day-	CL 6	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
handling (including what records to keep, storage area of records and how to process performance documentation)			to-day records handling.		
B.11. Monitoring of Leakage <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>					
B.11.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/ /4/	DR/I	According to the simplified baseline and monitoring methodology for category I.D small-scale projects, leakage shall be considered, only if the project involves transfer of energy equipment from or to another activity. Since this is not the case in this project, no leakage needs to be considered.		OK
B.11.2. Are the choices of project leakage indicators reasonable and conservative?	/1/	DR/I	Same as B.11.1		OK
B.11.3. Is the measurement method clearly stated for each leakage value to be monitored and deemed appropriate?	/1/	DR/I	Same as B.11.1		OK
B.12. Monitoring of Sustainable Development Indicators/ Environmental Impacts <i>It is assessed whether choices of indicators are reasonable and complete to monitor sustainable performance over time.</i>					
B.12.1. Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/	DR/I	Host country does not call for monitoring the sustainable development indicators.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.12.2. Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR/I	This is not required as per the legislation and hence not applicable.		OK
B.12.3. Are the sustainable development indicators in line with stated national priorities in the Host Country?	/1/	DR/I	Refer to B.12.1		OK
B.13. Project Management Planning <i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i>					
B.13.1. Is the authority and responsibility of overall project management clearly described?	/1/	DR/I	Yes, The authority and responsibility of the project management has been identified in the PDD. General Manager will be responsible for overall project management.		OK
B.13.2. Are procedures identified for training of monitoring personnel?	/1/	DR/I	Yes provisions for training requirements for the monitoring personnel have been formularized in the PDD.		OK
B.13.3. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR/I	As the project activity is a hydropower project, no emergencies are foreseen which can cause unintended emissions.		OK
B.13.4. Are procedures identified for review of reported results/data?	/1/	DR/I	Yes, This has been identified in the PDD.		OK
B.13.5. Are procedures identified for corrective actions in	/1/	DR/I	Yes, This has been identified in the PDD.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
order to provide for more accurate future monitoring and reporting?					
C. Duration of the Project/ Crediting Period <i>It is assessed whether the temporary boundaries of the project are clearly defined.</i>					
C.1.1. Are the project's starting date and operational lifetime clearly defined and evidenced?	/1/ /8/	DR/I	The starting date of the project activity is February 12th 2007 (Start Date of Civil Construction Agreement) and it is before the start date of validation. The life time of the project is expected to be 25 years. However evidence to support the claim on start date need to be furnished for verification.	CL4	OK
C.1.2. Is the start of the crediting period clearly defined and reasonable?	/1/	DR/I	10 Years of fixed crediting period has been chosen and the start date of the crediting period is stated to be September 01, 2009. However the start date of crediting period would be either from the date of registration of the project activity or from the date of commissioning of the project activity, which ever is later.		OK
D.1. For Small-scale projects					
D.1.1. Does host country legislation require an analysis of the environmental impacts of the project activity?	/1/	DR/I	As per the latest EIA notification, from the MoEF, no EIA study is required for such hydro projects.		OK
D.1.2. Does the project comply with environmental legislation in the host country?	/1/ /30/ /31/	DR/I	The clearances from the Pollution Control Board and other statutory requirements need to be clarified with approvals.	CL4	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.1.3. Will the project create any adverse environmental effects?	/1/	DR/I	The project is not likely to create any adverse environmental or social impacts.		OK
D.1.4. Have environmental impacts been identified and addressed in the PDD?	/1/	DR/I	Refer D.1.3.		OK
D. Stakeholder Comments <i>The validator should ensure that stakeholder comments have been invited with appropriate media and that due account has been taken of any comments received.</i>					
E.1.1. Have relevant stakeholders been consulted?	/1/ /18/ /30/ /31/ /32/ /33/	DR/I	Stakeholders have been identified and the process of inviting their comments undertaken either through public announcements or direct approach to the stakeholders. The identified stakeholders include the KSPCB, KREDL, KPTCL, and Department of fisheries, department of Industries and Boilers and the local village panchayat.		OK
E.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/ /16/ /17/ /18/	DR/I	The following details need to be clarified: <ul style="list-style-type: none"> • Date when the public hearing was held. • The communications processes adopted for intimation/consultation of the stakeholders meeting. • The recorded minutes of the meeting. Local populace, if any in the region who are part of the stakeholder consultation process as well.	CL-5	OK
E.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the	/1/	DR/I	There is no stakeholder consultation process required by the regulations/laws in the India for		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
stakeholder consultation process been carried out in accordance with such regulations/laws?			small scale run-of-the-river hydro power projects.		
E.1.4. Is a summary of the stakeholder comments received provided?	/1/	DR/I	No negative comments have been received for the proposed project activity.		OK
E.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR/I	Refer to E.1.4		OK

Table 3: Resolution of Corrective Action and Clarification Requests

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
<p>CAR 1</p> <p>The DNA of Host Country India approval is yet to be received.</p>	<p>Table 1</p> <p>A.2.2</p> <p>A.2.3</p> <p>A.4.1</p>	<p>The Host Country Approval received from Indian DNA is enclosed.</p>	<p>Letter of Approval Dated 26 May 2008 has been verified by DNV.</p> <p>OK Accepted.</p> <p>CAR 1 Closed.</p>
<p>CAR 2</p> <p>Project proponent is requested to provide following with respect to the investment barrier:</p> <ul style="list-style-type: none"> • Copy of applied Benchmark and validity of choice of benchmark. • Copy of financial analysis sheet for the project activity and references for all the assumptions made. • Copy of PPA • Loan document and interest rate proof need to be provided for verification. • Third party verified copy for Total static investment need to be provided for verification. • All statutory clearances need to be provided for verification. 	<p>B.3.1</p> <p>B.3.2</p> <p>B.3.3</p>	<ul style="list-style-type: none"> • The Bench mark is selected based on the recent guidelines of EB. The justification for selection of benchmark is described in the PDD under B.5. • Soft copy of Excel sheet of the financial calculations is enclosed • Power Purchase Agreement is provided for verification. • Loan sanction letters which includes rate of interest are provided for verification. • Certificate from an independent CA on the capital expenditure incurred so for as well as the expenditure 	<p>Applied benchmark has been reviewed by DNV.</p> <p>Financial analysis (project IRR Spreadsheet) has been reviewed by DNV.</p> <p>Loan Documents from State Bank of India dated 27 November 2006 and State Bank of Mysore dated 17 March 2007 has been verified by DNV.</p> <p>Power Purchase Agreement signed dated 4 November 2006 has been verified by DNV.</p> <p>Certificate from Independent Auditor dated 29 September 2008 on the capital expenditure incurred so for as well as the expenditure required to be incurred for completing the project has been verified by DNV.</p>

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
<ul style="list-style-type: none"> What are the incentives offered by the Government of Karnataka? Have these been considered in the financial analysis 		<p>required to be incurred for completing the project is provided for verification. We also furnish orders released for civil works and electro mechanical equipment as additional evidence on major capital expenditure.</p> <ul style="list-style-type: none"> All the clearances / approvals are provided for verification. <p>No incentives are being offered by government of Karnataka. However Ministry of New and Renewable energy (MNRE) offering a subsidy subject to availability of budget. Still for conservativeness the same was taken into account while preparing the cash flow statements.</p>	<p>Consent to establish from Karnataka state Pollution Control Board Dated 30 September 2005 has been verified by DNV.</p> <p>Approvals from KREDL, Local gram panchayat and KNNL have been verified by DNV.</p> <p>There are no incentives offered by government of Karnataka. However subsidy offered by Ministry of New and Renewable energy (MNRE) has been considered in Cash flow for project IRR calculation spreadsheet.</p> <p>OK Accepted. CAR 2 Closed.</p>
<p>CAR 3</p> <p>The project proponent is requested to demonstrate at which level of deviation of the sensitivity parameters the IRR of the project will touch the benchmark and the likelihood of that being achieved.</p> <p>The project developer is also requested to justify (along with the documentary evidence) the PLF assumed for the proposed project.</p>	<p>B.3.1 B.3.2 B.3.3</p>	<p>The sensitivity analysis indicating the parameters and at which %age the IRR reaches the benchmark is incorporated in the PDD and soft copy of which is furnished.</p> <p>The PLF is calculated based on the Gauge data available in the region Devangan during the period of 15 years. The Hydrological data is available in</p>	<p>Project proponent has revised the PDD and now sensitivity analysis has been conducted to the level when the project IRR touches the benchmark and justification for not likelihood of these scenarios has also been included in the revised PDD version 03.</p> <p>Detailed description has now been provided in section 04 of the validation</p>

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
		DPR. The same is enclosed.	report. OK Accepted. CAR 3 Closed
CAR 4 Copy of approval from need to be provided for verification. However it is not explained in PDD, how these barriers would prevent implementation of the project activity and also revenues from CDM would alleviate these barriers.	B.3.1 B.3.2 B.3.3	Copy of the approval received from Karnataka Neeravari Nigam Limited (KNNL) is provided for verification. The impact of these barriers on project activity is now explained in the PDD at Sec.B.5 under hydrological barriers.	Approval from KNNL dated 25 April 2007 has been verified by DNV. These barriers have now been removed from the PDD. OK Accepted. CAR 4 Closed.
CL 1 Since the starting date of the project activity is prior to the start of validation, evidence on serious consideration of revenues from CDM activity in the decision to proceed with the project activity need to be furnished for verification.	B.3.4	The Minutes of the board of directors Meeting held on 02-11-2006 considering CDM revenues is enclosed.	CDM consideration evidence submitted by project proponent has been reviewed by DNV. Detailed description has been included in the Section 4 of the Validation report. OK Accepted. CL 1 Closed.
CL 2 The measurement equipment for electricity generated and exported would be measured by energy meters. Accuracy class of energy meter and frequency of calibration of meters need to be included in the PDD.	B.10.4	Main meters and check meters for measurement of energy are of 0.2 class accuracy. Both meters will be calibrated once in every six months. When the main meters are sent for calibration, during which period, the readings of the check meter are taken into account for recording the energy delivered to the grid.	Necessary Changes has been incorporated in the revised PDD version 2. Revised PDD reviewed. OK Accepted CL 2 Closed

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
		The above is incorporated in the PDD.	
<p>CL 3</p> <p>Procedures for maintenance of monitoring equipment and installations need to be addressed in the PDD.</p> <p>Procedures are required to be identified for day-to-day records handling.</p>	B.10.4	<p>Procedure for installation and maintenance of the monitoring equipment will be followed as per meter supplier's manual. The same is incorporated in the PDD.</p> <p>Procedure for day-to-day records handling: The data recorded by the meters can be retrieved any time. Normally, initial and final readings are recorded in the registers at 0.0 hrs of the day. The meter readings will be recorded by the representatives of the project developer and purchaser on the designated billing date of every month.</p>	<p>Necessary Changes has now been incorporated in the revised PDD version 2.</p> <p>Revised PDD has been reviewed by DNV.</p> <p>OK Accepted.</p> <p>CL 3 Closed.</p>
<p>CL 4</p> <p>The clearances from the Pollution Control Board and other statutory requirements need to be clarified with approvals.</p>	D.1.2	<p>Clearance from Pollution Control Board and other clearances / approvals are enclosed.</p>	<p>Consent to establish from Karnataka state Pollution Control Board Dated 30 September 2005 has been verified by DNV.</p> <p>Approvals from KREDL, Local gram panchayat and KNNL have been verified by DNV.</p> <p>OK Accepted.</p> <p>Accepted CL 4 Closed.</p>
CL 5	E.1.2	<ul style="list-style-type: none"> Stakeholders consultation was 	Details regarding stakeholder

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
<p>The following details need to be clarified:</p> <ul style="list-style-type: none"> • Date when the public hearing was held. • The communications processes adopted for intimation/consultation of the stakeholders meeting. • The recorded minutes of the meeting. <p>Local populace, if any in the region who are part of the stakeholder consultation process as well.</p>		<p>held on 02.04.2008</p> <ul style="list-style-type: none"> • Publicity of the stakeholders meeting was given in two news papers in Kannada (Local Language) and English. • The minutes of the stakeholder meeting is enclosed 	<p>consultation have now been included in the revised PDD version 03.</p> <p>Copy of local Newspapers has been verified by DNV.</p> <p>Minutes of meeting of stakeholder consultation has been verified by DNV.</p> <p>OK Accepted</p> <p>CL 5 Closed.</p> <p>.</p>

APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Vidyacharan Astakala

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-9-8-i1-CDMJ1-i1)

GHG Auditor:	Yes				
Technical Area	CDM Validator	CDM Verifier	Sector Expert	Methodology Expert	Technical Reviewer
Landfill gas					
Hydro power	Jan 2009	Jan 2009			
Renewables					
Wind power					
Other renewable					
Biomass	Jan 2009	Jan 2009		Jan 2009	Jan 2009
Grid connection of isolated system					
Cement					
Waste-heat / waste-gas recovery					
Efficiency of thermal power plants					
Coal mine methane					
Fuel switch					
Manure management					
Waste / wastewater treatment					
Energy efficiency					
N ₂ O					
HFCs					
Flare reduction					
PFCs					
Charcoal					
CO ₂ recovery					
Transport					
Non-renewable biomass					
Biofuel					
Pipeline leakage reduction					
SF ₆					

Høvik, 9 January 2009

Michael Lehmann

Michael Lehmann

Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Ramesh Ramachandran

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-9-8-i1-CDMJ1-i1)

GHG Auditor:	Yes				
Technical Area	CDM Validator	CDM Verifier	Sector Expert	Methodology Expert	Technical Reviewer
Landfill gas	Jan 2009	Jan 2009	Jan 2009		
Hydro power	Jan 2009	Jan 2009			
Renewables	Jan 2009	Jan 2009		Jan 2009	Jan 2009
Wind power	Jan 2009	Jan 2009			
Other renewable	Jan 2009	Jan 2009			
Biomass	Jan 2009	Jan 2009			
Grid connection of isolated system	Jan 2009	Jan 2009			
Cement	Jan 2009	Jan 2009			
Waste-heat / waste-gas recovery	Jan 2009	Jan 2009			
Efficiency of thermal power plants	Jan 2009	Jan 2009			
Coal mine methane	Jan 2009	Jan 2009			
Fuel switch	Jan 2009	Jan 2009			
Manure management	Jan 2009	Jan 2009			
Waste / wastewater treatment	Jan 2009	Jan 2009	Jan 2009		
Energy efficiency	Jan 2009	Jan 2009			
N ₂ O	Jan 2009	Jan 2009			
HFCs	Jan 2009	Jan 2009			
Flare reduction	Jan 2009	Jan 2009			
PFCs	Jan 2009	Jan 2009			
Charcoal	Jan 2009	Jan 2009			
CO ₂ recovery	Jan 2009	Jan 2009			
Transport	Jan 2009	Jan 2009			
Non-renewable biomass	Jan 2009	Jan 2009			
Biofuel	Jan 2009	Jan 2009			
Pipeline leakage reduction	Jan 2009	Jan 2009			
SF ₆	Jan 2009	Jan 2009			

Høvik, 9 January 2009

Michael Lehmann

Michael Lehmann

Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Raman Venkata Kakaraparthi

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-9-8-i1-CDMJ1-i1)

GHG Auditor:	Yes				
Technical Area	CDM Validator	CDM Verifier	Sector Expert	Methodology Expert	Technical Reviewer
Landfill gas	Jan 2009				
Hydro power	Jan 2009				
Renewables	Jan 2009	Jan 2009		Jan 2009	Jan 2009
Wind power					
Other renewable					
Biomass	Jan 2009				
Grid connection of isolated system					
Cement					
Waste-heat / waste-gas recovery	Jan 2009	Jan 2009	Jan 2009		
Efficiency of thermal power plants			Jan 2009		
Coal mine methane					
Fuel switch			Jan 2009		
Manure management					
Waste / wastewater treatment	Jan 2009				
Energy efficiency	Jan 2009	Jan 2009	Jan 2009		
N ₂ O					
HFCs	Jan 2009	Jan 2009			
Flare reduction					
PFCs					
Charcoal					
CO ₂ recovery			Jan 2009		
Transport					
Non-renewable biomass					
Biofuel					
Pipeline leakage reduction					
SF ₆					

Høvik, 9 January 2009

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