



VALIDATION REPORT

“13 MW GRID CONNECTED DANDELA MINI HYDEL SCHEME, KARNATAKA STATE, INDIA”

REPORT No. 2008-1018

REVISION No. 01



VALIDATION REPORT

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Approved by: Hendrik W. Brinks	Organisational unit: Climate Change Services
Client: Sagar Power (Dandela) Private Limited	Client ref.: Mr. J. C. Pavan Reddy

Project Name: 13 MW Grid Connected Dandela Mini Hydel Scheme, Karnataka State, India

Country: India

Methodology: AMS-I.D

Version: 13

GHG reducing Measure/Technology: Grid connected electricity generation

ER estimate: 32 160 tCO₂ equivalent per annum

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 "13 MW Grid Connected Dandela Mini Hydel Scheme, Karnataka State, India", as described in the PDD version 2 of 16 October 2009, meets all relevant UNFCCC requirements for the CDM and all relevant host Party 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.: 2008-1018	Date of this revision: 24 Mar 2010	Rev. No. 01
Report title: 13 MW Grid Connected Dandela Mini Hydel Scheme, Karnataka State, India		
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Key words:

Climate Change

Kyoto Protocol

Validation

Clean Development Mechanism

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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
EB	Executive Board
EPC	Engineering, Procurement and Construction
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
GWh	Giga Watt Hour
IPCC	Intergovernmental Panel on Climate Change
kWh	Kilo Watt hour
KPTCL	Karnataka Power Transmission Corporation Limited
KREDL	Karnataka Renewable Energy Development Limited
KSPCB	Karnataka State Pollution Control Board
MESCOM	Mangalore Electricity Supply Company Limited
MW	Mega Watt
MP	Monitoring Plan
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
PPA	Power Purchase agreement
SEC	Specific Energy Consumption
SR	Southern Regional Grid
UNFCCC	United Nations Framework Convention on Climate Change
WRDO	Water Resource Development Organization



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1 EXECUTIVE SUMMARY – VALIDATION OPINION

“Det Norske Veritas Certification AS (DNV) has performed a validation of the “13 MW Grid Connected Dandela Mini Hydel Scheme, Karnataka State, India. The validation was performed 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, the simplified modalities and procedures for small-scale CDM project activities and the subsequent decisions by the CDM Executive Board.

The project activity has been proposed as unilateral project and the project participant is Sagar Power (Dandela) Private Limited. The host Party India meets all participation requirements and the DNA of India has confirmed its voluntary participation. The DNA of India confirmed that the project assists in achieving sustainable development and has accorded the approval for the project on 21 July 2008.

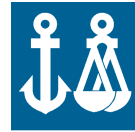
Having an installed capacity of less than 15 MW, the project is eligible as type I small scale CDM project activity. It has also been demonstrated that the project is not a de-bundled component of a large scale project. The validation has confirmed that the project is eligible as category I.D small-scale CDM project activity and correctly applies the simplified baseline and monitoring methodology AMS-I.D, version 13. 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 fixed crediting period. Moreover, an analysis of the barriers faced by the project demonstrates that 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 annual emission reductions from the project are estimated to be on the average 32 160 tCO₂e per year over the selected 10 year fixed 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 implemented.

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 also 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 during this period.



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In summary, it is DNV's opinion that the project, as described in the project design document version 2 of 16 October 2009, meets all relevant UNFCCC requirements for the CDM, is eligible as category I.D small-scale CDM project activity and correctly applies the approved simplified baseline and monitoring methodology AMS-I.D version 13. Hence, DNV requests the registration of the "13 MW Grid Connected Dandela Mini Hydel Scheme, Karnataka State, India " project as a CDM project activity.



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2 INTRODUCTION

Sagar Power (Dandela) Private Limited has commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of *the 13 MW Grid Connected Dandela Mini Hydel Scheme, Karnataka State, India* project (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, the simplified modalities and procedures for small-scale CDM project activities 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 /1/ and the Validation and Verification manual version 1.1 /3/

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.



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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-SSC-PDD of “13 MW Grid Connected Dandela Mini Hydel Scheme, Karnataka State, India”, version 01, dated 4 February 2008 and version 2 of 16 October 2009.
- /2/ Letter of Approval from DNA of India, dated 21 July 2008
- /3/ CDM EB 44: *Validation and Verification Manual version 1.1.*
- /4/ CDM Executive Board AMS-I.D, version 13 *Grid connected renewable electricity Generation*
- /5/ CDM Carbon Dioxide Baseline Data base, version 3, 15 December 2007 (www.cea.nic.in)
- /6/ Government of Karnataka: Order no. DE 28 NCE 1996 (12) dated 24 July 1996 according sanction to implement 10 MW hydropower station at Dandela.
- /7/ Government of Karnataka: Order no. EN 31 NCE 2006 dated 20 January 2006 according approval to enhance the capacity of the project from 10 MW to 13 MW.
- /8/ Sagar Power (Dandela) Private Limited: Detailed Project Report, February 2005.
- /9/ Purchase order for the Electro Mechanical equipments by Boving Fouress Limited, dated 27 April 2006.
- /10/ Loan sanction letters from State Bank of India dated 15 January 2006 and from Union Bank of India dated 22 May 2006, both Govt. of India undertakings.
- /11/ Power Purchase Agreement between Sagar Power and Karnataka Power Transmission Corporation Limited, dated 9 June 2005.
- /12/ Supplementary Power Purchase Agreement between Sagar Power (Dandela) Private Limited and Mangalore Electricity Supply Company Ltd, dated 8 February 2008.
- /13/ Board Meeting considering CDM benefits for the project, dated 24 May 2005
- /14/ Agreement with Karnataka government for development of the project, dated 22 November 1996
- /15/ Lease deed with Forest department, Karnataka for land requirement of the project, dated 16 December 2005
- /16/ Agreement between Karnataka Renewable Energy Development Limited and M/s



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- Sagar Power Limited, dated 9 September 2004.
- /17/ Karnataka Electricity Regulatory Commission, tariff order for Non conventional energy based power projects, dated 7 July 2004.
 - /18/ Consent and clearance from Karnataka State Pollution Control Board, dated 31 May 2007
 - /19/ Approval from the Irrigation department, dated 28 June 2007
 - /20/ CDM consultancy enquiry, 25 January 2006.
 - /21/ Receipt of offers for CDM consultancy, 8 May 2006.
 - /22/ Appointment of M/s Zenith Energy as consultant for the development of CDM project on 20 February 2007.
 - /23/ Appointment of DOE on 1 October 2007.
 - /24/ Stakeholder consultation minutes of meeting dated 2 May 2008.
 - /25/ Reserve Bank of India Bulletin May 2005
http://www.rbi.org.in/scripts/BS_ViewBulletin.aspx?Id=6087
 - /26/ Report of CRISIL Advisory Services, *Cost of Capital for Central Sector Utilities*, available at <http://cercind.gov.in/rep1304.pdf>
 - /27/ Report of Prof. Rajnish Mehra, *The Equity Premium in India*
<http://www.academicwebpages.com/preview/mehra/pdf/Equity%20Premium%20in%20India.pdf>
 - /28/ Karnataka Government: Approval for change in name of the company to Sagar Power (Dandela) Private limited, dated 9 July 2003.
 - /29/ Report of Prof. Jayant R. Verma and Samir K. Barua, *A First Cut Estimate of the Equity Risk Premium in India*
<http://www.iimahd.ernet.in/~jrvarma/papers/WP2006-06-04.pdf>
 - /30/ KERC order on tariff for new hydro projects, dated 18 January 2005.
 - /31/ Website of DNA of India, Ministry of Environment and Forests
<http://cdmindia.nic.in/cdmindia/projectList.jsp>
 - /32/ Work orders placed for the civil works of the project on M/s AMR Constructions and M/s K. Kishore Reddy & Co. dated 1 June 2005.
 Work orders placed for the civil works of the project on M/s Saravana Constructions dated 2 June 2005, and Former Wing (P) Ltd. dated 6 September 2008.
 - /33/ Financial analysis spreadsheet.
 - /34/ CDM EB 39: Tool for the demonstration and assessment of additionality version 5.2
 - /35/ EMC Consultants and Contractors, Hyderabad: Hydrological studies and determination of plant load factor of the project dated 10 September 2009.
 - /36/ MESCOM: Commissioning report of the project activity dated 4 August 2009
 - /37/ Boving Fouress: Letter regarding life time of the project dated 18 August 2009



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/38/ C. Ramachandram & Co., Registered Chartered Accountants: Certified cost incurred on the project, dated 31 July 2009.

The main difference between the web hosted PDD and the final PDD are:

- The additionality is demonstrated in the final PDD with investment analysis. All other barriers described in the webhosted PDD have been removed from the final version.
- The benchmark has been changed from WACC approach to the bond rate escalated by the market risk premium.

3.2 Follow-up Interviews with Project Stakeholders

On 29 May 2008, Mr. Shivraj Sharma, GHG Auditor of DNV performed site visit and interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of the project proponent and the consultant Zenith Energy were interviewed. The main topics of the interviews are summarized below.

Date	Name	Organization	Topic
/39/ 2008-05-29	M. Jagadeesha A. Prabhakar Reddy Shailesh Thosar	Sagar Power (Dandela) Private Limited	<ul style="list-style-type: none"> ➤ Determination on baseline ➤ Determination of project additionality and ascertaining that CDM was considered during the project conceptualization.
	S.K. Rambabu	Zenith Energy	<ul style="list-style-type: none"> ➤ Clarifications on establishment of baseline, monitoring plan and emission reduction calculations. ➤ Resources, training needs and procedures for operation and maintenance. ➤ Monitoring methodology

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;



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- 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 *13 MW Grid Connected Dandela Mini Hydrel Scheme, Karnataka State, India* 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.



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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

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 review was performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

3.5 Validation Team

The validation team consists of the following personnel:



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Role/Qualification				Type of involvement					
				Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	Expert input
Project Manager/ Technical Team Leader/CDM validator	Astakala	Vidyacharan	India	√		√	√		
GHG auditor	Prabhu	Ravi Kumar	India	√		√			
GHG auditor	Sharma	Shivraj	India	√	√				
CDM validator with sectoral knowledge	Huang	Peng	China	√		√			√
Technical Reviewer (Draft)	Ramesh	Ramachandran	India					√	
Technical Reviewer	Sharma	Anjana	India					√	

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



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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 2 of 16 October 2009.

4.1 Participation Requirements

The project activity is being proposed as a unilateral project developed by Sagar Power (Dandela) Private Limited. The host Party India fulfils the participation requirements, having ratified the Kyoto Protocol on the 26 August 2002 and established National Clean Development Mechanism Authority, Ministry of Environment and Forests (MoEF) as its DNA. Ministry of Environment and Forests (MoEF) has approved the project on 21 July 2008 /2/ and provided confirmation that the project assists in achieving sustainable development. The issuance of Letter of Approval by DNA of India for the proposed project activity has been further verified by DNV from the website of DNA of India, Ministry of Environment and Forests /31/. No Annex I Party has yet been identified for the project.

The project is owned by Sagar Power (Dandela) Private Limited and 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 10 MW capacity Mini Hydel project at Dandela was originally allotted to Sagar Power Ltd. by Government of Karnataka on 24 July 1996 /6/. In 2003, the name of the company was changed to Sagar Power (Dandela) Limited, approval for which was granted by government of Karnataka on 9 July 2003 /28/. The promoters have gone for enhancement for capacity from 10 MW to 13 MW, the permission for the same was received on 20 January 2006 /7/.

The proposed project is a run of the river 13 MW hydro power project located at Dandela village, Beltangady Taluk, Dakshina Kannada District in the State of Karnataka in India and is connected to the Karnataka Power Transmission Corporation Limited grid, which forms a part of the southern regional grid of India. The proposed project is across the Netravathi River at Dandela falls. Dandela mini hydel scheme utilizes discharge from Netravathi River and after power generation, water is released back to the river.

The technology used in the project is available in India and no transfer of technology is envisaged. Proposed project is expected to have an annual gross generation of 38.20 GWh at a plant load factor (PLF) of 33.54% and will export a net amount of 37.63 GWh to the southern regional grid through the Karnataka Power Transmission Corporation Limited grid M/s. EMC Consultants and Contractors /35/, engaged by the project participant to determine the hydrology and PLF of the project, has concluded based on the 5 years hydrological data that the project has a potential to generate 37.759 GWh using 13 MW generators, which corresponds to a PLF of 33.16%. The PLF of 33.54% considered in the PDD for the project is higher than estimate of the consultant and is deemed conservative.



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The project activity is not a debundled component of a larger project activity, since there is no registered CDM project activity or an application to register another CDM project activity;

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

The capacity of the generators at 13 MW (3 numbers of 4.333 MW each) has been verified from the scope of supply of the machines stated in the purchase order /9/. The project will result in an estimated reduction of average 32 160 tCO_{2e} per annum over its entire crediting period of 10 years. The technology applied is deemed current good practice and is not expected to be replaced within the crediting period.

The major investment decisions on the project were taken by the project participant by:

- Issue of work order placed on M/s AMR Constructions and M/s K. Kishore Reddy & Co. for the civil works of the project on 1 June 2005 /32/.
- Placement of purchase order for Electro-Mechanical equipment on M/s Boving Fouress Limited on 27 April 2006 /9/.

The starting date of the project activity is 1 June 2005, the date on which the project participant issued work orders for the civil works. This is the first financial commitment for the project activity. The expected operational lifetime of the project is 30 years, which is verified from the letter from the supplier of turbines /37/. A fixed crediting period of 10 years has been chosen with the starting date of the first crediting period as 1 June 2010 or the date of registration of the CDM project activity, whichever is later.

4.3 Baseline Determination

The simplified baseline methodology AMS-I.D, version 13 is applicable for grid connected renewable electricity generation projects since:

- The project generates electricity using hydro resources and it displaces the grid electricity. Power Purchase Agreement, dated 9 June 2005 /11/, signed between Sagar Power Limited and Karnataka Power Transmission Corporation Limited and the supplementary PPA signed between MESCOM and M/s Sagar Power (Dandela) Private Limited /12/, have been provided and verified by DNV.
- The project activity is a run of the river power plant with a total installed capacity of 13 MW and hence less than 15 MW. The name plate capacity of generating equipment has been verified from the purchase order for electro mechanical equipment /9/.
- No co-generation is involved

As the project activity exports net electricity to the Karnataka Power Transmission Corporation Limited (KPTCL) grid which forms a part of the southern regional electricity grid, the baseline for this project activity is a function of the generation mix of the southern regional grid. The selection of the southern regional grid as the grid system boundary for the project activity is in line with the recent EB guidance for large countries such as India. The project system boundary is the physical boundary around the diversion structure across the river, approach channel, forebay, Penstock, intake structure, powerhouse, tailrace pool,



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tailrace channel and the transmission system till the evacuation point. The project activity includes three numbers of 4.333 MW generators, amounting to 13 MW of capacity /9/. The spatial boundary of the project includes the southern regional grid. The selected sources and gases are justified for the project activity.

	GHGs involved	Description
Baseline emissions	CO ₂	Emissions equivalent to the amount of net electricity supplied by the project activity that would otherwise be generated by KPTCL, which is a part of southern grid.
Project emissions	CO ₂	Emissions from diesel consumption in diesel generator set during emergency
Leakage	NA	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.

4.4.1 CDM consideration and continued action to secure CDM status:

As discussed in Section 4.2, the starting date of the project activity was verified to be 1 June 2005.

Early consideration of CDM is evidenced by Board of Directors resolution, dated 24 May 2005 /13/, in which the Board discussed viability of 13 MW Dandela project and suggested to get the project registered under CDM, so that the additional revenues will help in overcoming the barriers in project implementation. CDM was therefore seriously considered in the decision to proceed with the project activity.

The assessment that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation is summarized below:

- Though the initial agreement for the execution of the project activity with an installed capacity of 10 MW was signed with Karnataka Government on 24 July 1996 /6/, the approval for enhancing the capacity from 10 MW to 13 MW was received only on 20 January 2006 /7/.
- Enquiry floated for CDM consultancy on 25 January 2006 /20/.
- Appointment of M/s Zenith Energy as consultant for the development of CDM project on 20 February 2007 /22/.
- Appointment of DOE on 1 October 2007 /23/.
- Validation started with global stakeholder consultation on 19 February 2008.
- The project activity commissioning 19 July 2009 /36/.



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Since there were no gaps in initiatives taken to secure CDM status of more than two years from the starting date to the start of validation, sufficient efforts to secure CDM status was confirmed.

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.

4.4.3 Investment analysis: Benchmark selection:

At the time of decision making, the project participant had selected the benchmark based on WACC approach, with the cost of debt (post tax) taken at the actual lending rate and 16% rate of return on equity (as per KERC order dated 18 January 2005 for tariff calculation). The project participant has changed the benchmark in the revised PDD, based on the paragraph 40 of EB 40.

The project-IRR of 15.37% has been chosen as the benchmark, which is the Government bond rate increased by country risk premium for India. As per the Investment Analysis, clause 6 a) of the Additionality tool /34/, a relevant benchmark for a project's IRR can be derived from the "Government bond rates,, increased by a suitable risk premium to reflect the private investment and or project type, as substantiated by an independent (financial) expert or documented by official publicly available financial data". In line with this, the benchmark has been derived from the risk free rate indicated by Reserve bank of India, arrived from the weighted average yield of government securities, increased by the market risk premium for specific project sector. The weighted average yield of government securities indicated by the Reserve Bank of India at the time of decision making was 7.17% /25/. The selected specific project type country risk premium of 8.2% was arrived from the "Report on the Cost of Capital for the Central Sector Utilities" prepared by CRISIL advisory services that is available in the official website of Central Electricity Regulatory Commission (CERC) /26/. It is considered appropriate as the report has arrived at the risk premium for the power sector units of India using the data for the relevant energy sector units. This report published in the year 2000 was not updated at the time the project participant decided to go ahead with the project and the use of the document for selecting the benchmark was deemed appropriate. Further, the selected benchmark is also the lowest risk premium among other published risk premiums:

1. Study report of Prof Jayant Verma (2006), Professor of Finance at Indian Institute of Management, Ahmedabad and former full time member of Securities and Exchange Board of India, have arrived at a risk premium of 8.75% /29/.
2. Study report of Prof. Rajnish Mehra (2006), University of California, Santa Barbara and National Bureau of Economic Research, who has arrived at a risk premium of 9.7% /27/.

The resulting benchmark is 15.37%. DNV has verified the data and sources for the benchmark adopted for the project and found to be appropriate.



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4.4.4 Investment analysis: Input parameters:

The investment analysis /33/, has been performed for 30 years which is the expected life time of the project activity. DNV was able to verify the financial inputs considered in the IRR analysis from the documents available at the time of the decision to go ahead with the project activity.

The tariff for investment analysis has been verified from the KERC order dated 18 January 2005 /30/. The tariff of INR 2.9/unit escalated by INR 0.58 for the first 10 years is considered as per the power purchase agreement with KPTCL dated 9 June 2005 /12/. As the tariff has to be renegotiated from the 11th year onwards according to the terms of PPA, PP estimated the tariff of INR 2.8/unit for the financial analysis from 11th to 30th year of operation of the project. According to the KERC order /30/ dated 18 January 2005, which considering various costs associated with the renewable energy projects, arrived at the tariff of INR 3.24/unit during the first year of operation of mini hydro projects and INR 2.33 in the 10th year and fixed an average rate of INR 2.8 for the entire 10 year period. The reduction in cost of generation estimated by KERC is in view of the reduction in repayment of loans and interest over the years and by the end of 10th year, all the loans would have been paid back. Though the order does not fix tariff after 10 years, the intention of the commission is made clear by stating that “Considering the debt repayment obligations, the Commission opines that differential tariff should be applicable for projects that have completed 10 years. However in the present case the Commission is limiting the determination of tariff to new projects only”. It is clear that KERC has adopted a cost plus pricing policy for the renewable energy generators and accordingly reduced the tariff to INR 2.8 for the first 10 years for all new hydro projects. Considering the cost of generation calculated by KERC for the 10th year is INR 2.33, and KERC’s cost plus approach for tariff, INR 2.8 considered for financial analysis from 11th year onwards is deemed conservative.

The plant load factor of 33.54% is considered in the Detailed Project Report /8/ as well as the PDD. The PLF of 33.54% considered is conservative, since it is higher than the PLF of 33.16% estimated in the report of the third party consultant appointed by the PP /35/. Further, the PLF of the project is also higher than the normative PLF of 30% adopted by KERC for all mini hydro projects /17/ for calculation of tariff.

The total project cost of INR 572.10 million has been cross checked against the term loan sanction letters from State Bank of India and Union Bank of India /10/, shows that the loan was sanctioned considering a debt-equity ratio of 75:25 and that an amount of INR 429 million was sanctioned.

The operation and maintenance cost (2% of the project cost) with 5% yearly escalation has been verified from the Detailed Project Report /8/. Although the O&M costs of the project are slightly higher than the KERC norms of 1.5%, it does not have any material impact on the IRR, as stated in section 4.4.6 of the report.

All the taxes and incentives are confirmed to be applied correctly and as per the Indian Income Tax Act. Straight line depreciation has been calculated in line with the prevailing national regulation and industrial practice. The residual value of the assets at the end of the assessment period has been included as a cash inflow in the final year of investment analysis.



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4.4.5 Investment analysis: Calculation and conclusion:

Based on data from the Detailed Project Report of February 2006 /8/, tariff rates according to the PPA signed with KPTCL /11/ and the plant load factor as verified from the Detailed Project Report /8/, the project IRR without CDM has been calculated to be 12.61%, which is lower than the applied benchmark of 15.37%, which has been derived from the bond rate escalated by market risk premium. The IRR calculations were provided in a spreadsheet /33/. The calculations were verified by DNV and have been found to be correct.

4.4.6 Investment analysis: Sensitivity analysis:

A sensitivity analysis has been preformed in order to check the robustness of the financial analysis for reasonable variations in parameters contributing more than 20% to the project costs or project revenues. The values were varied till the benchmark was reached and the likelihood for that to happen was assessed. No significant positive correlations between the parameters are anticipated.

- a) Project cost: The IRR touches the benchmark if the project cost decreases by 14.35%. As per project report, 89% of the project cost is accounted for the electromechanical equipment cost and civil works. Due to the rising inflation rates, the cost of cement and steel have gone up further and the chances of reduction in project cost are unlikely. Moreover, the actual investment cost was verified at INR 659.9 million from the Chartered Accountant certificate, dated 31 July 2009 is higher than the estimated cost of Rs 572.10 million in the Detailed Project Report /8/ and IRR analysis. Thus reduction in investment cost is not possible.
- b) Plant load factor: With the plant load factor increased by 16.3%, the project IRR touches the benchmark. A plant load factor of 33.54% considered in the Detailed Project Report /8/ is higher than the 33.16% estimated by the third party consultant /35/, based on the 9 years past data on daily discharge at the regulator from 1996 to 2005. The 30% PLF considered by KERC for tariff calculation is also lower than the PLF considered for the IRR analysis. Thus, increase in plant load factor is deemed unlikely.
- c) Tariff: The project IRR improves to the applied benchmark if the tariff increases by 16.3%. /33/ However, it has been verified from the Power Purchase Agreement /11/ that the tariff structure is pre-determined for 10 years for the proposed project activity. Thereafter, the tariff structure would depend on the order and recommendation from Karnataka Electricity Regulatory Commission. This is likely to be lower than INR 2.8, as discussed in section 4.4.4. Thus, increase in tariff by 16.3% is deemed unlikely.
- d) Operation and maintenance cost: It has been demonstrated that if the operation and maintenance cost is removed, the project IRR still only improves to 14.98% /33/, which is lower than the benchmark. Hence, reduced operation and maintenance costs can not improve the IRR above the benchmark.

It has been demonstrated that the IRR with the above sensitivity analysis is always less than the benchmark IRR of 15.37%. The financial analysis including the assumptions for the sensitivity analysis and the benchmark has been certified by an independent third party Chartered Accountant /38/. Hence, the financial analysis and the benchmark, which has been derived from the bond rate escalated by market risk premium for the project activity is found to be appropriate.



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4.5 Monitoring

The project applies the approved monitoring methodology AMS-I.D, Version 13 - “*Grid connected renewable electricity generation*” for Type I – Renewable Energy Projects, according to Appendix B of the “*Simplified modalities and procedures for small-scale CDM project activities*” - Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activities. Given that the emission factor is calculated *ex-ante* and according to the monitoring methodology AMS-I.D, version 13, the data to be monitored are the net electricity supplied and imported from the grid by the project. The diesel consumption in the diesel generator set during emergency will also be monitored.

The net electricity supplied to the grid will be monitored by main meter and check meter. The recorded data will be cross checked against the sale receipts. Diesel consumption will be monitored by dip stick/ level gauge or store issues and cross checked against the fuel purchase receipt. The operating hours and the quantity of diesel consumption will be recorded

All the data collected under the monitoring plan will be kept for 2 years after the end of crediting period or till the last issuance of CERs, whichever is later. The monitoring plan stated in the PDD is feasible and of the project participants have ability to implement it. The monitoring plan is in accordance with the monitoring methodology and will give opportunity for real measurements of achieved emission reductions.

4.5.1 Parameters determined *ex-ante*

Data available at the time of validation are as follows:

- CO₂ emission factor of the Southern regional grid, combined margin value, taken from CEA published data 2006-2007.
- CO₂ emission coefficient factor of diesel, sourced from IPCC default value.

DNV has verified the value used against the sources and concluded that the data used are appropriate and conservative. This has been further described in section 4.6 of the report.

4.5.2 Parameters monitored *ex-post*

The parameters that will be monitored *ex-post* are:

- The total electricity generated by the project activity,
- The auxiliary electricity utilized by the project activity within the project boundary
- The net electricity delivered to the KPTCL/MESCOM.
- Amount of diesel consumed by the project activity during emergency.

4.5.3 Management system and quality assurance

Electricity meters of 0.2S class accuracy will be used. Maintenance and calibration of electricity meters will be calibrated as per the national regulation.

Board of Directors of the company is responsible for registration, monitoring, measurement, reporting and reviewing of the data and overall project management. Internal audit for the proposed CDM project will be carried out quarterly.

4.6 Estimate of GHG Emissions

The calculations and formulae as addressed in the approved baseline and monitoring methodology AMS-I.D, version 13, have been applied. All aspects related to the direct and



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indirect GHG emissions as relevant to the project activity have been addressed and are presented in a transparent manner, in line with the approved methodology.

Baseline emission: The combined margin emission coefficient for the southern grid of India is 854.7 tCO₂e/GWh, has been sourced from Central Electricity Authority data /5/. The Central Electricity Authority, Ministry of Power, Government of India has published a database of carbon dioxide emission factors from the power sector in India based on detailed authenticated information obtained from all operating power stations in the country. This database i.e. the CO₂ baseline database provides information about the OM and BM factors of all the regional electricity grids in India. 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. BM is calculated *ex ante* based on 20% most recent capacity additions in the grid based on net generation as described in ACM0002. Actual calorific values of coal and lignite have been used and their emission factors were based on the values provided in India's Initial National Communication under the UNFCCC. For all other fuels, default emission factors were derived from the IPCC 2006 guidelines. In line with the Grid Tool, the low end values of the 95% confidence intervals indicated by IPCC were used.

DNV was able to verify the value of combined margin from the Central Electricity Authority published data, 2007 /5/, which was the latest data available at the time of web hosting of the PDD.

The GHG emission reduction due to the project activity has been calculated as the product of net electricity supplied to the grid and the combined margin grid emission factor. The net electricity supplied to the grid will be measured by the main electricity meter and cross checked against check meter. The amount of net electricity supplied to the grid will be verified against the sales receipt from MESCOM.

The emissions sources not foreseen by the methodology is unlikely to contribute more than 1% of the estimated emission reductions of the project. The baseline emission estimate can be replicated using the data and parameter values referenced to in the PDD. The data sources mentioned have been verified by DNV.

Project emission: Fossil fuel consumption in the diesel generator set, during emergency, has been incorporated as the project emission and shall be monitored and calculated.

Leakage: It has been addressed and verified by DNV that no transfer of equipment has taken place in the project activity, thus leakage is not involved in the project activity as per the methodology.

4.7 Environmental Impacts

The total investment cost of the project activity is less than INR 1000 million, thus no environmental impact assessment study is required as per Indian regulation. Further, the proposed project being a mini hydro power plant and does not involve submergence of land or rehabilitation, no adverse impact on the environment is envisaged from the project activity. The proposed project activity contributes to generation of green power and is expected to benefit the economic development of a backward region. Thus, the project activity is expected



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to have only beneficial impacts and no adverse impacts are foreseen. All the statutory clearances /18/, /19/ has been provided and verified by DNV.

4.8 Comments by Local Stakeholders

The local stakeholders identified by the project proponent are Department of revenue, Mangalore Electricity Supply Corporation Limited, Karnataka Renewable Energy Development Ltd., State Pollution Control Board and local village panchayat.

The clearances issued by the State pollution control board /18/, and Karnataka Renewable Energy Development Corporation /16/, Mangalore Electricity Supply Corporation Limited /12/, Revenue department /14/, irrigation department /19/ and forest department /15/, covers the entire affected local stakeholders and their environmental and social concerns. These clearances have been verified by DNV.

The project participants have also conducted a formal stakeholders meeting at the project site on 2 May 2008 specific to CDM process. The stakeholders are invited through a notice published at the local village office. The meeting was attended by *Sarpanch* of the village, committee members and stakeholders. The copy of the minutes of the stakeholder meeting was made available for verification /24/. There were no comments from the participants.

4.9 Comments by Parties, Stakeholders and NGOs

The PDD version 1 dated 4 February 2008 was made publicly available on DNV's climate change website http://www.dnv.com/focus/climate_change/Projects/ProjectDetails.asp?ProjectId=1731 and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 19 February 2008 to 19 March 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 has been proposed 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 The letter of approval from the host country is pending. 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 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
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	The Designated National Authority (DNA) of India is "National Clean Development

Requirement	Reference	Conclusion
		Mechanism Authority”.
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	The host country India has ratified the Kyoto protocol on August 26, 2002
8. The participating Annex I Party’s assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b	NA
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	CAR 2, CL 3, CL 7 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	CL 4 OK
For large-scale projects only		
12. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	NA

Requirement	Reference	Conclusion
About small-scale project activities (if applicable)		
13. 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
14. 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
15. 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 §22c	OK
About stakeholder involvement		
16. 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 8 OK
17. 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	The PDD of “4 February 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 19 February 2008 to

Requirement	Reference	Conclusion
		19 March 2008. No comment received.
Other		
18. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
19. 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
20. 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
21. The project design document shall be in conformance with the UNFCCC CDM-PDD format.	CDM Modalities and Procedures Appendix B, EB Decision	OK
22. 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	Yes, the project's spatial boundaries are defined. The project site is located at survey number 182/ P2 and 182/ P3 of Dandela Village, Dakshina Kannada District of Karnataka state. The project co-ordinates are 12 ⁰ 57' 17" N 75 ⁰ 21' 44" E. However, copy of the same (Land surveys) to be provided for verification.	CL1	OK
A.1.2. Are the project's system boundaries (components and facilities used to mitigate GHGs) clearly defined?	/1/	DR, I	The project's system boundary has been clearly defined. This has been verified during the site visit.		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, Letter of Approval, Authorization and Project Participant.</i>					
A.2.1. Which Parties and project participants are participating in the project?	/1/	DR	For this project, India is the host party and Sagar Power (Dandela) Private Limited is the		OK

* MoV = Means of Verification, DR= Document Review, I= Interview
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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			Project participant.		
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/	DR	The letter of approval (LoA) from the DNA, India need to be provided.	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/	DR	The Designated National Authority of India is Ministry of Environmental and Forests. India ratified the Kyoto Protocol on 22 August 2002. The letter of approval to be provided for verification mentioning the voluntary participation in the CDM project activity.	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	No public funding has been taken for this 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 used.</i>					
A.3.1. Does the project design engineering reflect current good practices?	/1/	DR, I	The project design engineering reflects current good practices through installation of Hydro power plant to generate electricity		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			from renewable source.		
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	The project comprises 3 Horizontal synchronous generator of capacity 13000 kW coupled to Horizontal 'S' type full Kaplan type turbine. The generated voltage at the generator terminals will be 11 kV with a step up voltage of transformer 33 kV. The evacuation of power will be through 33kV double circuit transmission line to KPTCL 33kV sub station at Beltangady. Supporting documents to the claim on technology need to be provided for verification.	CL-1	OK
A.3.3. Does the project make provisions for meeting training and maintenance needs?	/1/	DR	Training and maintenance needs have been identified and provisions have been made.		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/	DR	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	The project will help to decrease the dependence on fossil fuels for power generation. The project activity will lead to direct and indirect 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/	DR	Yes, the project qualifies as a small scale CDM project activity, since 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	The project activity is not a debundled component of a larger project activity since the project participant has not registered another project using the same technology within 1 km radius of the project during the past two years.		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/	DR	The project applies the approved baseline methodology “Grid connected renewable electricity generation” type I. D, Version 13.		OK
B.1.2. Are the applicability criteria in the baseline	/1/	DR,	The project activity and the applicability	CL-2	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
methodology all fulfilled?		I	<p>criteria of AMS I.D are described as under :</p> <ul style="list-style-type: none">▪ This category comprises renewable energy generation units that supply electricity to and / or displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit. <p>The project activity uses hydro source which is renewable and it is displacing the electricity from the Southern Region Grid that is supplied by fossil fuel fired generating unit.</p> <ul style="list-style-type: none">▪ The capacity of the entire unit shall not exceed the limit of 15 MW. <p>The capacity of the renewable generation unit is 13 MW.</p> <p>However, demonstration of the generation capacity needs to be substantiated with supporting evidences.</p>		
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/	DR	The baseline scenario is that in the absence of the project activity, equivalent amount of		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			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. The baseline scenario is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO ₂ e/ kWh) calculated in a transparent and conservative manner.		
B.2.2. What other alternative scenarios have been considered and why is the selected scenario the most likely one?	/1/	DR	The small scale methodology allows the project developer to not to consider other alternatives than base line scenario.		OK
B.2.3. Has the baseline scenario been determined according to the methodology?	/1/	DR	Yes, the baseline scenario has been determined according to the methodology.		OK
B.2.4. Has the baseline scenario been determined using conservative assumptions where possible?	/1/	DR	Yes, considering the baseline emissions the continuation of power generation from existing and future grid connected power plants have been selected as the baseline since this option results in lower baseline emissions than the fossil fuel based power plant option. This clearly shows that the baseline scenario is arrived at based on conservative assumptions.		OK
B.2.5. Does the baseline scenario sufficiently take into	/1/	DR	Yes, the national policies favour the		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
account relevant national and/or sectoral policies, macro-economic trends and political aspirations?			development of renewable energy sources.		
B.2.6. Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/	DR	Yes the project is located in the state of Karnataka which for a part of the Southern grid hence the baseline scenario has been appropriately considered to be the grid mix in the southern regional grid of India. The baseline determination is compatible with the available data. The grid emission factor has been used from the official Central Electricity Authority (CEA) website.		OK
B.2.7. Have the major risks to the baseline been identified?	/1/	DR	There are no major risks perceived to the proposed baseline.		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/	DR, I	For the project activity, the Project Proponent chose to discuss the Barrier Analysis - Investment Barrier: Hydrology related – at the time of planning the project activity in 1996, the project proponent (PP) was aware of the lack of hydrology data for reasonable estimation of power generation from the project activity. The project proponent signed a Memorandum	CAR-2, CL-3, CL-7	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			of Understanding (MoU) with Government of Karnataka in the year 1996 to establish the project activity but no effective steps could be taken for implementation, as hydrology data for the project activity was not available for estimation of power generation. Netravathi river has been gauged just upstream of Dandela falls by the Irrigation Department at Dharmasthala-Mangalore bridge over the 13 year period from 1982-83 to 1994-95. The gauging station has since become defunct and it is understood that flow measurements were stopped since 1995. There is no available data on the water availability the river could not be gauged. The data has been taken from Water Resource Development Organization (WRDO) which has the river gauging station at nearby location of project activity. Therefore the storage expected at the proposed diversion weir will be only by estimation and may vary from the real inflows into the reservoir at the project site. Till the project becomes operational the accuracy of the estimated inflows cannot be established and this will have an effect on the certainty of power generation estimated for the project activity.		

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>Eligibility of the project as CDM project it self is debatable as per the signed MOU with Government of Karnataka. Demonstrate the eligibility of this project on line of incentives from CDM consideration. Was CDM considered at that time?</p> <p>In which way this affects the project? Justify and explain supporting evidences.</p> <p>Lower Project IRR:</p> <p>The project activity is not financially an attractive proposition as the project IRR is less than the rate of return expected by the project proponent. The return expected by the project proponent is the weighted average cost of capital. For the purpose of computation of Weighted Average Cost of Capital (WACC), the project proponent had taken the interest payable on term loan and in respect of equity the return recommended by Karnataka Electricity Regulatory Commission, vide their Order dated January 18, 2005. Based on the above, the project proponent had arrived at a project IRR (for 20 year period) of 12.38% as compared to benchmark return of 13.87%. A comparison of benchmark return and the project IRR prove beyond doubt that the project activity is financially unattractive.</p>		

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>Benchmark adopted for the project activity lacks clarity and the same needs to be demonstrated in line with the comment made during EB 40 on Renewable energy projects in India.</p> <p>It is only with CDM benefits, the project activity achieves the benchmark return. With CDM benefits, the project IRR goes upto 14.88% as against the benchmark return of 13.87%. This is the reason for the PP to seek CDM benefits as it alleviates a major problem, viz., return commensurate with the benchmark and thereby make the project financially attractive.</p> <ul style="list-style-type: none">▪ Excel sheet of the financial calculation for the project activity needs to be provided and same needs to be demonstrated in line with the recent guideline on financial calculations.▪ Supporting documents for the values assigned in the financial calculations needs to be provided.▪ Supporting documents for justifying that the clause of handing over the property to state government at the end of 30 years has been considered while making the decision to invest in the project.		

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<ul style="list-style-type: none">Detailed Project Report (DPR) and PPA needs to be provided for verification. <p>Other Barriers:</p> <p>Transmission risks - The substation is located at a distance of more than 18 km from the project sites, requiring construction of a long transmission system. This line, to be constructed by the project participants, passes through thick forest and private lands. Right of way compensation is required to be paid to the forest department as well as private people as per their demand at the time of execution which some times will be unreasonable. Passing of the lines in the forest area also is susceptible to failures. The substation voltage level is 33 kV which is high for the small capacity of the project but low for the purpose of transmission over long distances. The system would face outages due to distribution system overload.</p> <ul style="list-style-type: none">All agreement performed with Karnataka forest department and private land owners are to be provided for verification.Justification and demonstration required in terms that how it will act as a barrier. This argument can not be considered for		

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>additionality.</p> <p>Institutional barriers – Power Purchase Agreement (PPA) requires the project proponent to back down the generation whenever required by the utility company, KPTCL. A clause to this effect has been incorporated in the Power Purchase Agreement. A significant risk, therefore, exists for the project activity as it has to shut down the project in situations such as an emergency, surplus power situation, off-peak duration etc. This risk has been already experienced recently by some of the power developers in Karnataka when KPTCL issued orders to some of the power plant operators to stop generation due to low demand for power across the state during a particular time.</p> <p>Conditions that have an impact on the project viability as well as sustainability of operations –</p> <p>➤ After expiry of the above mentioned period of 30 years after commissioning of power house or such further period for which the lease is renewed. The entire power generation facility would be taken over by the government and nothing</p>		

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>would be paid to the project proponent.</p> <p>Has it been reflected in the investment calculations?</p> <p>How does this impact the project activity?</p> <p>➤ The company shall pay to the government, royalty on water at 10 percent of the weighted average of prevailing industrial tariff for electricity for High Tension Industries from time to time.</p> <p>The legal and regulatory approvals are to be provided for verification.</p> <p>➤ If any work taken up by the irrigation department for safeguarding and strengthening the head works at any future date during the lease period, the cost of the same shall be borne by the company as decided by the Energy Department at that time.</p> <p>The DPR would have this issue addressed; the copy of DPR needs to be provided for verification.</p> <p>Has it been considered in the investment calculations?</p> <p>➤ The release of water would be totally controlled by the Irrigation Department/ Karnataka Power Corporation Limited</p>		

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			(Wherever KPCL controlling water) when there is no power generation. In the event of power generation, the inflow into the turbine in the power house shall be controlled by the Irrigation Department /KPCL. They may cut off the entire flow if the need for irrigation arises. The legal and regulatory approvals are to be provided for verification.		
B.3.2. Are all assumptions stated in a transparent and conservative manner?	/1/	DR, I	Same as B.3.1	CAR-2, CL-3, CL-7	OK
B.3.3. Is sufficient evidence provided to support the relevance of the arguments made?	/1/	DR, I	Same as B.3.1	CAR-2, CL-3, CL-7	OK
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/	DR, I	The start date of the project activity is 1 June 2005 and it is before the date of validation. <ul style="list-style-type: none"> Eligibility of the project as CDM project it self is debatable as per the signed MOU with Government of Karnataka. Demonstrate the eligibility of this project on line of incentives from CDM consideration. Was CDM considered at that time? Proofs on consideration of incentives 	CAR-2, CL-6	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>from CDM at the time conceptualising the project are to be provided for verification.</p> <ul style="list-style-type: none"> Evidences regarding the start date are to be provided for verification. Chronological order of events from the start date till their approach to DOE needs to be prepared and submitted. The date for start of the crediting period needs to be changed. 		
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?	/1/	DR	Emission reduction calculation excel sheet to be provided for verification	CL 4	OK
B.4.2. Have conservative assumptions been used when calculating the project emissions?	/1/	DR	Same as B.4.1	CL 4	OK
B.4.3. Are uncertainties in the project emission estimates properly addressed?	/1/	DR	Same as B.4.1	CL 4	OK
B.5. Calculation of GHG Emission Reductions – Baseline emissions					

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<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/	DR	Emission reduction calculation excel sheet to be provided for verification	CL 4	OK
B.5.2. Have conservative assumptions been used when calculating the baseline emissions?	/1/	DR	Same as B.5.1	CL 4	OK
B.5.3. Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR	Same as B.5.1	CL 4	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	No leakage needs to be addressed in the PDD.		OK
B.6.2. Have conservative assumptions been used when calculating the leakage emissions?	/1/	DR	Same as B.6.1		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.6.3. Are uncertainties in the leakage emission estimates properly addressed?	/1/	DR	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/	DR	Emission reduction calculation excel sheet to be provided for verification	CL 4	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/	DR	Yes, the monitoring plan documented according to the approved methodology AMS I D 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/	DR	Yes, all monitored data required for verification and issuance to 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	/1/	DR	Yes the monitoring plan provide for the		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?			collection and archiving of all relevant data 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/	DR	The choice of CO ₂ as GHG indicator is reasonable and conservative.		OK
B.9.3. Is the measurement method clearly stated for each GHG value to be monitored and deemed appropriate?	/1/	DR	Yes the emission factor for CO ₂ has been calculated from Central Electricity Authority (CEA) and it would be multiplied with the electricity produced.		OK
B.9.4. Is the measurement equipment described and deemed appropriate?	/1/	DR	The measurement equipment for electricity generated and exported would be measured by meter which is appropriate.		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	The measurement accuracy needs to be addressed in the PDD. Procedures to deal with erroneous measurements need to be addressed in the PDD.	CL-5	OK
B.9.6. Is the measurement <i>interval</i> identified and deemed appropriate?	/1/	DR	Intervals for measurements are identified and are appropriate.		OK
B.9.7. Is the <i>registration, monitoring, measurement and reporting</i> procedure defined?	/1/	DR	The procedure for registration, monitoring, measurement and reporting is defined.		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.9.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR	Procedures are identified for maintenance of monitoring equipment and installation. However, more clarity needs to be provided on the calibration of the meters involved in the project.	CL-5	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	The procedure for day-to-day records handling has been identified.		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/	DR	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.		OK
B.10.2. Are the choices of baseline GHG indicators reasonable and conservative?	/1/	DR	The choice of CO ₂ as GHG indicator is reasonable and conservative.		OK
B.10.3. Is the measurement method clearly stated for each baseline indicator to be monitored and also deemed appropriate?	/1/	DR	Yes the emission factor for CO ₂ has been calculated from Central Electricity Authority (CEA) and it would be multiplied with the electricity produced.		OK
B.10.4. Is the measurement <i>equipment</i> described and deemed appropriate?	/1/	DR	The measurement equipment for electricity		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			generated and exported would be measured by meter which is appropriate.		
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	The measurement accuracy needs to be addressed in the PDD. Procedures to deal with erroneous measurements need 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	Intervals for measurements are identified and are appropriate.		OK
B.10.7. Is the registration, <i>monitoring</i> , <i>measurement</i> and <i>reporting</i> procedure defined?	/1/	DR	The procedure for registration, monitoring, measurement and reporting is defined.		OK
B.10.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR	Procedures are identified for maintenance of monitoring equipment and installation. However, clarity on industrial standards needs to be demonstrated.	CL-5	OK
B.10.9. 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	The procedure for day-to-day records handling.		OK
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	/1/	DR	No leakage needs to be addressed in the		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
collection and archiving of all relevant data necessary for determining leakage?			PDD.		
B.11.2. Are the choices of project leakage indicators reasonable and conservative?	/1/	DR	Same as B.6.1		OK
B.11.3. Is the measurement method clearly stated for each leakage value to be monitored and deemed appropriate?	/1/	DR	Same as B.6.1		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	Host country does not call for monitoring the sustainable development indicators.		OK
B.12.2. Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR	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	Refer to B.12.1		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
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	Yes, The authority and responsibility of the project management has been identified in the PDD. CDM team will be responsible for overall project management.		OK
B.13.2. Are procedures identified for training of monitoring personnel?	/1/	DR	Procedures for training of monitoring personnel are identified in the PDD.		OK
B.13.3. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	No GHG emission related emergency situations are expected to occur.		OK
B.13.4. Are procedures identified for review of reported results/data?	/1/	DR	This has been identified in the PDD		OK
B.13.5. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR	This has been addressed in the PDD.		OK
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/	DR, I	The start date of the project is 1 June, 2005. The operational lifetime of the project is 30	CAR-2, CL-6	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			years. <ul style="list-style-type: none">▪ Eligibility of the project as CDM project it self is debatable as per the signed MOU with Government of Karnataka. Demonstrate the eligibility of this project on line of incentives from CDM consideration.▪ Was CDM considered at that time?▪ Eligibility of the project activity as a CDM project activity needs to be demonstrated.▪ Proofs on consideration of incentives from CDM at the time conceptualising the project are to be provided for verification.▪ Evidences regarding the start date are to be provided for verification.▪ Chronological order of events from the start date till their approach to DOE needs to be prepared and submitted.		
C.1.2. Is the start of the crediting period clearly defined and reasonable?	/1/	DR	The crediting period starts from 1 June 2010 or the date of registration of the project activity whichever occurs later. The date for start of the crediting period needs to be changed accordingly.	CL-6	OK
D. Environmental Impacts					

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<i>Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.</i>					
D.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/	DR	The host country regulations do not require project activities of this type to carry out an environmental impact analysis.		OK
D.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/	DR	No, there are no requirements for an Environment Impact Assessment to be carried out for projects less than INR 1000 million.		OK
D.1.3. Will the project create any adverse environmental effects?	/1/	DR	The project is not expected to create any significant environmental impacts.		OK
D.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	DR	Same as D.1.3		OK
D.1.5. Have identified environmental impacts been addressed in the project design?	/1/	DR	Same as D.1.3		OK
D.1.6. Does the project comply with environmental legislation in the host country?	/1/	DR	The legal and regulatory approvals are to be provided for verification.	CL7	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	The host country regulations do not require project activities of this type to carry out an environmental impact analysis.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.1.2. Does the project comply with environmental legislation in the host country?	/1/	DR	The legal and regulatory approvals are to be provided for verification.	CL-7	OK
D.1.3. Will the project create any adverse environmental effects?	/1/	DR	The project is not expected to create any significant environmental impacts.		OK
D.1.4. Have environmental impacts been identified and addressed in the PDD?	/1/	DR	Same as above.		OK
E. 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/	DR	<p>The stakeholder consultation was carried out on 2 May 2008.</p> <p>Among identified stakeholders Karnataka Renewable Energy Development Limited (KREDL), Karnataka Power Transmission Corporation Limited (KPTCL), Karnataka State Pollution Control Board (KSPCB), Revenue Department and local village panchayat have been included.</p> <p>Details and the documents of the Local stakeholder consultation process to be provided for Validation.</p>	CL-8	OK
E.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	Same as above	CL-8	OK

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E.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/	DR	Not specifically required for hydro power projects under Indian legislation.		OK
E.1.4. Is a summary of the stakeholder comments received provided?	/1/	DR	No comments were received for the project.		OK
E.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR	Refer to E.1.4		OK

Table 2b: Additional requirements checklist for VVM version 1 (EB 44)

A.6. Letter of approval					
A.6.1. Is the LoA received directly from the DNA or through the project participant.	/1/ /5/	DR/I	The LoA was received through the project participant.		OK
A.7. Project design					
A.7.1. Does the PDD describe the CDM project activity with all relevant elements in a transparent and accurate way?	/1/	DR/I	Yes, the PDD describes the CDM project activity with all relevant elements in a transparent and accurate way.		OK
A.7.2. Has the CDM project activity at the start of the validation been constructed or does the CDM project activity use existing	/1/	DR/I	The CDM project activity (installation of hydro power project) has been constructed at		OK

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facilities or equipment?			the start of the validation. Project activity does not use any existing facilities or equipment.		
A.7.3. Is the project a large scale project, a small scale project with average annual emission reductions above 15 000 tonnes or a bundled small scale project? Has on-site visit been carried out?	/1/	DR	This is a large scale project, with estimated annual emission reductions of 32 160 tonnes. The on-site visit was carried out by the GHG auditor of DNV.		OK
A.7.4. Does the project activity involve alteration of existing installations? If so, have the differences between pre-project and post-project activity been clearly described in the PDD?	/1/	DR	No. The project activity involves installation of new hydro power generators. Since this is a new project, the differences between pre-project and post-project activity are not described in the PDD		OK
A.8. Project emissions not addressed by the methodology					
A.8.1. Does the methodology describe all project emission source for the project activity that contributes all 1% of the emission reductions? Sources that the methodology considers not to take into account are not relevant (e.g. cement and iron consumption for building hydropower plants).	/1/ /3/	DR	Yes. The methodology sufficiently describes all project emission sources for the project activity that contributes to more than 1% of the emission reductions. Sources that the methodology considers not to take into account are not relevant		OK
A.9. Documentation of baseline emissions					
A.9.1. Documentation of the baseline determination: a. All assumptions and data used by the project participants are listed in the PDD and related document to be submitted for registration. The data are properly referenced. b. All documentation is relevant as well as correctly quoted and interpreted.	/1/ /3/	DR	Yes. All assumptions and data used by the project participants are listed in the PDD and related document to be submitted for registration. The data are properly referenced. Yes. All documentation is relevant as well as correctly quoted and interpreted. Yes. Assumptions and data can be deemed		OK

<p>c. Assumptions and data can be deemed reasonable</p> <p>d. Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD.</p> <p>e. The methodology has been correctly applied to identify what would occurred in the absence of the proposed CDM project activity</p>			<p>reasonable</p> <p>Yes. Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD.</p> <p>Yes. The methodology has been correctly applied to identify what would have occurred in the absence of the proposed CDM project activity</p>		
A.10. Documentation of the calculations					
<p>A.10.1. Algorithms and/or formulae used to determine emission reductions</p> <ul style="list-style-type: none"> All assumptions and data used by the project participants are listed in the PDD and related document submitted for registration. The data are properly referenced All documentation is correctly quoted and interpreted. All values used can be deemed reasonable in the context of the project activity The methodology has been correctly applied to calculate the emission reductions and this can be replicated by the data provided in the PDD and supporting files to be submitted for registration. 	/1/ /3/	DR/I	<p>Yes. All assumptions and data used by the project participants are listed in the PDD and related document submitted for registration. The data are properly referenced</p> <p>Yes. All documentation is correctly quoted and interpreted.</p> <p>Yes. All values used can be deemed reasonable in the context of the project activity</p> <p>Yes. The methodology has been correctly applied to calculate the emission reductions and this can be replicated by the data provided in the PDD and supporting files to be submitted for registration.</p>		OK
A.11. Implementation of the monitoring plan					
<p>A.11.1. How were the plans for implementation of the monitoring plan, data management, QA/QC procedures assessed? To what extent can the emission reductions achieved by the project by monitored ex-post and verified later by a</p>	/1/	DR/I	<p>The PDD describes in detail the QA/QC procedures proposed. The projected emission reductions are expected to be achieved depending on the actual PLF during</p>		Yes

DOE?			operation of the project.		
A.12. CDM consideration prior to starting date					
A.12.1. The prior consideration of CDM for the project activity complies with EB41 annex 46	/1/ /14/	DR	The prior consideration of CDM in the project is demonstrated through the minutes of Board meeting demonstrating CDM awareness dated 24 May 2005. The parallel action to secure CDM revenues is demonstrated by chronology of events, described in section B.5 of the PDD. This is in compliance with EB 41 annex 46 guidelines.		Yes

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CAR.1 <ul style="list-style-type: none"> ▪ The LoA from the DNA, India need to be provided. ▪ The letter of approval to be provided for verification mentioning the voluntary participation in the CDM project activity. 	Table 1, A.2.2, A.2.3, A.4.1,	The LOA received from Indian DNA is enclosed.	OK. Copy of the LoA No.4/9/2008-CCC dated 21 July 2008 verified. CAR 1 is closed
CAR 2 Eligibility of the project as CDM project it self is debatable as per the signed MoU with the Government of Karnataka. Demonstrate the eligibility of this project on line of incentives from CDM consideration. Was CDM considered at that time?	Table 1, B.3.1, B.3.2, B.3.3, B.3.4, C.1.1	Government of Karnataka in October 1996 granted permission to Sagar Power Ltd. to set up mini hydel plant of 10 MW capacity at Dandela. The name of the company was subsequently changed to Sagar Power (Dandela) Limited and the same was approved by government of Karnataka On 9 July 2003. Since the project was found unviable, the project proponents have gone for enhancement for capacity from 10 MW to 13 MW, the permission for the same was received in January, 2006. The CDM consideration and the additional revenues from the sale of emission reductions were clearly stated in the Board note of 24 May 2005.	OK. PP has provided a copy of the government order approving the change in name of the company /28/. Also the government order approving the increase in capacity of the project to 13 MW was provided for verification /7/. The minutes of Board meeting dated 24 May 2005 demonstrates CDM awareness at the time of decision to go ahead with the project . CAR 2 is closed

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL 1. <ul style="list-style-type: none"> Copy of Land surveys to be provided for verification. 	A.1.1, A.1.2,	Land lease agreement executed with Govt. of Karnataka dt.16.12.2005 is enclosed	OK. Copy of the lease agreement dated 16 December 2005 has been verified. CL 1 is closed.
CL 2 The applicability of the small scale methodology adopted for the project activity has been discussed in the PDD. However the following needs to be addressed; <ul style="list-style-type: none"> Demonstration of the generation capacity is below 15 MW needs to be done. Supporting documents to the claim on technology need to be provided for verification 	A.3.2, B.1.2	The purchase order specification of the turbines is furnished to support the claim that the project activity is less than 15 MW capacity and hence eligible to use simplified modalities and procedures applicable small scale projects. The technology used in the project activity is the one that is being used by all the hydro projects. The order placed for electro mechanical equipment is enclosed for DOE verification.	OK. The purchase order placed on M/s. Boving Fouress Limited is for 3 no.s of 4.33 MW each with the total capacity being 13 MW, which justifies that the project comes under small scale methodologies. CL 2 is closed.
CL 3 The additionality of the project has been demonstrated using Investment Barrier and other barriers like institutional barrier and Transmission risks. But the following needs to be clearly addressed: <ul style="list-style-type: none"> Benchmark adopted for the project activity lacks clarity and the same needs to be demonstrated in line with the comment made during EB 40 on Renewable energy projects in India. Excel sheet of the financial calculation for 	Table 1, B.3.1, B.3.2, B.3.3, B.3.4	Taking into consideration the latest guidelines of EB 40 on benchmark, the revised calculations for benchmark are furnished. Soft copy of Excel sheet of the financial calculations is enclosed Supporting documents viz., DPR, PPA, term loan sanction letters are enclosed.	OK. PP has selected the benchmark of bond rate escalated by the country risk premium, which is as per the additionality tool. Excel worksheet of financial analysis has been provided for verification. The supporting documents such as PPA, DPR etc. for the various parameters used for the financial analysis have also been provided for verification.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>the project activity needs to be provided and same needs to be demonstrated in line with the recent guideline on financial calculations.</p> <ul style="list-style-type: none"> ▪ Supporting documents for the values assigned in the financial calculations needs to be provided. ▪ Supporting documents for justifying that the clause of handing over the property to state government at the end of 30 years has been considered while making the decision to invest in the project. ▪ Detailed Project Report (DPR) and PPA needs to be provided for verification. ▪ Justification and demonstration required in terms that how the hydrology will act as a barrier. Has the institutional barrier been reflected in the investment calculations? How does this impact the project activity? 		<p>Agreement executed with Govt. Of Karnataka having a clause to handover the property at the end of 30 years, is enclosed.</p> <p>DPR and PPA enclosed</p> <p>PP has decided to demonstrate the additionality with benchmark analysis and remove other barriers for arguing the additionality.</p>	<p>The agreement with the government allotting the project to Sagar Power states that the project site will vest with the government after 30 years.</p> <p>PP had updated the additionality section of the PDD to demonstrate the additionality using benchmark analysis. The other barriers described in the web hosted PDD have been deleted.</p> <p>CL 3 is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL 4 Emission reduction calculation excel sheet to be provided for verification	Table 1, B.4.1-B.4.3, B.5.1-B.5.3, B.7.1	Emission reduction calculation sheet in Excel is enclosed	OK. PP has provided spreadsheet for the ER calculations. CL 4 is closed.
CL 5 The monitoring methodology adopted for the project is appropriate. However the Monitoring plans lacks clarity on the following: <ul style="list-style-type: none"> ▪ The measurement accuracy needs to be addressed in the PDD. ▪ Procedures to deal with erroneous measurements. ▪ Calibration frequency. ▪ Clarity on industrial standards needs to be demonstrated. 	B.9.5, B.9.8, B.10.5, B.10.8	Measurement accuracy is incorporated in the PDD Procedures to deal with erroneous measurements are incorporated in the PDD. Calibration frequency is incorporated There are prescribed standards for measurement of the energy and monitoring. The prescribed standards are enclosed.	OK. PDD is revised incorporating accuracy class of electricity meters as 0.2 class, calibration frequency and procedure to deal with erroneous measurements. CL 5 is closed.
CL 6 The starting date of the project activity lacks clarity and is prior to the starting of the validation process. Hence the following needs to be clearly addressed and demonstrated: <ul style="list-style-type: none"> ▪ Proofs on consideration of incentives from CDM at the time conceptualising the project are to be provided for verification. ▪ Evidences regarding the start date are to be provided for verification. 	C.1.1, C.1.2	The Minutes of the board of directors Meeting held on 24-05-2005 considering CDM revenue is enclosed. The start date of the project chosen is revised to 1 June 2005, the date of issue of work orders for civil works. Copy of the work order is enclosed. Chronological order of events enclosed The start date of crediting period is now revised to 1 June 2010	OK. PP has provided copies of minutes of Board meeting and purchase order for electro mechanical equipment for verification. In the revised PDD, chronological order of events is provided under section B.5. The project start date is revised to 1

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<ul style="list-style-type: none"> Chronological order of events from the start date till their approach to DOE needs to be prepared and submitted. The date for start of the crediting period needs to be changed. 			<p>June 2005 and the start date of crediting period to 1 June 2010 in the revised PDD.</p> <p>CL 6 is closed.</p>
<p>CL 7 The legal and regulatory approvals are to be provided for verification.</p>	<p>B.3.1, B.3.2, B.3.3, D.1.2, D.1.6</p>	<p>All the clearances / approvals are enclosed</p>	<p>OK. Clearances from pollution control board, forest department and irrigation department have been evidenced. CL 7 is closed.</p>
<p>CL 8 Details and the documents of the local stakeholder consultation process to be provided for validation.</p>	<p>Table 1, E.1.1, E.1.2</p>	<p>The minutes of the stakeholder meeting is enclosed</p>	<p>OK. Copy of the minutes of stakeholder consultation provided. CL 8 is closed.</p>

APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Vidyacharan Astakala

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-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	Jul 2009	Jul 2009			
N ₂ O					
HFCs					
Flare reduction					
PFCs					
Charcoal					
CO ₂ recovery					
Transport					
Non-renewable biomass					Aug 2009
Biofuel					
Pipeline leakage reduction					
SF ₆					

Høvik, 24 August 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)

<i>GHG Auditor:</i>	Yes				
<i>Technical Area</i>	<i>CDM Validator</i>	<i>CDM Verifier</i>	<i>Sector Expert</i>	<i>Methodology Expert</i>	<i>Technical Reviewer</i>
<i>Landfill gas</i>	Jan 2009	Jan 2009	Jan 2009		
<i>Hydro power</i>	Jan 2009	Jan 2009			
<i>Renewables</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Wind power</i>	Jan 2009	Jan 2009			
<i>Other renewable</i>	Jan 2009	Jan 2009			
<i>Biomass</i>	Jan 2009	Jan 2009			
<i>Grid connection of isolated system</i>	Jan 2009	Jan 2009			
<i>Cement</i>	Jan 2009	Jan 2009			
<i>Waste-heat / waste-gas recovery</i>	Jan 2009	Jan 2009			
<i>Efficiency of thermal power plants</i>	Jan 2009	Jan 2009			
<i>Coal mine methane</i>	Jan 2009	Jan 2009			
<i>Fuel switch</i>	Jan 2009	Jan 2009			
<i>Manure management</i>	Jan 2009	Jan 2009			
<i>Waste / wastewater treatment</i>	Jan 2009	Jan 2009	Jan 2009		
<i>Energy efficiency</i>	Jan 2009	Jan 2009			
<i>N₂O</i>	Jan 2009	Jan 2009			
<i>HFCs</i>	Jan 2009	Jan 2009			
<i>Flare reduction</i>	Jan 2009	Jan 2009			
<i>PFCs</i>	Jan 2009	Jan 2009			
<i>Charcoal</i>	Jan 2009	Jan 2009			
<i>CO₂ recovery</i>	Jan 2009	Jan 2009			
<i>Transport</i>	Jan 2009	Jan 2009			
<i>Non-renewable biomass</i>	Jan 2009	Jan 2009			
<i>Biofuel</i>	Jan 2009	Jan 2009			
<i>Pipeline leakage reduction</i>	Jan 2009	Jan 2009			
<i>SF₆</i>	Jan 2009	Jan 2009			

Høvik, 9 January 2009

Michael Lehmann

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CERTIFICATE OF COMPETENCE

Ravi Kumar Prabhu

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

<i>GHG Auditor:</i>	<i>Yes</i>				
<i>Technical Area</i>	<i>CDM Validator</i>	<i>CDM Verifier</i>	<i>Sector Expert</i>	<i>Methodology Expert</i>	<i>Technical Reviewer</i>
<i>Landfill gas</i>					
<i>Hydro power</i>					
<i>Renewables Wind power</i>					
<i>Other renewable</i>					
<i>Biomass</i>					
<i>Grid connection of isolated system</i>					
<i>Cement</i>					
<i>Waste-heat / waste-gas recovery</i>					
<i>Efficiency of thermal power plants</i>					
<i>Coal mine methane</i>					
<i>Fuel switch</i>					
<i>Manure management</i>					
<i>Waste / wastewater treatment</i>					
<i>Energy efficiency</i>					
<i>N₂O</i>					
<i>HFCs</i>					
<i>Flare reduction</i>					
<i>PFCs</i>					
<i>Charcoal</i>					
<i>CO₂ recovery</i>					
<i>Transport</i>					
<i>Non-renewable biomass</i>					
<i>Biofuel</i>					
<i>Pipeline leakage reduction</i>					
<i>SF₆</i>					

Høvik, 1 December 2008

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CERTIFICATE OF COMPETENCE

Shivraj Sharma

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

<i>GHG Auditor:</i>	Yes				
<i>Technical Area</i>	<i>CDM Validator</i>	<i>CDM Verifier</i>	<i>Sector Expert</i>	<i>Methodology Expert</i>	<i>Technical Reviewer</i>
<i>Landfill gas</i>					
<i>Hydro power</i>					
<i>Renewables Wind power</i>					
<i>Other renewable</i>					
<i>Biomass</i>					
<i>Grid connection of isolated system</i>					
<i>Cement</i>					
<i>Waste-heat / waste-gas recovery</i>					
<i>Efficiency of thermal power plants</i>					
<i>Coal mine methane</i>					
<i>Fuel switch</i>					
<i>Manure management</i>					
<i>Waste / wastewater treatment</i>					
<i>Energy efficiency</i>					
<i>N₂O</i>					
<i>HFCs</i>					
<i>Flare reduction</i>					
<i>PFCs</i>					
<i>Charcoal</i>					
<i>CO₂ recovery</i>					
<i>Transport</i>					
<i>Non-renewable biomass</i>					
<i>Biofuel</i>					
<i>Pipeline leakage reduction</i>					
<i>SF₆</i>					

Høvik, 9 January 2009

Michael Lehmann

Michael Lehmann

Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Anjana Sharma

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJi-i1)

<i>GHG Auditor:</i>	Yes				
<i>Technical Area</i>	<i>CDM Validator</i>	<i>CDM Verifier</i>	<i>Sector Expert</i>	<i>Methodology Expert</i>	<i>Technical Reviewer</i>
<i>Landfill gas</i>				Jan 2009	Jan 2009
<i>Renewables</i>					
<i>Hydro power</i>	Jan 2009				
<i>Wind power</i>				Jan 2009	Jan 2009
<i>Other renewable</i>					
<i>Biomass</i>					
<i>Grid connection of isolated system</i>					
<i>Cement</i>					
<i>Waste-heat / waste-gas recovery</i>					
<i>Efficiency of thermal power plants</i>					
<i>Coal mine methane</i>					
<i>Fuel switch</i>					
<i>Manure management</i>					
<i>Waste / wastewater treatment</i>					
<i>Energy efficiency</i>					
<i>N₂O</i>					
<i>HFCs</i>					
<i>Flare reduction</i>					
<i>PFCs</i>					
<i>Charcoal</i>					
<i>CO₂ recovery</i>					
<i>Transport</i>					
<i>Non-renewable biomass</i>					
<i>Biofuel</i>					
<i>Pipeline leakage reduction</i>					
<i>SF₆</i>					

Høvik, 9 January 2009

Michael Lehmann

Michael Lehmann

Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Peng Huang

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJi-i1)

<i>GHG Auditor:</i>	Yes				
<i>Technical Area</i>	<i>CDM Validator</i>	<i>CDM Verifier</i>	<i>Sector Expert</i>	<i>Methodology Expert</i>	<i>Technical Reviewer</i>
<i>Landfill gas</i>					
<i>Renewables</i> <i>Hydro power</i>	Jan 2009	Jan 2009			
<i>Wind power</i>	Mar 2009	Jan 2009			
<i>Other renewable</i>		Sept 2009			
<i>Biomass</i>					
<i>Grid connection of isolated system</i>		Sept 2009			
<i>Cement</i>					
<i>Waste-heat / waste-gas recovery</i>					
<i>Efficiency of thermal power plants</i>					
<i>Coal mine methane</i>					
<i>Fuel switch</i>					
<i>Manure management</i>					
<i>Waste / wastewater treatment</i>					
<i>Energy efficiency</i>					
<i>N₂O</i>					
<i>HFCs</i>					
<i>Flare reduction</i>					
<i>PFCs</i>					
<i>Charcoal</i>					
<i>CO₂ recovery</i>					
<i>Transport</i>					
<i>Non-renewable biomass</i>					
<i>Biofuel</i>					
<i>Pipeline leakage reduction</i>					
<i>SF₆</i>					

Høvik, 1 September 2009

Michael Lehmann

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