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# VERIFICATION / CERTIFICATION REPORT

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## 6 MW RENEWABLE ENERGY PROJECT FOR A GRID SYSTEM BY IND-BARATH ENERGIES LIMITED IN INDIA

(CDM REGISTRATION REFERENCE NO: 0970)

MONITORING PERIOD:  
25 MARCH 2008 TO 24 MARCH 2009

REPORT No. 2009-0333

REVISION No. 01

DET NORSKE VERITAS



## VERIFICATION / CERTIFICATION REPORT

Date of first issue: 20 November 2009	Project No.: <b>PRJC-182677-2009-CCS-IND</b>
Approved by: Kakaraparthi Venkata Raman	Organisational unit: Climate Change Services
Client: Ind-Barath Energies Limited	Client ref.: D.Madhusudana Reddy Director

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### Summary:

Det Norske Veritas Certification AS (DNV) has performed the verification of the emission reductions reported for the “6 MW renewable energy project for a grid system by Ind-Barath Energies Limited” in India (UNFCCC Registration Ref. No. 0970) for the period 25 March 2008 to 24 March 2009.

In our opinion, the GHG emission reductions reported for the project in the revised monitoring report (Version 02) of 10 February 2010 are fairly stated.

The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology AMS-I.D (version 10) and the monitoring plan contained in the Project Design Document of 20 February 2007.

Hence, DNV is able to certify that the emission reductions from the “6 MW renewable energy project for a grid system by Ind-Barath Energies Limited” during the period 25 March 2008 to 24 March 2009 amount to 17 663 tCO<sub>2</sub> equivalent.

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Report title: 6 MW renewable energy project for a grid system by Ind-Barath Energies Limited in India			
Work carried out by: Astakala Vidyacharan			
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***Abbreviations***

APTRANSCO	Transmission Corporation of Andhra Pradesh Limited
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CEF	Carbon Emission Factor
CER	Certified Emission Reduction(s)
CH <sub>4</sub>	Methane
CO <sub>2</sub>	Carbon dioxide
CO <sub>2e</sub>	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
DOE	Designated Operational Entity
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IBEL	Ind-Barath Energies Limited
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MNES	Ministry of Non-conventional Energy Sources
NEDCAP	The Non-Conventional Energy Development Corporation of Andhra Pradesh
N <sub>2</sub> O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
SCCL	Singareni Coal Collieries Limited
UNFCCC	United Nations Framework Convention for Climate Change



## 1 INTRODUCTION

Ind-Barath Energies Limited (IBEL) has commissioned Det Norske Veritas Certification AS (DNV) to carry out the verification and certification of emission reductions reported for the “6 MW renewable energy project for a grid system by Ind-Barath Energies Limited” in India (the project) in the period 25 March 2008 to 24 March 2009. This report contains the findings from the verification and a certification statement for the certified emission reductions.

### 1.1 Objective

Verification is the periodic independent review and *ex post* determination by a Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the registered CDM project activity during a defined verification period.

Certification is the written assurance by a DOE that, during a specific period in time, a project activity achieved the emission reductions as verified.

The objective of this verification was to verify and certify emission reductions reported for the “6 MW renewable energy project for a grid system by Ind-Barath Energies Limited” for the period 25 March 2008 to 24 March 2009.

### 1.2 Scope

The scope of the verification is:

- To verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan.
- To evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement.
- To verify that reported GHG emission data is sufficiently supported by evidence.

The verification shall ensure that reported emission reductions are complete and accurate in order to be certified.

### 1.3 Description of the Project Activity

The project is a 6 MW (gross) capacity grid-connected biomass based power project located at Miryalaguda, Nalgonda district, Andhra Pradesh state in India. The project synchronised to connected grid in September 2000 and was operational continuously from October 2000. The project utilises the available biomass in the region, such as rice husk, groundnut shell etc. to generate electricity for sale to the state electricity board and to third parties using the Andhra Pradesh grid transmission lines. The project also uses coal as support fuel along with the renewable biomass. It uses a condensing type steam generator with a matching boiler of travelling grate technology capable of firing multiple fuels. The technology used in the project is indigenous.

The project activity results in the reduction of GHG emissions through displacement of fossil fuel based southern region grid power by the biomass based renewable power.



Project Parties:	India, United Kingdom of Great Britain and Northern Ireland
Title of project activity:	6 MW renewable energy project for a grid system by Ind-Barath Energies Limited
UNFCCC registration No:	0970.
Baseline and monitoring methodology	AMS-I.D (version 10)
Project Entity:	Ind-Barath Energies Limited and Noble Carbon Credits Limited
Location of the project activity:	Miryalaguda, Nalgonda district, Andhra Pradesh state, India
Project's crediting period:	01 October 2000 to 30 September 2010
Period verified in this verification:	25 March 2008 to 24 March 2009

## 1.4 Methodology for Determining Emission Reductions

According to AMS-I.D (version 10), the project's emission reductions are determined as the product of the net electricity generated by the project in a year and the grid emission factor calculated as the weighted average of the current generation mix, determined ex-post for the southern regional grid. According to the validated project design, no leakage effects are associated with the project activity.

## 2 METHODOLOGY

The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project. These include:

- Electricity generation - net electricity exported to grid and auxiliary consumptions recorded on a monthly basis;
- Biomass fuel used (recorded on a daily basis);
- Project emissions due to usage of coal as a support fuel (recorded on a daily basis);
- Southern grid emission factor calculated as weighted average of current generation mix – monitored annually.

**Verification team****Type of involvement**

<b>Role/Qualification</b>	<b>Last Name</b>	<b>First Name</b>	<b>Country</b>	Desk review	Site visit	Reporting	Supervision of work	Technical review	Expert input
Project Manager/CDM verifier / Technical team leader	Astakala	Vidyacharan	India	√	√	√	√		
Sectoral Working knowledge	Astakala	Vidyacharan	India						√
Methodology expert	Astakala	Vidyacharan	India						√
Technical reviewer (applicant)	Leiroz	Andrea	Brazil					√	
Technical Reviewer	Kakaraparthi	Venkata Raman	India	√				√	

**Duration of verification**

Preparations: *From 10 October 2009 to 20 October 2009*

On-site verification: *From 21 October 2009*

Reporting, calculation checks and QA/QC: *From 01 February 2010 to 22 April 2010*

**2.1 Review of Documentation**

The monitoring report (webhosted version 01 dated 18 September 2009 and version 02 dated 10 February 2010) and the emission reduction calculations / 1/, provided in the form of spreadsheets submitted by Ind-Barath Energies Limited, were assessed as a part of the verification. In addition, the Project Design Document / 2/, the monitoring plan contained in the registered PDD as well as the project's validation report /3/ were also assessed. Other relevant documents were also assessed as evidence / 6/-/ 18/.

**2.2 Site Visits**

On 21 October 2009, DNV carried out a site visit at Ind-Barath Energies Limited. During the site visit, DNV verified the actual operation of the project as described in the registered PDD. The instruments used for monitoring electricity and biomass fuels were checked, including the calibration records for these instruments and these were found to be in order.



Interviewed organisation	Interview topics
Ind-Barath Energies Limited	<ul style="list-style-type: none"> <li>➤ Whether the project has been implemented as planned</li> <li>➤ Calculation of ex-post baseline emission factor</li> <li>➤ Adherence to monitoring plan established in registered Project Design Document.</li> <li>➤ Management procedures like internal audits and reviews to minimise uncertainties in data monitoring and data management</li> <li>➤ Project performance</li> <li>➤ Resources, training needs and procedures for operation and maintenance.</li> </ul>

The data presented in the monitoring report were assessed in detail through a review of the detailed project documentation and production records, interviews with personnel at Ind-Barath Energies Limited, collection of measurements, observation of established monitoring and reporting practices and assessment of the reliability of monitoring equipment. This has enabled the verification team to assess the accuracy and completeness of the reported monitoring results and verify the correct application of the approved monitoring methodology. Data from other sources include the grid emission factor, which is based on CEA data, was calculated ex-post for the period, have been verified and assessed.

## 2.3 Reporting of Findings

A corrective action request (CAR) is issued, where:

- i. Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
- ii. Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;
- iii. Issues identified in a FAR during validation to be verified during verification have not been resolved by the project participants.

A clarification request (CL) shall be raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A forward action request (FAR) is issued for actions if the monitoring and reporting require attention and/or adjustment for the next verification period.

During this verification, two CARs have been identified. These CARs were satisfactorily addressed by Ind-Barath Energies Limited by revising the monitoring report. No forward action requests were identified (refer to Appendix A).





### 3 VERIFICATION FINDINGS

This section summarises the findings from the verification of the emission reductions reported for the “6 MW renewable energy project for a grid system by Ind-Barath Energies Limited” for the period 25 March 2008 to 24 March 2009.

#### 3.1 Remaining Issues, CARs, FARs from Previous Validation or Verification

According to the validation report / 3/, no CAR, FAR or CL's were required to be closed out during verification. Also there were no issues pending to be resolved from previous verifications. This has been confirmed by DNV.

#### 3.2 Project Implementation

The project was commissioned in October 2000. The project boundary and all key equipment are in line with the registered PDD. The project boundary covers source of biomass supply, electricity generation and the southern regional grid to which the generated electricity is exported. The following equipment is operational as mentioned in the PDD:

- 6 MW gross capacity steam turbine;
- Travelling grate technology type boiler (capacity 35 t/hr steam at 45 kg/cm<sup>2</sup> and 455<sup>0</sup>C temperature);
- Ash handling system for effective disposal of fly ash;
- Demineralised water plant for boiler feed water supply;
- Electro static precipitator;
- Energy meters for monitoring electricity.

The project has all statutory clearances like consent for establishment, valid consents for operation including air and water consents from the pollution control board, and clearance from NEDCAP a nodal agency for MNES for monitoring of renewable energy power projects. These facts have been verified by DNV during the site visit. In addition the verification of air and effluent reports confirm that relevant pollution parameters as specified in the consents are within the specified limits.

#### 3.3 Completeness of Monitoring

The approved baseline methodology AMS-I.D (version 10) / 6/ has been applied for the project activity. As required by the monitoring methodology, monitoring of parameters essentially comprises:

- Electricity generation - net electricity exported to grid and auxiliary consumptions;
- Each type of biomass fuel used and the net calorific values;
- Project emissions due to usage of coal as a support fuel;



- Southern grid emission factor calculated as weighted average of current generation mix.

In accordance with AMS-I.D, the baseline for the project activity has been calculated ex-post every year by determining the CO<sub>2</sub> emissions from the electricity generation from the southern regional grid using the weighted average of current generation mix approach. Accordingly, the emission factor the year 2007-08 has been sourced as 722.28 tCO<sub>2</sub>/GWh from the official website of Central Electricity Authority of India / 17/, which is the authentic data source available in India. As there was no official data available for the year 2008-09 at the time when the monitoring report was web hosted, the emission factor of year 2007-08, had been considered while estimating the baseline emissions. However, the data for year 2008-09 was published by Central Electricity Authority of India on their website during the course of verification / 17/ and the value was observed to be 749.23 tCO<sub>2</sub>/GWh. The Project Proponent has decided to use value of 722.28 tCO<sub>2</sub>/GWh which was available during the initial webhosting of monitoring report in the emission reduction calculations in order to be more conservative in estimation of emission reductions. This has been accepted.

Based on the validated emission factor and electricity generation, the emission reductions have been verified to be 17 663 tCO<sub>2</sub> equivalent for the period 25 March 2008 to 24 March 2009.

**Biomass** fuels rice husk, ground nut shells, Julieflora twigs and other agricultural residues up to an extent of 50 382 tonnes / 14/ have been consumed for the purpose of electricity generation. The biomass consumption data is recorded on a daily basis in the plant records. The receipt of biomass at plant premises is measured on each truck basis and reported in the form of weigh bridge slips and aggregated to daily records.

**The calorific values** of the various biomass fuels being used are measured in the laboratory on daily basis and externally on quarterly basis, for monitoring plant operational performance periodically/ 19/.

Electricity generated and auxiliary consumptions have been logged based on the readings taken from the energy meters in the plant control room. Auxiliary power consumption has also been reported as a difference of gross generation and net power exported in-order to ensure that transmission and transformer losses are also accounted. The power export/import readings are recorded on monthly basis from externally installed main/check meters (class 0.2) / 10/ jointly by APTRANSCO officials and the plant representatives. These meters are annually calibrated by APTRANSCO authorities and the joint meter reading certificates form the basis for estimation the net power exported to grid and used in calculation of baseline emissions.

Main meter/check meters were removed on 30 October 2008 for calibration and new calibrated (temporary) meters were installed for three days by APTRANSCO authorities. Old meters were re-installed after calibration on 3 November 2008. 13 392 units were added as units exported during calibration period by APTRANSCO authorities during removal and installation of meters for calibration that was recorded by the temporary meter. This figure was cross verified from calibration reports / 10/ from Central Power Distribution Company of AP limited. A gap of 5 months was observed in-between the calibrations of the main meter. In accordance with EB52 Annex 60 guidelines, emission reductions have been adjusted for the delayed calibration period. in response to the CAR-2 raised.



Parameter No.1	Assessment/ Observation
Data/Parameter: (as in monitoring plan of PDD):	Gross Electricity Generation
Measuring frequency:	Continuous
Reporting frequency:	Hourly recorded in log sheets and updated daily into daily production reports and aggregated to monthly figures.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes/No)	Yes.
Type of monitoring equipment:	Electricity Meter
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	PDD does not specify the accuracy of meters used. Meter is of 0.5 class accuracy which represents a good practice in the industry for a gross generation meter.
Calibration frequency /interval:	Annually
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	PDD does not specify the calibration frequency; however the selected annual frequency represents good practice.
Company performing the calibration:	Chandra Electricals, Hyderabad
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes.
Is(are) calibration(s) valid for the whole reporting period?	Yes. Calibration dates are: 1) 17 May 2007 2) 10 May 2008.
If applicable, has the reported data been cross-checked with other available data?	Yes.
How were the values in the monitoring report verified?	From the operational logs (Turbine Log, electrical shift log books).
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. Daily and monthly reports are monitored on regular basis by the project Management. CDM team is responsible for data monitoring and management.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable



Parameter No.2	Assessment/ Observation
Data/Parameter: (as in monitoring plan of PDD):	Export/Import electricity
Measuring frequency:	Continuous
Reporting frequency:	Daily recorded in production reports and monthly in Joint Meter Reading (JMR) certificates
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes/No)	Yes.
Type of monitoring equipment:	Tri-vector electricity Meter
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Yes. The monitoring equipment is of 0.2s class accuracy which is in line with PDD.
Calibration frequency /interval:	Annually
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	Yes and the selected annual frequency represent good practice.
Company performing the calibration:	Central Power Distribution Company of AP Ltd
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes.
Is(are) calibration(s) valid for the whole reporting period?	No. There is gap of more than 5 months for calibration after expiry of earlier calibration. Calibration dates are: Dated 1) 8 May 2007 2) 30 October 2008. In accordance with EB52 Annex 60 CERs have been adjusted for the delayed calibration period in response to CAR-2
If applicable, has the reported data been cross-checked with other available data?	Yes.
How were the values in the monitoring report verified?	From the Joint Meter Reading Certificates signed jointly by APTRANSCO authorities and Plant representatives.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. Daily and monthly reports are monitored on regular basis by the project Management. CDM team is responsible for data monitoring and management.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in	Not applicable.



accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	
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Parameter No.3	Assessment/ Observation
Data/Parameter: (as in monitoring plan of PDD):	Auxiliary electricity
Measuring frequency:	Continuous
Reporting frequency:	Daily
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes/No)	Yes
Type of monitoring equipment:	Electricity Meter
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	PDD does not specify the accuracy of meters used. Meter is of 0.5 class accuracy which represents a good practice in the industry.
Calibration frequency /interval:	Annually
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	PDD does not specify the calibration frequency, however the selected annual frequency represents good practice.
Company performing the calibration:	TVL Electricals-Vijayawada
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes.
Is(are) calibration(s) valid for the whole reporting period?	Yes. Calibration dates are: 1) 1) 17 May 2007 2) 10 May 2008
If applicable, has the reported data been cross-checked with other available data?	Yes.
How were the values in the monitoring report verified?	From the operational logs (Turbine Log, electrical shift log books).
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. Daily and monthly reports are monitored on regular basis by the project Management. CDM team is responsible for data monitoring and management.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a	Not applicable



request for deviation been approved?	
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Parameter No.4	Assessment/ Observation
Data/Parameter: (as in monitoring plan of PDD):	Fuel consumption
Measuring frequency:	Each incoming load
Reporting frequency:	Daily
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes/No)	Yes
Type of monitoring equipment:	30 t Weighbridge
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	PDD does not specify the accuracy however the weighbridge is of +/-5 kg accuracy which represents a good practice in the industry.
Calibration frequency /interval:	Annually
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	PDD does not specify the calibration frequency, however the selected annual frequency represents good practice.
Company performing the calibration:	Office of Controller of Legal metrology.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes.
Is(are) calibration(s) valid for the whole reporting period?	Yes. Calibration dates are: 1) 11 July 2007 2) 11 July 2008
If applicable, has the reported data been cross-checked with other available data?	Yes.
How were the values in the monitoring report verified?	From the operational logs (fuel receipts, purchase records, weighbridge slips).
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. Daily and monthly reports are monitored on regular basis by the project Management. CDM team is responsible for data monitoring and management.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable



It has been verified that each type of biomass used is being monitored separately. During the monitoring period the project has consumed various types of renewable biomass to an extent of 50 382 tonnes. Consumption data has been verified from the daily boiler log records / 14/ & / 16/ and the weighbridge records where the daily receipts are logged.

An annual assessment on surplus biomass availability / 15/ has been conducted by an independent consultant T. Narayana Rao consultants, appointed by the project proponent and presented for verification of DOE. The assessment is based on most recent data available for the Nalgonda region, where the project activity is located. According to the assessment, it has been confirmed that there is surplus biomass available in the region. Assessment mainly covers the various sources of biomass generation, mainly agro-industries available in the region and crop patterns in the area to estimate the total biomass generated for the estimated years 2008-09. The biomass consumption including the consumption in the project activity is considered while arriving at surplus biomass availability estimations. Based on this it has been demonstrated that there is up to 51.8% of surplus availability of biomass in the region against the overall consumption including the project consumption in the region.

The project activity has consumed 7798.7 t of coal as support fuel; hence emissions due to usage of coal have been deducted as project emissions. Since the only source of coal for the project activity is from the Singareni Collieries, the supplier's data on calorific value has been used for the estimations of project emissions due to coal used.

It has been observed that the emission reductions verified for the chosen verification period are lower than the ex-ante estimated CERs as per the registered PDD. The lower emission reductions reported are mainly attributed to the lower plant load factor of 84%, than estimated load factor of 90% in the PDD. The reason is also for the fact that the grid emission factor applied for the current verification period is lower than the value assumed in the PDD.

This is further explained in a table form below.

25 March'08-24 March'09	Baseline Emissions (tCO <sub>2</sub> )	Project Emissions (tCO <sub>2</sub> )	Net Reductions (tCO <sub>2</sub> )
As per PDD	31 468	12 402	19 066
As per the Initial Webhosted MR	27 700	10 006	17 694
As per revised MR	27 669	10 006	17 663

The parameters reported, including source, frequency and review criteria as indicated in the monitoring plan were verified to be correct and in line with the validated monitoring plan of the PDD. Necessary management system procedures including responsibility and authority of monitoring activities have been verified to be consistent with the PDD. Knowledge of personnel associated with the project activity was also found to be satisfactory.





### 3.4 Accuracy of Emission Reduction Calculations

No significant reporting risks have been identified for the data reported, except for the CAR raised during the verification as summarized in Appendix A. All the data required for emission reduction calculations are manually recorded in log sheets like turbine log, boiler log and electrical log once in each shift i.e., after every 8 hours. These are then transferred to spread sheets for emission reduction calculations. Fuel consumption particulars such as biomass type, quantity and source are maintained at their point of entry and recorded in these log books. These have been verified by DNV. Energy balance is made to ensure the right efficiency of operation. All other data are culled out either from the log books or daily power generation and fuel consumption reports. The biomass consumption data is recorded on a daily basis. The log books also have the provision of recording coal consumption data. The responsibility of ensuring that there is no data misstatement is with the general manager of the plant, subsequently the verified reports are sent to head office for management reference. Periodical internal audits are carried out by the CDM team from head office to ensure the transparency and accuracy of the data being monitored and recorded.

It has been noticed that for two months in the verification period, the gross electricity generated has crossed the rated capacity marginally by 0.3%. It has been considered acceptable as the turbine is designed technically for an overload of up to 10%. The operation and maintenance manual of turbine / 18/ confirming this been provided and verified by DNV. A comparison has been incorporated in the monitoring report by project proponent.

The analysis of fuel being consumed is carried out in internal laboratories on daily basis / 19/ when ever there is a change in source of fuel. Calorific value of the coal consumed is monitored through the data provided by the M/s. Singareni Collieries, the only source of coal and used for estimation of project emissions due to coal used. The calorific values of other relevant biomass consumed are monitored and verified against the electricity generation for efficiency.

The calibration of monitoring equipments is being maintained and same has been verified by DNV. Quantity of biomass received is weighed twice during entry and exit on duly calibrated and checked weigh bridges and subjected to quality check and rejection criteria of Ind-Barath Energies Limited. Daily power generation data (including total power and auxiliary power) is monitored and recorded from duly calibrated energy meters, and APTRANSCO officials monitor the export/import power meters on monthly basis. The auxiliary meter and other internal meters are calibrated on annual basis through an external party and the main energy meter and check meter (of class 0.2 accuracy) which are under control of APTRANSCO are tested periodically and calibrated annually as per procedures defined in the power purchase agreement by the electricity board. The calibration certificates of the instruments used for data monitoring and recording were also verified during the site visit. All the power generation, fuel receipt and consumption data are maintained daily in electronic as well as hard print form, and have been assessed for correctness.

### 3.5 Quality of Evidence to Determine Emission Reductions

The emission reductions reported during 25 March 2008 to 24 March 2009 was verified to be 17 663 tCO<sub>2</sub>e.

Sufficient evidence was presented for the reported net emission reductions.





### 3.6 Management System and Quality Assurance

Ind-Barath Energies Limited has established management procedures and implemented the same effectively to ensure that the process is consistent. The procedures cover management responsibilities, data monitoring procedures, training procedures, periodical internal audits, management reviews and corrective actions in case of any deviations effectively. Calibration process is followed as per defined procedures and carried out annually and the calibration certificates of the instruments used for data monitoring and recording were also verified during the site visit.



#### 4 CERTIFICATION STATEMENT

Det Norske Veritas Certification AS (DNV) has performed the verification of the emission reductions that have been reported for the “6 MW renewable energy project for a grid system by Ind-Barath Energies Limited” (UNFCCC Registration Reference No. 0970) for the period 25 March 2008 to 24 March 2009.

The project participants are responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project.

It is DNV’s responsibility to express an independent verification statement on the reported GHG emission reductions from the project.

DNV conducted the verification on the basis of the monitoring methodology AMS-I.D (version 10), the monitoring plan contained in the registered Project Design Document of 20 February 2007 and the monitoring report (Version 02) dated 10 February 2010. The verification included i) checking whether the provisions of the monitoring methodology and the monitoring plan were consistently and appropriately applied and ii) the collection of evidence supporting the reported data.

DNV’s verification approach draws on an understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. DNV planned and performed the verification by obtaining evidence and other information and explanations that DNV considers necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

In our opinion the GHG emissions reductions of the “6 MW renewable energy project for a grid system by Ind-Barath Energies Limited” (UNFCCC Registration Ref. No. 0970) for the period 25 March 2008 to 24 March 2009 are fairly stated in the monitoring report (Version 02) dated 10 February 2010.

The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology AMS-I.D (version 10) and the monitoring plan contained in the registered PDD of 20 February 2007.

Det Norske Veritas Certification AS is able to certify that the emission reductions from the “6 MW renewable energy project for a grid system by Ind-Barath Energies Limited” during the period 25 March 2008 to 24 March 2009 amount to 17 663 tonnes of CO<sub>2</sub> equivalent.

Hyderabad and Oslo, 22 April 2010

Astakala Vidyacharan  
Project Manager/CDM Verifier  
DNV Hyderabad, India

Kakaraparthi Venkata Raman  
Technical Manager, South Asia,  
Det Norske Veritas Certification AS



## 5 REFERENCES

*Documents provided by the Project Participants that relate directly to the GHG components of the project. These have been used as direct sources of evidence for the periodic verification conclusions, and are usually further checked through interviews with key personnel.*

- / 1/ Ind-Barath Energies Limited: “6 MW renewable energy project for a grid system by Ind-Barath Energies Limited” - Monitoring report & CER calculation excel sheet for the monitoring period of 25 March 2008 to 24 March 2009 of version 01 dated 18 September 2009 and version 02 dated 10 February 2010.
- / 2/ Ind-Barath Energies Limited: CDM PDD for “6 MW renewable energy project for a grid system by Ind-Barath Energies Limited”, version 2 of 20 February 2007.
- / 3/ Det Norske Veritas: Validation Report – “6 MW renewable energy project for a grid system by Ind-Barath Energies Limited” DNV Report No. 2006-9065 revision 02 dated 20 February 2007.
- / 4/ Det Norske Veritas: Verification/Certification Report – “6 MW Renewable Energy Project for a Grid System by Ind-Barath Energies Limited” DNV Report No. 2008-2045 revision 01 dated 20 February 2009.

*Background documents related to the design and/or methodologies employed in the design or other reference documents.*

- / 5/ CDM Executive Board: Validation and Verification Manual. Version 01.1
- / 6/ CDM Executive Board: 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 activity categories. AMS-I.D, version 10: 23 December 2006.
- / 7/ Consent for Operation (CFO) from Andhra Pradesh state Pollution Control Board consent Order No: APPCB/PTN/NGL/112/HO/W/2006-856 dated 19.07.2007 valid till 30 September 2009.
- / 8/ Gross generation meter: Calibrated by Chandra Electricals: Meter No. TNB 00540 Dated 1) 17 May 2007 2) 10 May 2008
- / 9/ Auxiliary Meter: TVL Electricals Vijayawada: Meter Number: OF 60328 Dated 1) 17 May 2007 2) 10 May 2008
- / 10/ Export/Import Main Meter: calibrated by Central Power Distribution Company of AP Ltd. Meter No. Main meter: 00034105 MF=1000 dated 1) 8 May 2007 2) 30 October 2008
- / 11/ Letter from IBEL to Central Power Distribution Company for request of calibration dated 4 April 2008 requesting for calibration of Main meter which is due in May 2008
- / 12/ Periodical Stack and ambient air monitoring reports by Global Enviro Labs Hyderabad for the verification period.
- / 13/ Weighbridge calibration: by Office of Controller of Legal metrology dated 1) 11 July 2007 2) 11 July 2008.
- / 14/ Shift Boiler, turbine and electrical log books for the entire verification period
- / 15/ Surplus Biomass assessment Report by Independent Consultant T. Narayana Rao for



- the period of 2008-09
- / 16/ Daily Production log records, maintenance records, internal calibration records, internal audit reports for entire verification period.
  - / 17/ CEA Website link:  
<http://www.cea.nic.in/planning.c%20and%20e.Government%20of%20India%20website.htm>
  - / 18/ Operation and Maintenance Manual of SKODA Turbine
  - / 19/ Fuel analysis records for the entire monitoring period
  - / 20/ [www.scclmines.com](http://www.scclmines.com): official website of Singareni Coal Collieries, India

*Persons interviewed during the initial verification, or persons who contributed with other information that are not included in the documents listed above.*

- |       |                      |   |
|-------|----------------------|---|
| / 21/ | Satyanarayana Pandit | Manager Accounts-head office-IBEL             |
| / 22/ | Venkateswara rao.K   | Deputy General Manager-Technical – IBEL       |
| / 23/ | Surendra babu.M      | Asst general manager-Finance & Accounts- IBEL |
| / 24/ | RLARD Prasad         | Shift Engineer- IBEL                          |
| / 25/ | Chalamareddy.PVS     | AGM-Procurement- IBEL                         |
| / 26/ | K. Satyanarayana     | Boiler Operator- IBEL                         |
| / 27/ | B.Trimurthulu        | Asst.Engineer Electrical- IBEL                |
| / 28/ | B.Venu Bahadur Reddy | Manager – Zenith Energy                       |

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## **APPENDIX A**

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### **CORRECTIVE ACTION REQUESTS, CLARIFICATION REQUESTS AND FORWARD ACTION REQUESTS**

### Corrective action requests

CAR ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants																					
CAR 1	<p>Gross generation details for few months were not inline with plant records and minor variation has been noted due to error in multiplication factor calculations.</p> <table><tr><td></td><td>As reported</td><td>As verified and actual</td></tr><tr><td>25.03.08 to 24.04.08</td><td>3583340</td><td>3583300</td></tr><tr><td>24.07.08 to 24.08.08</td><td>1839260</td><td>1839300</td></tr><tr><td>24.10.08 to 24.11.08</td><td>4233422</td><td>4233400</td></tr><tr><td>24.11.08 to 24.12.08</td><td>4103480</td><td>4103500</td></tr><tr><td>24.12.08 to 24.01.09</td><td>4478710</td><td>4478700</td></tr><tr><td>24.01.09 to 24.02.09</td><td>4127020</td><td>4127000</td></tr></table> <p>The revised Monitoring report should be submitted duly corrected.</p>		As reported	As verified and actual	25.03.08 to 24.04.08	3583340	3583300	24.07.08 to 24.08.08	1839260	1839300	24.10.08 to 24.11.08	4233422	4233400	24.11.08 to 24.12.08	4103480	4103500	24.12.08 to 24.01.09	4478710	4478700	24.01.09 to 24.02.09	4127020	4127000	<p>The revised MR is duly corrected and resubmitted.</p>	<p>The revised Monitoring report has been verified for its corrections and accepted.</p> <p>CAR closed.</p>
	As reported	As verified and actual																						
25.03.08 to 24.04.08	3583340	3583300																						
24.07.08 to 24.08.08	1839260	1839300																						
24.10.08 to 24.11.08	4233422	4233400																						
24.11.08 to 24.12.08	4103480	4103500																						
24.12.08 to 24.01.09	4478710	4478700																						
24.01.09 to 24.02.09	4127020	4127000																						
CAR2	<p>It has been verified that the calibration for the main export meter is deferred by 5 months from the date of expiry of calibration in May 2008 to October 2008. The CERs have to be adjusted for the delayed calibration period to an extent of maximum permissible error as per EB52 Annexure 60.</p>	<p>The Monitoring report has been revised as per the EB52 guidelines as the subsequent calibration of main meter confirm the accuracy of the meter with the permissible limits. Hence CERs are adjusted for the delayed calibration period of 5 months.</p>	<p>The revised Monitoring report duly covers the requirements of EB52-Annexure 60 guidelines for delayed calibration hence CAR is closed.</p> <p>By the addressing of the above CAR and this CAR, the emission reductions reduce by 31 tCO<sub>2</sub>e.</p>																					

### Clarification requests

<b>CAR ID</b>	<b>Corrective action request</b>	<b>Response by Project Participants</b>	<b>DNV's assessment of response by Project Participants</b>
CL 1	No CL was issued.		

### Forward action requests from previous verification

<b>FAR ID</b>	<b>Forward action request</b>	<b>Summary of how FAR has been addressed in this reporting period</b>	<b>Assessment of how FAR has been addressed</b>
FAR 1	No FAR was issued.		

### Forward action requests from this verification

<b>FAR ID</b>	<b>Forward action request</b>	<b>Response by Project Participants</b>	<b>DNV's assessment of response by Project Participants</b>
FAR 1	No FAR has been raised.		