



VERIFICATION REPORT

- VOLUNTARY EMISSION REDUCTION -

IND POWER LIMITED (IPL)

10 MW BIOMASS BASED POWER PROJECT OF
IND POWER LIMITED

VERIFICATION PERIOD
2006-12-13 TO 2007-11-25
(Including both days)

Report No: 53147807- 08/08- V01

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Approved by: Mr. Rainer Winter	Organisational unit: TÜV NORD JI/CDM Certification Program
Client: Ind Power Ltd, India	Client ref.: Mr. Umesh Sharma

Summary:

Project Title: "10 MW biomass based power project of Ind Power Limited"

Project Participant(s): Ind Power Limited

Applied Standard: Voluntary Carbon Standard (version 01)

Monitoring period: 2006-12-13 to 2007-11-25

Type of Verification: Combined (no separate validation) Based on validated PDD

PDD: Registered by CDM EB of UNFCCC (Ref no 1295, version 05 dt. 2006-10-11)

Monitoring report: Draft version 01 dt. 2007-12-18; final version 03 dt. 2008-01-14

Methodological approach: Approved CDM Meth; Combined appr. Meths; Project specific Meth

Applied methodology(s): AMS I.D: "Grid connected renewable electricity generation" (Version 11)

Verification Opinion: The scope of this verification covers the determination of voluntary greenhouse gas emission reductions generated by the above mentioned project. The verification is based on the above mentioned PDD and Monitoring reports, emission reduction calculation spreadsheet and supporting documents made available to the TÜV NORD JI/CDM CP by the project participant.

As a result of the verification, the verifier confirms that:

- The project activity is in line with all applicable criteria of the VCS version 01.
- all operations of the project are implemented and installed as planned and described in the project design document. The monitoring system is in place and functional. The installed equipment essential for generating emission reductions runs reliable and is calibrated appropriately.
- the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner.

TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as below:

Emission reductions:	CO ₂ [t CO ₂]	CH ₄ [t CH ₄]	N ₂ O [t N ₂ O]	HFCs [t HFC]	PFCs [t PFC]	SF ₆ [t SF ₆]	Sum [t CO ₂ e]
2006 (13/12/2006 to 31/12/2006)	2,336	-	-	-	-	-	2,336
2007 (01/01/2007 to 25/11/2007)	32,883	-	-	-	-	-	32,883
TOTAL:	35,219	-	-	-	-	-	35,219

Work carried out by:

**Asim Kumar Jana,
Imran Ustad, Ravi
Shankar, Katja Beyer**

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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CO₂	Carbon dioxide
CO_{2e}	Carbon dioxide equivalent
CR	Clarification Request
ER	Emission Reduction
ESP	Electro Static Precipitator
GHG	Greenhouse gas(es)
ISO	International Standardisation Organisation
IPL	Ind Power Limited
KV	Kilo Volt
MR	Monitoring Report
MP	Monitoring Plan
MW	Megawatt
MWh	Megawatt Hours
PDD	Project Design Document
PP	Project Participant
QA/QC	Quality Assurance / Quality Control
TPA	Tones Per Annum
TPD	Tones Per Day
TG	Turbo Generator
UNFCCC	United Nations Framework Convention on Climate Change
VER	Voluntary Emission Reduction

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1. INTRODUCTION

Ind Power Limited (IPL) has commissioned the TÜV NORD JI/CDM Certification Program (UNFCCC accredited DOE) to carry out the verification of the project: “10 MW biomass based power project of Ind Power Limited” with regard to the relevant requirements for voluntary emission reduction on demand^{/CON/}. The verifiers have reviewed the implementation of the monitoring plan (MP) in the registered CDM project number 1295¹, registered on 2007-11-26 for the crediting period 2007-11-26 to 2016-11-25, ie, without claim of retrospective credits. The applied monitoring methodology is AMS I.D/Version 11 “Grid connected renewable electricity generation”.

GHG data related to voluntary emission reduction for the monitoring period covering 2006-12-13 to 2007-11-25 was verified in detailed manner using set of requirements, audit practices and principles as required under verification criteria.

This report presents the findings and conclusions of the verification assessment of voluntary emission reduction.

1.1. Objective

The purpose of this verification, by independent checking of objective evidence, is as follows:

- to assess the implementation of the monitoring plan (MP) content in the PDD;
- to assess the project’s compliance with other relevant rules, including the host country (India) legislation;
- to verify that the project is implemented as described in the project design document;
- to confirm that the monitoring system is implemented and fully functional to generate voluntary emission reductions (VERs / VCUs²) without any double counting; and
- to establish that the data reported are accurate, complete, consistent, transparent and free of material error or omission by checking the monitoring records and the emissions reduction calculation.

This verification report only addresses the issues of the VCS that have not been so far addressed in the validation report as per CDM requirements.

¹ <http://cdm.unfccc.int/Projects/DB/SGS-UKL1187359571.24/view>

² As per VCS, Verified Emission Reductions (VERs) are considered to be VCUs only after successful registration in an approved VCU Registry.

1.2. Scope

The verification of this registered CDM project is based on the validated project design document ^{/PDD/}, the monitoring report ^{/MR1/, /MR2/}, emission reduction calculation spread sheet ^{/XLS1/, /XLS2/}, supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment. Furthermore publicly available information was considered as far as available and required.

The TÜV NORD JI/CDM CP has, based on the recommendations in the Validation and Verification Manual ^{/VVM/}, employed a risk-based approach in the verification, focusing on the identification of significant risks and reliability of project monitoring and generation of emission reductions.

1.3. GHG Project Description

1.3.1 Project Scope

The considered GHG project can be classified as a VER project in the sector given in Table 1-1 (according to the VCS list of eligible scopes and the list of Sectoral Scopes of the UNFCCC).

Table 1-1: Project Scope(s)

Scope definition	Scope No.	Scope description
VCS	1	Renewable Energy (Biomass)
UNFCCC	1	Energy Industry (renewable/ non-renewable sources)

1.3.2 Project Entities

The list of the project entities involved in the project activity is given in table 1-2 below:

Table 1-2: Project Entities

Project Participant: Ind Power Limited (IPL)
10, Daga Layout, North Ambazari Road
201, Shri Krishnam Apartments
Nagpur, Maharashtra
India – 440033

Contact person: Mr Umesh Sharma
Tel: +91-712-2229700-8
mumbai@indsynergy.com

Project Consultant: E&Y Pvt Ltd
20th Floor, Express Towers
Nariman Point, Mumbai -400021
India

Contact Person: Mr Shashi Prakash
Tel: +91- 9920038762
shashi.prakash@in.ey.com

1.3.3 Project Location

The project activity site is located at Village Mahapalli, District: Raigarh, State- Chhattisgarh, The details of the project location are given in table 1-3:

Table 1-3: Project Location

No.	Project Scope
Host Country	India
Region:	Chhattisgarh, Western Region of India
Project location address:	Village Mahapalli, District: Raigarh, State- Chhattisgarh
Latitude:	83°29'40" E – 83°30'01" E
Longitude:	21°55'45" N – 21°56'02" N
Top sheet No. (map developed by Geological Survey of India)	64 O/5, 64 O/9

1.3.4 Technical Project Description

The project activity involves co-firing of single type biomass (locally produced rice husk as a major fuel) and indigenous coal as a supplementary fuel for generation of grid-connected electricity. The net electricity generated out of 10 MW biomass power plant is connected via neighbouring plant electricity distribution system to the local grid, which is a part of the western grid of India.

The project consist of a 10 MW steam turbine generator (extraction cum condensing type) and a matching high pressure 40 TPH steam boiler of atmospheric fluidised bed combustion type firing mechanism, which is capable of firing duel fuels (biomass and coal). During this monitoring period the plant uses mostly rice husk which is locally produced^{/BIO/} and permitted by legislation as well. The biomass availability study report shows there is no competing use of biomass^{/BIO/}. Coal as a fossil fuel has been used in this monitoring period, ie, 2.45 % which is within 20 % on an annual basis as mentioned in the PDD. The plant has started commercial operation on 12th Dec 2006^{/COD/}. The technical specification including pollution control systems of the power plant as per PDD could be verified during onsite visit. The plant holds all necessary statutory clearances^{/SC/}.

The emission reduction is based on conservative value of net electricity generated from biomass in accordance with para 15,16,18 of AMS I.D. Ver 11 and the validated ex-ante emission factor 0.812 tCO₂/ MWh). The ex-ante specific fuel consumption (for rice husk 0.95 t/MWh on dry basis and for coal 1.00 t/MWh) based on single fuel operational records and test reports of biomass and coal are applied. The conservative value of net electricity generated from biomass and coal is used out of calculated difference of on-line gross generation meter reading and on-line meter reading of auxiliary consumption meters (sum of two meter readings) and the metered net electricity generation in accordance with the registered MP of the PDD. All these energy meters are cumulative type and under periodic calibration by state electricity board. The quantity of biomass and coal are measured by calibrated weigh bridge at the entry gate and the inventory difference certified by company secretary provides the quantity of rice husk and coal consumed during this monitoring period.

The key operational features during this reported monitoring period are:

Item	Data
Total Gross Electricity generated (from rice husk and coal)	53.816 GWh
Auxiliary power consumption	16.77 %
Net Exported Electricity to Grid (metered)	44.77 GWh
Net Exported Electricity to Grid (calculated)	44.78 GWh
Total biomass fired (with moisture)	56,342 t
Moisture content of biomass (range of monthly test report)	13.1 % to 8.6 %
Total coal fired	1420.35 t
Average plant load factor covering the monitoring period	61.43 %
Net electricity (from rice husk) – adjusted and conservative value of generation as per AMS I.D. Ver 11 used for emission reduction calculation	43.372 GWh

The key fixed parameters during this reported monitoring period are:

Item	Data
Grid emission factor	0.812 tCO _{2e} / MWh
Ex-ante specific fuel consumption – Coal	1t/MWh of gross generation
Ex-ante specific fuel consumption – Biomass	0.95t (dry) /MWh of gross generation

As the biomass is a carbon neutral fuel and releases other GHGs in negligible quantities, the project reduces CO₂ emissions to the extent of equivalent net

electricity generated by mostly fossil fuel based power plants connected to the western grid of India.

2. VERIFICATION TEAM

The Verification Team was led by:

- **Asim Kumar Jana**, TÜV Nord - Mumbai, India. Mr. Jana, M.Tech (Env Engg), Dipl in Industrial Safety, is a TÜV-CERT Lead auditor for ISO 9001/14001 and OHSAS 18001. He is Head – Energy and Carbon Services for TÜV Nord India operation and holds energy auditorship from Bureau of Energy Efficiency of India. He is an appointed assessor for JI/CDM certification program of TÜV Nord.

For this verification he was assisted by:

- **Imran Ustad**, TÜV Nord - Mumbai, India. Mr. Ustad is a Master in Environmental Science. He took part in several CDM validations and verifications. He is an appointed expert for TÜV NORD JI/CDM CP.
- **Ravi Shankar**, TÜV Nord - Mumbai, India. Mr. Shankar is a TÜV-CERT Lead Auditor for ISO 9001/14001. He took part in several CDM validations and verifications. He is an appointed trainee for TÜV NORD JI/CDM CP.
- **Katja Beyer**, TÜV NORD Germany. She is an environmental Scientist and took part in several CDM validations and verifications. She is an appointed expert of the JI/CDM Certification Program of TÜV NORD.

The final verification report is verified by:

- **Rainer Winter**. Mr. Winter works at TÜV NORD as ISO 9001/ 14001 Auditor and environmental verifier for EMAS. He is also an approved emission verifier within the European Emission Trading Scheme. Mr. Winter is an authorized JI/CDM assessor and is in charge of the JI/CDM Certification Program of TÜV NORD.

3. METHODOLOGY

The verification of the project was carried out from Dec 2007 to Jan 2008 after the contract dated 30/10/2007.

Preparations: *From 2007-12-22 to 2007-12-24*

On-site verification: *2007-12-25*

(Draft) Reporting: *2007-12-28*

(Final) Reporting: *From 2008-01-03 to 2008-01-08*

The verification consisted of the following steps:

- A desk review of the Monitoring Report ^{/MR1/ /MR2/}, the emission reduction calculation spreadsheet ^{/XLS1/,/XLS2/}, and additional supporting documents which were submitted by the client. A customised verification protocol ^{/CPM/} (part of VCS requirement – refer Annex), according to the Validation and Verification Manual ^{/VVM/} was used to carry out risk based assessment,
- On-Site assessment,
- Background investigation and follow-up interviews with personnel of the project developer,
- Verification reporting (Draft Verification Report and Final Verification Report).

The criteria of this verification includes the relevant rules and steps of CDM excluding:

- the public availability of the MR;
- the public availability the Verification Report; and
- non-accounting of retroactive credits

and the contract conditions ^{/CON/}.

3.1. Verification audit planning

On the basis of the document review results the verification audit / on-site assessment was planned. The planning involves:

- Identification and assessment of material risks for the verification,
- Identification of issues to be covered during the on-site visit,
- Identification of documentation to be provided by the project developer,
- Detailed audit planning w.r.t. personnel resources, time schedule, travel arrangements,
- Drafting of the audit plan.

Material risks have been identified and classified acc. to the categories defined in the VCS. For details pl. refer to table 3-1.

Table 3-1: Material verification risks

Risk category	Identified Risk	Verifiers action
High risk (> 5 %)	Data source not compliant with the defined project boundary	Data traceability check, Checking of original meter readings, Cross-check with own meter readings
	Exchange of monitoring equipment	Identification of each instrument
	Incomplete documentation	Application of appropriate discounts
Moderate risk (< 5 %)	Negligence of internal consumption and transmission losses	Identification of own consumption and transmission losses
Low risk (< 1 %)	Data uncertainty of measuring equipment	Check of instrument specifications, Check of calibration records
	Lack of metering equipment calibration	Check of calibration records

It has to be mentioned that data used for emission reduction calculation that has been derived from approved methodologies, published IPCC values or any other data that have been published by official organisations has not been accounted for with regard to quantification of verification risks.

3.2. On-site assessment

The assessment performed during the verification enabled the verifier to arrive at a conclusion regarding the readiness of the project to generate high quality emission reductions. As such, it was in-dispensable to carry out an inspection on site in order to verify that the project is implemented in accordance with the applicable criteria. Furthermore the on-site assessment is necessary to check the monitoring data with respect to accuracy to ensure the calculation of emission reductions.

- The on-site assessment included an investigation of whether all relevant equipment is installed and works as anticipated.
- The operating staff was interviewed and observed in order to check the risks of inappropriate operation and data collection procedures.
- Information processes for generating, aggregating and reporting the selected monitored parameters were reviewed.
- Metering equipment was checked, included an investigation whether all metering equipment was duly calibrated.
- The monitoring processes, routines and documentations were audited to check their proper application.
- The monitoring data were checked via spot sample on the level of the meter recordings.

On 2007-12-25 the verification team of TÜV NORD JI/CDM CP performed interviews with project participants to confirm selected information and to resolve issues identified in the document review.

Representatives of the project participant and operational staff of the plant were interviewed. The main topics of the interviews and key interviewees are summarised in Table 3-2.

Table 3-2: Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
Mr Umesh Sharma (Business Development Manager)	<ul style="list-style-type: none"> - Technical equipment and operation - Project starting date - Project performance - Involved personnel and responsibilities
Mr A. K. Shrivastava, AGM (E&I)	<ul style="list-style-type: none"> - Monitoring and measurement equipment - Monitoring data
Mr R. K. Dixit, AGM (QC)	<ul style="list-style-type: none"> - Emission reduction calculation - Calibration of key meters
Mr P. K. Shah, Environmental Officer	<ul style="list-style-type: none"> - Downtimes and equipment failures - Auxiliary firing - Data uncertainty and residual risks - Training and practice of the operational personnel
Mr Jayprakash Tiwari, Assistant Engineer	
Mr B.D. Jyothi Kumar ,Manager Power plant	
Mr Shashi Prakash (Sr Consultant)	
Ms. Rajeshwari. M (Associate Consultant)	

3.3. Resolution of Forward and Corrective Action Requests

Nonconformities raised during the verification can either be seen as a non-fulfilment of criteria ensuring the proper implementation of a project or where a risk to deliver high quality emission reductions is identified.

Corrective Action Requests (CARs) are issued, if:

- mistakes have been made in assumptions or the project documentation which directly will influence the project results,
- the eligibility requirements for VCU projects have not been met

- there is a clear deviation concerning to the applicable verification criteria.
- requirements set by the monitoring plan have not been met; or
- mistakes in the emission reduction calculation have been detected.

Forward Action Requests (FAR) indicates essential risks for further periodic verifications. Forward Action Requests are issued, where:

- the actual status requires a special focus on this item for the next consecutive verification, or
- an adjustment of the monitoring plan is recommended.

The verification team may also use the term Clarification Request (CR), which would be issued if:

- additional information is needed to fully clarify an issue.

The identified risks are reported in the form of FAR, CAR and CR in the Draft Verification Report (DVR). Based on the response provided against the FAR, CAR and CR reported in the DVR and the revised PDD and MR, the Final Verification Report (FVR) containing the verification opinion is issued.

4. VERIFICATION FINDINGS

In the following paragraphs the findings from the desk review of the monitoring report ^{/MR1/}, the PDD ^{/PDD/} and other supporting documents, as well as from the on-site assessment and the interviews are summarised.

The summary of CAR, FAR and CR issued are shown in Table 4-1:

Table 4-1: Summary of CAR, FAR and CR

Verification topic	No. of CAR	No. of CR	No. of FAR
Remaining issues	-	-	2
Project implementation	-	-	1
Internal and external data	-	2	-
Environmental and social indicators	-	-	-
Management and operational system	-	-	-
Completeness of Monitoring	2	1	-
Accuracy of emission reduction calculations	1	-	-
Quality of Evidence to Determine Emission Reductions	-	1	1
Management system and quality assurance	-	-	-
SUM	3	4	4

Summary of Findings and Conclusion

The findings of the Verification process are summarized in the table 4-2 below.

Table 4-2: Findings and conclusions of the verification

Topic	#					
Remaining issues, CARs and CRs from previous validation	FAR 1	Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> FAR	<input type="checkbox"/> CR	<input type="checkbox"/> None
		Findings	The monitoring plan of the registered PDD does not comply with the monitoring requirements of AMS I.D version 11 (Cp para 15, 16 and 18 in the context of co-firing). Hence the monitoring plan should be revised in accordance with relevant procedures of UNFCCC before next issuance.			
		Corrective Action	The revised PDD with revised monitoring plan will be submitted to executive board of UNFCCC for the approval before next issuance.			
		Additional comment	NIL			
		Conclusion	<input checked="" type="checkbox"/> To be checked during next periodic verification <input type="checkbox"/> Appropriate action was taken <input type="checkbox"/> MR was corrected correspondingly <input type="checkbox"/> Appropriate action was not taken <input type="checkbox"/> The project complies with the requirements			

Topic	#					
Remaining issues, CARs and CRs from previous validation	FAR 2	Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> FAR	<input type="checkbox"/> CR	<input type="checkbox"/> None
		Findings	Draft monitoring report ^{MR1/} does not address the ex-ante determination of specific fuel consumption (Cp para 15 of AMS I.D). The mention of Electricity emission factor under section B.7.1 of PDD reflects that the same has to be monitored ex-post whereas the validation report (section 3.5) mentions that the grid emission factor is calculated ex-ante and will remain fixed for entire crediting period. Moreover, B.7.1 and annex-4 of the PDD does not specify the monitoring frequency of the individual parameters. In these contexts the monitoring plan should be revised in accordance with relevant procedures of UNFCCC before next issuance.			
		Corrective Action	The revised PDD with revised monitoring plan will be submitted to executive board of UNFCCC for the approval before next issuance.			
		Additional comment	NIL			

Topic	#		
		Conclusion	<input checked="" type="checkbox"/> To be checked during next periodic verification <input type="checkbox"/> Appropriate action was taken <input type="checkbox"/> MR was corrected correspondingly <input type="checkbox"/> Appropriate action was not taken <input type="checkbox"/> The project complies with the requirements

Topic	#		
Project Implementation	FAR 3	Classification	<input type="checkbox"/> CAR <input checked="" type="checkbox"/> FAR <input type="checkbox"/> CR <input type="checkbox"/> None
		Findings	During site visit on 25 th December 2007 it was evident that the biomass storage is mixed with coal storage by spreading biomass (rice husk) over coal stack. Moreover, the storage area for the biomass considering full day full capacity operation is inadequate. Before next verification this two issues must be resolved.
		Corrective Action	The project proponent will construct separation between the storage of two fuels. In present monitoring system the quantity of fuel used in monitored in the weigh bridge installed in the gate. Therefore project proponent is monitoring the fuel use with the help of fuel inlet in the premise. The system will be made more robust before the next verification.
		Additional comment	NIL
		Conclusion	<input checked="" type="checkbox"/> To be checked during next periodic verification <input type="checkbox"/> Appropriate action was taken <input type="checkbox"/> MR was corrected correspondingly <input type="checkbox"/> Appropriate action was not taken <input type="checkbox"/> The project complies with the requirements

Topic	#		
Internal and External Data	CR 1	Classification	<input type="checkbox"/> CAR <input type="checkbox"/> FAR <input checked="" type="checkbox"/> CR <input type="checkbox"/> None
		Findings	The monitoring report ^{/MR1/} and corresponding Excel sheet ^{/XLS1/} applies validated emission factor i.e. 0.812 tCO ₂ /MWh, whereas PDD (section B.7.1) mentions that the grid emission factor has to be monitored ex-post (Cp FAR 2). Clarification is requested.
		Corrective Action	According to the calculation in the registered PDD and subsequently in the validation report the electricity emission factor is constant ex ante. The same electricity factor will be used in entire crediting period.



Topic	#		
		Additional comment	NIL
		Conclusion	<input type="checkbox"/> To be checked during next periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> MR was corrected correspondingly <input type="checkbox"/> Appropriate action was not taken <input checked="" type="checkbox"/> The project complies with the requirements

Topic	#		
Internal and External Data	CR 2	Classification	<input type="checkbox"/> CAR <input type="checkbox"/> FAR <input checked="" type="checkbox"/> CR <input type="checkbox"/> None
		Findings	The calorific value of biomass and coal mentioned in the PDD as well as in the monitoring report provided do not specify gross or net. Based on the specification a possibility check of electricity generation and project emission can be performed by verification team.
		Corrective Action	The calorific value in the test report is gross calorific value (in the test report referred as GCV) which can be measured directly. The project proponent has submitted the separate excel sheet for the possibility check of electricity generation, this possibility check is a part of emission reduction calculation based on para 15,16,18 of approved methodology.
		Additional comment	The GCV has no relevance for the possibility check in the context of right application of monitoring methodology in the revised monitoring report. The /XLS2/ provides the computation of possibility of gross electricity generation and the basis of emission reduction calculation in accordance with para 15, 16 and 18 of AMS I.D.
		Conclusion	<input type="checkbox"/> To be checked during next periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> MR was corrected correspondingly <input type="checkbox"/> Appropriate action was not taken <input type="checkbox"/> The project complies with the requirements

Topic	#					
Environmental and Social Indicators		Classification	<input type="checkbox"/> CAR	<input type="checkbox"/> FAR	<input type="checkbox"/> CR	<input checked="" type="checkbox"/> None
		Findings	-			
		Corrective Action	-			
		Additional comment	-			
		Conclusion	<input type="checkbox"/> To be checked during next periodic verification <input type="checkbox"/> Appropriate action was taken <input type="checkbox"/> MR was corrected correspondingly <input type="checkbox"/> Appropriate action was not taken <input checked="" type="checkbox"/> The project complies with the requirements			

Topic	#					
Management and operational system		Classification	<input type="checkbox"/> CAR	<input type="checkbox"/> FAR	<input type="checkbox"/> CR	<input checked="" type="checkbox"/> None
		Findings	-			
		Corrective Action	-			
		Additional comment	-			
		Conclusion	<input type="checkbox"/> To be checked during next periodic verification <input type="checkbox"/> Appropriate action was taken <input type="checkbox"/> MR was corrected correspondingly <input type="checkbox"/> Appropriate action was not taken <input checked="" type="checkbox"/> The project complies with the requirements			

Topic	#					
Completeness of Monitoring	CR 3	Classification	<input type="checkbox"/> CAR	<input type="checkbox"/> FAR	<input checked="" type="checkbox"/> CR	<input type="checkbox"/> None
		Findings	The monitoring period ends on 25/11/2007 whereas biomass log provides monthly aggregated data of biomass consumption till 30/11/2007. Hence, apportioned figure of the same should be incorporated in the revised monitoring report.			
		Corrective Action	The same has been incorporated in the monitoring report and the calculation sheet. The proportion is based on the ratio of gross electricity generation upto 25 th Nov'07 and the generation of the full month. The ratio works out as 80.44% which corresponds to 3500100 KWh and corresponding biomass consumption is 3942 t.			
		Additional comment	Calculation logic is OK.			



Topic	#		
		Conclusion	<input type="checkbox"/> To be checked during next periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> MR was corrected correspondingly <input type="checkbox"/> Appropriate action was not taken <input checked="" type="checkbox"/> The project complies with the requirements

Topic	#		
Completeness of Monitoring	CAR 1	Classification	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> FAR <input type="checkbox"/> CR <input type="checkbox"/> None
		Findings	The draft monitoring report does not provide the actual monitored data covering the monitoring period. Whereas the monitoring report simply reproduce the monitoring plan of the registered PDD by inclusion of estimated figures of monitoring parameters. Nevertheless, the project emission does not apply in the monitoring period as the reported fuel ^{MR1/} is 100% biomass. Monitoring report needs appropriate corrections.
		Corrective Action	The monitoring report is corrected. The actual procedure and data used are incorporated in the monitoring report. Other than that the 1420.35 tons of coal is also used in the project activity which is shown as per bill of 04.12.2006.
		Additional comment	The MR is modified as per the applied methodology. Hence computation of project emission has indirectly taken into account.
		Conclusion	<input type="checkbox"/> To be checked during next periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> MR was corrected correspondingly <input type="checkbox"/> Appropriate action was not taken <input checked="" type="checkbox"/> The project complies with the requirements



Topic	#					
Completeness of Monitoring	CAR 2	Classification	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> FAR	<input type="checkbox"/> CR	<input type="checkbox"/> None
		Findings	The table "GHG emission reduction calculations" under Appendix 1 of monitoring report mentions credit period as 2007. The monitoring period should mention end and start date in DD/MM/YYYY format. Moreover, monitoring report should be detailed in providing all monitored parameters on monthly vintage basis including calculated difference of total and internal consumption of electricity (i.e net electricity export) and metered net electricity export. Lower value out of calculated and metered net electricity export should be used for emission reduction calculations. (Cp section B.7.1 of registered PDD)			
		Corrective Action	The same has been incorporated in the monitoring report in detailed manner. The emission reduction calculations are conservatively calculated based on the approved methodology.			
		Additional comment	The revised monitoring report ^{MR2/} is OK.			
		Conclusion	<input type="checkbox"/> To be checked during next periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> MR was corrected correspondingly <input type="checkbox"/> Appropriate action was not taken <input checked="" type="checkbox"/> The project complies with the requirements			

Topic	#																	
Accuracy of Emission Reduction Calculation	CAR 3	Classification	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> FAR	<input type="checkbox"/> CR	<input type="checkbox"/> None												
		Findings	<p>In the course of checking of basic data related to Gross electricity generation, Auxiliary consumption and net electricity export figures, verification team found the following deviations as below:</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>MONTH</th> <th colspan="2">GROSS GENERATION</th> </tr> <tr> <th></th> <th>As mentioned in the /XLS1/</th> <th>As recorded in Generation and Export register</th> </tr> </thead> <tbody> <tr> <td>Dec-06</td> <td>2510800</td> <td>3632400</td> </tr> <tr> <td>Jan-07</td> <td>5843500</td> <td>4791200</td> </tr> </tbody> </table> <p>Moreover, the figures of auxiliary consumption and net electricity export in /XLS1/ does not correspond to the basic monitored log data for the whole monitoring period.</p>				MONTH	GROSS GENERATION			As mentioned in the /XLS1/	As recorded in Generation and Export register	Dec-06	2510800	3632400	Jan-07	5843500	4791200
		MONTH	GROSS GENERATION															
			As mentioned in the /XLS1/	As recorded in Generation and Export register														
		Dec-06	2510800	3632400														
Jan-07	5843500	4791200																
Corrective Action	The same has been corrected and the corrected sheet is submitted to verifiers.																	
Additional comment	NIL																	
Conclusion	<input type="checkbox"/> To be checked during next periodic verification <input type="checkbox"/> Appropriate action was taken <input type="checkbox"/> MR was corrected correspondingly <input type="checkbox"/> Appropriate action was not taken <input type="checkbox"/> The project complies with the requirements																	

Topic	#					
Quality of Evidence	FAR 4	Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> FAR	<input type="checkbox"/> CR	<input type="checkbox"/> None
		Findings	The least count of the field mounted auxiliary meters (Sr. No. 05867466 and 05867449) and gross generation meter (Sr. No. 80676/117-0905) is ± 1.0 which contradicts with ± 0.5 as mentioned in the registered PDD.			
		Corrective Action	The export import meter which is used for actual transfer of electricity is 0.5 s class. Rest all the meters are 1 class. The project proponent will make the corrections before next issuance.			
		Additional comment	NIL			
		Conclusion	<input checked="" type="checkbox"/> To be checked during next periodic verification <input type="checkbox"/> Appropriate action was taken <input type="checkbox"/> MR was corrected correspondingly <input type="checkbox"/> Appropriate action was not taken <input type="checkbox"/> The project complies with the requirements			

Topic	#					
Quality of Evidence	CR 4	Classification	<input type="checkbox"/> CAR	<input type="checkbox"/> FAR	<input checked="" type="checkbox"/> CR	<input type="checkbox"/> None
		Findings	The onsite presence of substantial amount of coal and one entry of coal amounting to 1584.15 tons (Bill dt. 16/02/2007) during the reported monitoring period appears to be counter factual against the evidence provided for 100% biomass fired during monitoring period.			
		Corrective Action	The project activity has used 1420.35 ton of coal in the monitoring period as per bill dt. 04/12/06. Same has been included in the revised monitoring report. Other than this the inventory of 1584.15 ton is available in the plant as per bill of 16 th Feb 2007. The monitoring report is corrected accordingly.			
		Additional comment	The amount of coal fired was 1420.35 t during the monitoring period. The corresponding electricity is discounted for emission reduction calculation as per methodology. The same figure of coal was evidenced as a certified copy by company secretary.			
		Conclusion	<input type="checkbox"/> To be checked during next periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> MR was corrected correspondingly <input type="checkbox"/> Appropriate action was not taken <input checked="" type="checkbox"/> The project complies with the requirements			

The closure of all the CARs and CRs issued above resulted in change of net ER from 39841 ^{/MR1/} t CO_{2e} to 35219 ^{/MR2/} t CO_{2e}.

5. TESTING ON VCU VERIFICATION CRITERIA

Sr. No.	CRITERION	FINDING / CONCLUSION
1	Project category	VCS 1: Renewable Energy (Biomass) UNFCCC 1: Energy Industry (renewable/ non-renewable sources)
2	Geographic Location	In conformity with registered PDD and referred in table 1.33 of Verification report.
3	Eligible GHGs	Carbon dioxide
4	Project Start Date	07/09/2004
5	Emission Reduction Start Date	12/12/2006
6	Public Funding and Grants	This is a unilateral CDM Project Activity undertaken by the project proponent. Hence public funding, such as grants from official development funds (ODA), is not involved in this project.
7	Project boundary/GHG assessment boundary	The project boundary is limited to the renewable electricity generating power plant, connected to the western regional grid.
8	Calculation Methodology	AMS I.D: "Grid connected renewable electricity generation" (ver 11).
9	Secondary effects	The project is limited to plant premises, no secondary effects are foreseen.
10	Project additionality	Confirmed based on registered PDD.
11	Quality of reductions	The project has received all regulatory permits before the installation & commissioning and operating within the legal, social, environmental compliance of the host country.
12	Monitoring Process	Approved monitoring methodology AMS I.D. Ver 11 is used for the project activity, sustaining records was sufficient for verification of emission reductions. A set of problems was found through the process of risk assessment (ref section 4 and checklist of this report) and addressed as CARs and CRs which are finally closed. 4 FARs closing will be checked during next verification.

6. EMISSION REDUCTIONS

The VCS ver. 1 requires an annual GHG related breakdown of emission reductions. The following results have been verified (table 5-1).

Table 6-1: Emission reductions

Emission reductions:	CO2 [t CO2]	CH4 [t CH4]	N2O [t N2O]	HFCs [t HFC]	PFCs [t PFC]	SF6 [t SF6]	Sum [t CO2e]
2006 (13/12/2006 to 31/12/2006)	2,336	-	-	-	-	-	2,336
2007 (01/01/2007 to 25/11/2007)	32,883	-	-	-	-	-	32,883
TOTAL:	35,219	-	-	-	-	-	35,219

7. VERIFICATION STATEMENT

The scope of this verification covers the determination of voluntary greenhouse gas emission reductions generated by the above mentioned project. The verification is based on the registered PDD and Monitoring reports, emission reduction calculation spreadsheet and supporting documents made available to the TÜV NORD JI/CDM CP by the project participant.

TÜV NORD JI/CDM CP herewith confirms that the verification has been carried out in accordance with the requirements of the VCS 1 esp. w.r.t. transparency (as per para. 2.7) and meets the requirements of the Voluntary Carbon Standard Verification Protocol.

As a result of the verification, the verifier confirms that:

- The project activity is in line with all applicable criteria of the VCS version 01.
- all operations of the project are implemented and installed as planned and described in the project design document. The monitoring system is in place and functional. The installed equipment essential for generating emission reductions runs reliable and is calibrated appropriately.
- the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner.

The project has achieved emission reductions in line with the requirements of the VCS 1 in the monitoring period as stated in chapter 6.

Mumbai, 2008-01-08

A handwritten signature in black ink, appearing to read "Asim K. Jana". The signature is written in a cursive, flowing style.

Asim K. Jana
TÜV NORD JI/CDM Certification Program
Verification Team Leader

8. REFERENCES

Table 8-1: Documents provided by the project proponent

Reference	Documents
/AR/	Audited report prepared by Company secretary providing the Gross power generation and consumption of fuel (rice husk and coal) during Dec'06 to Nov'07.
/BILL/	Electricity bills raised by IPL for supply of electricity to Ind Synergy Ltd (ISL) throughout the monitoring period.
/BIO/	<ol style="list-style-type: none"> 1. Biomass purchase agreement dt 19/11/2006 between Ind Power Limited and Vipul Trading Company for supply of rice husk during Dec'06 to Dec'07. 2. Biomass inventory record (in soft) mentioning the inward receipt during the entire monitoring period. 3. Monthly delivery challan for biomass delivery raised by Vipul Trading Company covering the entire monitoring period.
/BR/	Breakdown record during the monitoring period
/CAL/	Calibration reports of the Gross generation meter, auxiliary consumption meters, export meter and weigh bridge during the monitoring period.
/COAL/	Coal inward receipt dt. 04/12/06 and 16/02/07.
/COD/	Commercial operating date or 1 st generation date, ie, 12/12/2006 (Letter dt. 12/12/2006 to The Superintendent, Central Excise and Customs)
/CON/	The signed contract dated 30.10.07 between TUV NORD and IPL for carrying out verification of voluntary emission reduction.
/EMP/	Emergency management plan of IPL.
/ENV/	Sample copy of stack emission monitoring report (Oct'07 and Nov'07).
/GEN/	G-Forms submitted to Chief Electrical Inspector mentioning the gross electricity generation from the 10 MW turbine generator set during the entire monitoring period.
/LOG/	Sample copy of TG log sheet mentioning the gross generation Sample copy of Power generation and consumption log book mentioning auxiliary consumption, import and export
/MANUAL/	CDM Project manual of Ind Power Ltd.

/MR1/	Draft VER Monitoring Report '10 MW biomass based power project of Ind Power limited' for the period 13/12/2006 to 25/12/2007, Ver 01 dt. 18/12/2007
/MR2/	Final VER Monitoring Report '10 MW biomass based power project of Ind Power limited' for the period 13/12/2006 to 25/12/2007, Ver 03 dt. 14/01/2008
/ORG/	Organization Chart of IPL.
/PLAN/	IPL Plant plant Layout
/PPA/	Power Purchase Agreement dt. 01/06/2006 between Ind Power Ltd and Ind Synergy Ltd. Power Purchase Agreement dt. 30/06/2006 between Ind Synergy Ltd. and Chhattisgarh State Electricity Board
/SC/	Statutory clearances: 1. Consent to establish and consent to operate from Chhattisgarh State Electricity Board 2. Boiler operator competency certificates
/TD/	Technical specifications of the boiler as provided by the manufacturer.
/TR/	Third party rice husk analysis report mentioning the moisture content and gross caloric value of the rice husk consumed during the monitoring period. Coal analysis report dt. 04/12/06 and 16/02/2007 mentioning the moisture content and gross caloric value of the coal intake by IPL.
/TR/	Training and competency records
/XLS1/	Excel calculation sheets provided by the project participant (related to MR1).
/XLS2/	Excel calculation sheets provided by the project participant (related to MR 2).

Table 8-2: Background investigation and assessment documents

Reference	Document
/AMS I.D/	AMS I.D/Version 11: "Grid connected renewable electricity generation".
/BIO/	Biomass availability assessment report by Chhattisgarh Govt. for 2005
/DVR/	Draft Verification Report for the CDM project:"10 MW biomass based power project of Ind Power limited" for the period 13/12/2006 to 25/12/2007.
/KP/	Kyoto Protocol (1997)

Reference	Document
/MA/	Decision 17/CP.7 (Marrakech Accords)
/PDD/	Registered Project Design Document for CDM project: "10 MW biomass based power project of Ind Power limited" Version 05 dated 11/10/2007.
/VAL/	Validation Report for CDM project: "10 MW biomass based power project of Ind Power limited" issued by SGS Ltd, Report number CDMVal0783 dated 12/10/2007.
/VVM/	IETA, PCF Validation and Verification Manual (V.4)
/VCS/	The Voluntary Carbon Standard (V.1)

Table 8-3: Websites used

Reference	Link	Organisation
/cea/	www.cea.nic.in	Central Electricity Authority, India
/iso/	www.iso.org/iso/en	The International Organisation for Standardisation
/ieta/	www.ieta.org	International Emissions Trading Association
/unfccc/	http://cdm.unfccc.int	UNFCCC-CDM

Table 8-4: Interviewed Persons

Reference		Name	Organisation / Function
/IM01/	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Umesh Sharma	Business Development Manager, IPL
/IM01/	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	A. K. Shrivastava	AGM (E&I), IPL
/IM01/	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	R. K. Dixit	AGM (QC), IPL
/IM01/	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	P. K. Shah	Environmental Officer, IPL
/IM01/	<input checked="" type="checkbox"/> Mr.	Jayprakash Tiwari	Assistant Engineer, IPL

Reference		Name	Organisation / Function
	<input type="checkbox"/> Ms.		
/IM01/	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	B.D. Jyothi Kumar	Manager Power plant, IPL
/IM02/	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Shashi Prakash	Sr. Consultant, E&Y Ltd
/IM02/	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Rajeshwari. M	Associate Consultant, E&Y Ltd

ANNEX

(Verification Checklist)



ANNEX – VERIFICATION CHECKLIST

Table A-1: Verification Minimum Criterion Checklist (Periodic verification items)

Criterion/ checklist points	Description of Minimum Criterion	Ref.	Comments	Draft/ final Concl.
1	Have there been any significant incidents, deviant operation modes and / or downtimes of the plant? In case yes, how have they been considered?	/IM01/ /COD/	The plant is in continuous operation since its starting date. Nevertheless FAR 3 has been raised.	FAR 3
2	Were there any malfunctions or downtimes of the installed measuring equipment? In case yes, how have they been considered?	/LOG/	The installed measuring devices are in continuous operation since the start of generation.	OK
3	Have the provisions for maintenance and calibrations of the monitoring equipment been applied according to the monitoring plan? If not how has this been considered?	/CAL/	Yes, all meters have been calibrated.	OK
4	Have the data collection, archiving and reporting procedures as defined in the monitoring plan been followed?	/PDD/ /MR1/ /LOG/ /unfccc/	Deviations from the MP have been observed. In this context of deviation, CAR 1-2	CAR 1-2 OK
5	Have the QA/QC procedures been applied in a stringent manner?	/PDD/ /MR1/	The QA/QC plan mentioned in the PDD and the monitoring report has been followed. However, CR4-5 has been raised.	FAR4 CR-4 OK



Criterion/ checklist points	Description of Minimum Criterion	Ref.	Comments	Draft/ final Concl.
6	Is it possible to trace the emission reduction calculation parameters to original records (meter readings, log sheets, delivery notes, invoices etc.)	/MR1/ /COD/ /LOG/	It was possible to countercheck the metered values. However, CAR 3 and CR5 are issued.	CAR 3-CR4 OK
7	Is the emission reduction calculation in line with the applied methodology and correct?	/PDD/ /unfccc/	Some specific deviations from the stipulations of AMS I.D version 11 have been identified. FAR 1-2 have been raised.	FAR 1-2
8	Is a material error (determined as a misstatement where aggregate omissions, misrepresentations, or errors in the total emissions figure) smaller than 5 %.	/PDD/ /MR/	The material error can be assessed as being < 5 % due to the fact that only electricity metering with a very low uncertainty level (< 1 %) is involved in the monitoring. However, FAR 4 is raised.	FAR 4