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# VERIFICATION/CERTIFICATION REPORT

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## 11.3 MW RENEWABLE ENERGY PROJECT FOR A GRID SYSTEM BY K.M. POWER (P) LIMITED IN INDIA

(CDM REGISTRATION REFERENCE NO. 0750)

VERIFICATION PERIOD:

06 February 2002 to 24 March 2006.

REPORT No. 2007-2019

REVISION No. 01

DET NORSKE VERITAS



# VERIFICATION/CERTIFICATION REPORT

Date of first issue: 2007-03-31	Project No.: 4607 2019	DET NORSKE VERITAS AS  DNV Certification  Veritasveien 1, 1322 HØVIK, Norway Tel: +47 67 57 99 00 Fax: +47 67 57 99 11 http://www.dnv.com Org. No: NO 945 748 931 MVA
Approved by: Einar Telnes Director	Organisational unit: DNV Certification, International Climate Change Services	
Client: K.M. Power Private Limited	Client ref.: G. Ramnarayan Reddy Managing Director	

## Summary:

Det Norske Veritas Certification AS. has performed a verification of the “11.3 MW Renewable Energy project for a grid system by K.M. Power (P) Limited” (Registration Ref. No. 0750) managed by K.M. Power Private Limited for the period 06 February 2002 to 24 March 2006.

In our opinion, the GHG emissions reductions reported for the project in the monitoring report of April 2007 are fairly stated.

The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology, AMS-I.D, version 9 and the monitoring plan and formulae provided in the validated PDD of 12 October 2006.

Det Norske Veritas Certification AS is able to certify that the emission reductions from the “11.3 MW Renewable Energy project for a grid system by K.M. Power (P) Limited”, managed by K.M. Power Private Limited for the period 06 February 2002 to 24 March 2006 amount to 60 602 tCO<sub>2</sub> equivalent.

Report No.:		Subject Group: Environment	
Report title: 11.3 MW Renewable Energy project for a grid system by K.M. Power (P) Limited in India			
Work carried out by: Astakala Vidyacharan, C.Kumaraswamy			
Work verified by: Telnes Einar			
Date of this revision: 2007-04-26	Rev. No.: 01	Number of pages: 10	

Indexing terms	
Key words Climate Change Kyoto Protocol Validation Clean Development Mechanism	Service Area Verification
	Market Sector
	Energy Industry
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**Abbreviations**

APTRANSCO	Transmission Corporation of Andhra Pradesh Limited
AP	Andhra Pradesh
CAR	Corrective Action Request
CDM	Clean Development Mechanism
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
ERU	Emission Reduction Units(s)
FAR	Forward Action Request
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MR	Monitoring Report
MVP	Monitoring and Verification Plan
N <sub>2</sub> O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
UNFCCC	United Nations Framework Convention for Climate Change
GWP	Global Warming Potential



## 1 INTRODUCTION

K.M. Power Private Limited has commissioned Det Norske Veritas Certification AS (DNV) to carry out the verification of emission reductions reported by the “11.3 MW Renewable Energy project for a grid system by K.M. Power (P) Limited” in Velugonda mandal, Kurnool district, Andhra Pradesh state, India, for the period 06 February 2002 to 24 March, 2006. 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 the 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 the DOE that, during a specific period in time, a project activity achieved the emission reductions as verified.

### 1.2 Scope

The Verification scope is:

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

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

The verification team has, based on the recommendations in the Validation and Verification Manual / 5/, employed a risk based approach, focussing on the identification of significant reporting risks and verifying the mitigation measures for these.

### 1.3 Description of the Project Activity

Project Party	India
Title of the project activity	11.3 MW Renewable Energy project for a grid system by K.M. Power (P) Limited
Registration Reference No	0750
Project Participants	K.M. Power Private Limited
Location of the project activity	Velugonda mandal, Kurnool district, Andhra Pradesh state, India
Project's crediting period start date	6 February 2002(Fixed crediting period of 10 years)



Verification period

6 February 2002 to 24 March 2006

The project activity is a bundle of three small hydro power projects with an aggregated gross capacity of 11.3 MW, connected to the Andhra Pradesh state electricity grid. The first project, Guntakandala mini hydel scheme (4.0 MW capacity) was commissioned in February 2002. The second project, Velpanuru mini hydel scheme (3.3 MW) was commissioned in November 2002 and the third project, Madhavaram mini hydel scheme (4.0 MW) was commissioned in October 2003. The project utilises the head available in the Nippulavagu natural stream (used as a carrier canal for Kurnool-Cuddapa canal) located in Andhra Pradesh region, for generation of electricity. The projects have a diversion structure for the stream, intake chamber, de-silting chamber, fore bay, and tail race for creating the additional head to run the turbines. The technology used in this project is indigenous.

The project's emission reductions are determined by multiplying the amount of net electricity generated in by the project in a year with a grid emission factor calculated as the weighted average of current generation mix, determined ex-post for the southern regional grid. According to the validated project design, there are no project emissions and leakage effects associated with the project.

## 2 METHODOLOGY

The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project. As the CDM Executive Board has not yet formally endorsed the application of any materiality principle for verification of emission reductions from CDM projects - implying that emphasis should be on the significant contributors to emission reductions - the DNV team has for this assignment decided to check all factors and issues with the same emphasis. The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project.

The verification process was guided by a verification checklist, which aims to ensure a transparent verification process. This documents in detail how emission reductions have been verified and how the verification findings have been reached. The statement "data are found to be correct" refer to a situation where the auditors through the testing processes have found no discrepancies in the reported data and that these, in the opinion of the auditors, are free from material misstatements.

### *Verification team*

Kumaraswamy Chandrashekara	DNV, Bangalore	Team Leader
Astakala Vidyacharan	DNV, Hyderabad	GHG Auditor
Einar Telnes	DNV, Oslo	Technical Reviewer & Energy sector expert

### *Duration of verification*

Preparations:	From 15 March 2007 to 22 March 2007
On-site verification:	From 23 March 2007 to 24 March 2007
Completion of Reporting:	14 April 2007



## 2.1 Review of Documentation

The monitoring reports / 1/ and the emission reduction calculations, provided in the form of spreadsheets submitted by K.M. Power Private Limited, were assessed as a part of the verification. In addition the Project Design Document / 2/, the monitoring plan contained in the PDD as well as the validation report / 3/ were also assessed. Other operational documents were also assessed as evidence.

## 2.2 Site Visits

On 23-24 March 2007, DNV carried out a site visit at K.M. Power Private Limited. During the site visit, DNV verified the actual operation of the project as described in the PDD. The instruments used for monitoring electricity in all the three project locations were checked, including the calibration records for these instruments and these were found to be in order. Evidence for the reported net generation of electricity was verified i.e., the electricity supplied to the grid minus the electricity consumption of the project (electricity imported from the grid).

## 2.3 Assessment

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 K.M. Power Private 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 reported monitoring results and verify the correct application of the approved monitoring methodology. Data from other sources include the grid emission factor which is calculated ex-post based on electricity generation mix in the southern region grid through out the crediting period, have been assessed and verified .

## 2.4 Reporting of Findings

Findings established during the verification may be that:

- i) the verification is not able to obtain sufficient evidence for the reported emission reductions or part of the reported emission reductions. In this case these emission reductions shall not be verified and certified;
- ii) the verification has identified material misstatements in the reported emission reductions. Emission reductions with material misstatements shall be discounted based on the verifiers' ex-post determination of the achieved emission reductions.

A forward action requests (FAR) should be issued, where:

- a. the actual project monitoring and reporting practices requires attention and /or adjustment for the next consecutive verification period, or
- b. an adjustment of the MP is recommended.

In the context of FARs, risks have been identified, which may endanger the delivery of high quality CERs in the future, i.e. by deviations from standard procedures as defined by the MP. As a consequence, such aspects should receive a special focus during the next consecutive verification. A FAR may originate from lack of data sustaining claimed emission reductions.



### 3 VERIFICATION FINDINGS

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

According to the validation report / 3/, no CAR or CL's were required to be closed out during verification. This has again been confirmed by DNV.

An assessment on CAR raised during the initial verification of the project, carried out voluntarily by DNV on the request of the project proponent, is described in the following table:

FAR/CAR initial verification	Description of finding	Response	Conclusion
CAR1	Data pertaining to import of electricity from the grid for the project when plant is not operational, is not included in the initial monitoring report submitted; though it has been observed being monitored along with net electricity exported. This needs to be included in the revised monitoring report, while arriving at net emission reductions.	In the initial monitoring report the import data was made part of net electricity generation, though monitored separately. Now in the revised MR it has been indicated separately and presented. Also import power during off season is now included in the report.	Accepted.

#### 3.2 Project Implementation

The project has been implemented as planned. The actual project construction activity started in 7 May 2001 with the installation of diversion structure, power canal, penstocks, powerhouse, and power evacuation system and tailrace canal. The first sub-project at Guntakandala site was commissioned on 6 February 2002. Hence the crediting period is chosen as starting from 6 February 2002. The second sub-project at Velpanuru was commissioned in November 2002 and the third at Madhavaram site was commissioned in October 2003. Electricity generation and supply to APTRANSCO grid is enabled through independent transmission lines for each part of the project. Synchronization reports for the three sub-projects have been verified by DNV.

After implementation and commissioning of the project technology, no changes have been carried out or are envisaged.

The following plant outages during the chosen verification period (6 February 2002 to 24 March 2006) have been recorded and verified to be correct:

- Total forced outage : 4324.8 hrs
- Total planned outage hours : 40584.0 hrs
- Total outage hours : 44908.8 hrs





### 3.3 Completeness of Monitoring

The approved baseline methodology AMS-I.D (version 09) has been applied for the project activity. In accordance with AMS-I.D, the baseline for the project activity has been calculated ex-post 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. The ex-post figures for the verification period from the validated and registered PDD have been used. It is confirmed that these emission factors indicated in the registered PDD for the period 2002 to 2006 have been validated and are, as reported in the validation report. However, for the period 2001-2002, the PDD has considered an emission factor of 819.04 t CO<sub>2</sub> /GWh (as determined for 2002-2003); reason being lack of publicly available data for the period 2001-2002. In the monitoring report, the emission factor now considered for 2001-2002 is 742.52 t CO<sub>2</sub>/GWh. This is considered acceptable and conservative, given that the CEA website now has the correct data published. Based on the validated emission factors and actual electricity generation, the emission reduction has been verified to be 60 602 tCO<sub>2</sub> equivalent for the period 6 February 2002 to 24 March 2006.

As required by the monitoring methodology AMS I.D version 09 monitoring of parameters essentially comprises:

- Electricity generation - net export to grid, import from grid during off season and auxiliary consumptions
- Leakages due to project activity, if any.

During verification it was observed that imported electricity during off season was not captured for CER calculations, although metered and monitored by APTRANSCO officials every month. A CAR was raised to include project emissions due to import of electricity from the grid.

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. All the data required for emission reduction calculations are manually recorded in log sheets once in each shift i.e., after every 8 hours for each project individually. These are then transferred to spreadsheets for emission reduction calculations.

All other data are culled out either from the log books or daily power generation reports. Log books are having provisions to indicate forced and planned shutdowns of projects.

The calibration of monitoring equipments is being maintained and same has been verified by DNV. 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. All the power generation, export 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 per month in the period 6 February 2002 to 24 March 2006 was verified to be 60 602 tCO<sub>2</sub>e.

Sufficient evidence was presented for the reported net emission reductions.

### 3.6 Management System and Quality Assurance

K.M. Power Private Limited has established management procedures and implemented 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 VERIFICATION STATEMENT

*Det Norske Veritas Certification AS (DNV Certification) has been engaged by K.M. Power Private Limited to examine the greenhouse gas (GHG) emission reductions reported from the 11.3 MW Renewable Energy project for a grid system by K.M. Power (P) Limited (CDM registration reference no. 0750) for the period, 6 February 2002 to 24 March 2006, equating to 60 602 tonnes of CO<sub>2</sub> equivalents.*

*The project has applied the approved baseline and monitoring methodologies AMS-I.D, version 09, and emissions reductions are reported in the monitoring report received on April 2007. We express no opinion on the baseline methodology neither of the project or on the validated and registered PDD.*

#### **Responsibilities of K.M. Power Private Limited and DNV Certification Limited.**

*The management of the 11.3 MW Renewable Energy project for a grid system by K.M. Power (P) Limited is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project Monitoring and Verification Plan. The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of GHG emission reductions from the project is the responsibility of the management of the project.*

*It is DNV's responsibility to express an independent verification statement on the reported GHG emission reductions from the project for the period 6 February 2002 to 24 March 2006.*

#### **Basis of GHG verification opinion**

*Our verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakech accord, as well as those defined by the CDM Executive Board.*

*Our approach is risk-based, drawing on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. Our examination includes assessment, on a test basis, of evidence relevant to the amounts and disclosures in relation to the project's GHG emissions for the period from 06 February 2002 to 24 March 2006.*



*We planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that the amount of GHG emission reductions for the period 6 February 2002 to 24 March 2006 are fairly stated.*

*We conducted our verification on the basis of the monitoring methodology AMS-I.D, version 09, and the monitoring plan included in the PDD of the project. The verification included:*

- collection and assessment of evidence supporting the reported data,*
- checking whether the provisions of the monitoring methodology AMS-I.D, version 09, and the monitoring plan in the PDD were consistently and appropriately applied.*

*We have verified whether the information included in the monitoring report of version 01 of January 2007 and version 02 of April 2007 is correct and that the emissions reductions achieved have been determined correctly.*

### **Opinion**

*In our opinion, GHG emissions reported for the project in monitoring report version 01 of January 2007 and version 02 of April 2007/ 1/are fairly stated.*

*The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology AMS-I.D Version 09 and the monitoring plan and formulae provided in the validated PDD of 12 October 2006.*

*Det Norske Veritas Certification AS is able to certify that the emission reductions from the “11.3 MW Renewable Energy project for a grid system by K.M. Power (P) Limited” for the period 6 February 2002 to 24 March 2006 amount to 60 602 ton CO<sub>2</sub> equivalent.*

*Bangalore & Oslo, 30 April 2007*

*Chandrashekara Kumaraswamy*

*Manager (South Asia)*

*Climate Change Services*

*Det Norske Veritas Certification AS*

*Einar Telnes*

*Director*

*International Climate Change Services*

*Det Norske Veritas Certification AS*



## 5 REFERENCES

### Category 1 Documents:

*Documents provided by the Project Participants that relate directly to the GHG components of the project.*

- / 1/ K.M. Power Private Limited: “11.3 MW Renewable Energy project for a grid system by K.M. Power (P) Limited” Monitoring report version 01 of January 2007 and version 02 of April 2007.
- / 2/ K.M. Power Private Limited: CDM PDD for “11.3 MW Renewable Energy project for a grid system by K.M. Power (P) Limited” version 02 dated 12 October 2006.
- / 3/ DNV Validation report for “11.3 MW Renewable Energy project for a grid system by K.M. Power (P) Limited”. Report No. 2006-9064 dated 28 October 2006.
- / 4/ 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*. Version 09: 28 July 2006.

### Category 2 Documents:

*Background documents related to the design and/or methodologies employed in the design or other reference documents. Category 2 documents have been used to cross-check project assumptions and confirm the validity of information given in the Category 1 documents and in verification interviews.*

- / 5/ International Emission Trading Association (IETA) & the World Bank’s Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>
- / 6/ Copies of APTRANSCO generation Certificates for all months
- / 7/ Test certificate for Energy meters for all three projects (Main meter and check meter) from Central Power Distribution Company of Andhra Pradesh Limited.
- / 8/ Daily generation reports including down times.
- / 9/ Production log records, Maintenance records, Internal calibration records, Internal audit reports.

### Persons interviewed:

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

- |       |                 |  |
|-------|-----------------|--|
| / 10/ | Mr. G.R. Reddy  | Managing Director, K.M. Power Private Limited  |
|       | Mr. Y. Timmayya | Executive Director, K.M. Power Private Limited |
|       | Mr. Madan Mohan | Plant In-charge, K.M. Power Private Limited    |