



VERIFICATION / CERTIFICATION REPORT

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

(UNFCCC Registration Ref. No. 0750)

Monitoring Period:
24 March 2010 to 23 March 2011

REPORT No. 2011-0659

REVISION No. 01

DET NORSKE VERITAS



VERIFICATION / CERTIFICATION REPORT

Date of first issue: 2011-10-17	Project No.: PRJC-316260-2011-CCS-IND	DNV CLIMATE CHANGE SERVICES AS Veritasveien 1, 1322 HØVIK, Norway Tel: +47 67 57 99 00 Fax: +47 67 57 99 11 http://www.dnv.com Org. No: NO 994 774 352 MVA
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Client: K.M. Power Private Limited	Client ref.: G. Ramnarayan Reddy Managing Director	
Summary: DNV Climate Change Services AS (DNV) has performed the verification of the emission reductions reported for the "11.3 MW Renewable Energy project for a grid system by K.M. Power (P) Limited" (UNFCCC Registration Ref. No. 0750) for the period 24 March 2010 to 23 March 2011. In our opinion, the GHG emission reductions reported for the project in the monitoring report (Version 03) of 08 November 2011 are fairly stated. The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology AMS-I.D (version 09) and the monitoring plan contained in the Project Design Document of 12 October 2006. DNV Climate Change Services 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" during the period 24 March 2010 to 23 March 2011 amount to 34 766 tonnes of CO ₂ equivalent.		

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Abbreviations

APTRANSCO	Transmission Corporation of Andhra Pradesh Limited
AP	Andhra Pradesh
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CEF	Carbon Emission Factor
CER	Certified Emission Reduction(s)
CH ₄	Methane
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
ERU	Emission Reduction Units(s)
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MR	Monitoring Report
N ₂ O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
UNFCCC	United Nations Framework Convention for Climate Change
VVM	Validation Verification Manual



1 INTRODUCTION

K.M. Power Private Limited has commissioned DNV Climate Change Services AS (DNV) to carry out the verification and certification of emission reductions reported for the “11.3 MW Renewable Energy project for a grid system by K.M. Power (P) Limited” (the project) in the period 24 March 2010 to 23 March 2011. 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 monitoring 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 “11.3 MW Renewable Energy project for a grid system by K.M. Power (P) Limited” for the period 24 March 2010 to 23 March 2011.

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

Project Parties:	India, Japan, Switzerland, United Kingdom of Great Britain and Northern Ireland
Title of project activity:	11.3 MW Renewable Energy project for a grid system by K.M. Power (P) Limited
UNFCCC registration No:	0750
Baseline and Monitoring methodology	AMS-I.D (version 09)
Project Participants:	K.M. Power (P) Ltd from India, Noble Carbon Credits Limited & Deutsche Bank AG from UK, CM Capital Markets Holding S.A. from Switzerland and Mitsubishi Corporation from Japan



Location of the project activity: Velgodu mandal, Kurnool district, Andhra Pradesh state, India
 Project's crediting period: 6 February 2002 to 5 February 2012
 Period verified in this verification: 24 March 2010 to 23 March 2011

The project activity is a bundle of three small hydro power projects with an aggregated installed 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 December 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.

1.4 Methodology for determining emission reductions

The project's emission reductions are determined as the product of the net electricity exported to the grid in a year and the ex-post monitored grid emission factor (southern regional grid) as the weighted average of current generation mix. According to the validated project design, there are no project emissions and leakage effects associated with the project.

The project has already had CERs issuance for the period starting from 6 February 2002 to 23 March 2010 through five periodic verifications.

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 for each unit:

- i) Electricity generation - net export to grid and auxiliary consumptions- monthly basis
- ii) import of electricity from grid during plant shut downs
- iii) Grid emission factor as weighted average of current generation mix – per data made available by the CEA.

Verification team

<i>Role</i>	<i>Last Name</i>	<i>First Name</i>	<i>Country</i>	<i>Type of involvement</i>					
				Desk review	Site visit	Reporting	Supervision of work	Technical review	TA 1.2 competence
Team leader (Verifier)	Astakala	Vidyacharan	India	✓	✓	✓	✓		✓
Technical reviewer	Govindarajulu	Murali	India					✓	✓

***Duration of verification***

Monitoring report publication: *20 June 2011*
Preparations: *From 1 July 2011 to 18 July 2011*
On-site verification: *On 19 July 2011*
Reporting, calculation checks and QA/QC: *From 01 August 2011 to 05 December 2011*

2.1 Review of documentation

The monitoring reports /1/ and the emission reduction calculations, provided in the form of spread sheets submitted by K.M. Power Private Limited, were assessed as a part of the verification.

In addition to the monitoring documentation provided by the project participants, DNV has reviewed:

- (a) The registered PDD, including the monitoring plan /2/
- (b) the corresponding validation report /3/;
- (c) Previous verification reports /4/;
- (d) The applied monitoring methodology AMS-I.D, version 09 /6/;
- (e) Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board if any /5/;
- (f) Any other information and references relevant to the project activity's resulting emission reductions (e.g., annual grid emission factor) /9/.
- (g) Other operational documents were also assessed as evidence /10/-/20/.

2.2 Site visit

On 19 July 2011, DNV carried out 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 /2/. The instruments used for monitoring electricity in all the three project locations were evidenced, 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).

The on-site assessment involves

- (a) Assessment of the implementation and operation of the proposed CDM project activity as per the registered PDD;
- (b) Review of information flows for generating, aggregating and reporting the monitoring parameters;
- (c) Interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the monitoring plan in the PDD;
- (d) A cross-check between information provided in the monitoring report and data from other sources such as plant log books, inventories, purchase records or similar data sources;



- (e) A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD and the selected methodology;
- (f) Review of calculations and assumptions made in determining the GHG data and emission reductions;
- (g) Identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

Interviewed Personnel & Organisation	Interview topics
K.M Power Private Limited: K.E Hari babu – Executive Director <u>Guntakandala Unit</u> A. Venkateswara reddy, Plant In-charge B.Lakshmaiah – Shift In-charge <u>Velpanuru Unit</u> N. Ravindra babu – Plant In-charge K. Raghavendra – Shift In-charge <u>Madhavaram Unit</u> Mr. K. Madan mohan Reddy, Plant In-charge M. Jabiullakhan – Shift In-charge- Madhavaram <u>From zenith Energy</u> ISRC Murthy – Senior Manager –CDM V. Naresh Kumar – Trainee Engineer -CDM	<ul style="list-style-type: none"> ➤ Whether the project has been implemented as planned ➤ Calculation of ex-post baseline emission factor ➤ Adherence to monitoring plan established in registered Project Design Document. ➤ Management procedures like internal audits and reviews to minimise uncertainties in data monitoring and data management ➤ Project performance ➤ Calibration of metering equipment ➤ Data archival and Management

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 monitoring period.

One CAR and a CL have been raised during this verification which have been resolved with adequate justification from the project participant. Also the Monitoring report has been



revised by the project participant to effect minor corrections due to data misstatement in the webhosted Monitoring report.



3 VERIFICATION FINDINGS

This section summarises the findings from the verification of the emission reductions reported for the “11.3 MW Renewable Energy project for a grid system by K.M. Power (P) Limited” for the period 24 March 2010 to 23 March 2011.

3.1 Remaining issues, CARs, FARs from previous validation / verification

According to previous verification /4/, no FARs were required to be followed-up during this verification.

3.2 Project implementation

The project has been implemented as planned. The actual project construction activity started at Guntakandala site on 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 December 2003. Electricity generation and supply to APTRANSCO grid is enabled through independent transmission lines from individual units of the project activity. Grid synchronization reports for the three sub-projects have been verified by DNV.

After implementation and commissioning of the project, no changes have been carried out. As part of the site visit DNV was able to confirm that the project implementation is in accordance with the project description contained in registered PDD of 12 October 2006 /2/.

3.3 Information (data and variables) provided in the monitoring report that is different from that stated in the registered PDD

It has been observed that the emission reductions verified for the chosen verification period are higher than the ex-ante estimated CERs as per the registered PDD. The higher emission reductions reported are mainly attributed to the unforeseen excess rain fall in the project area increasing the water availability during the verification period for the project. This is further explained below.

24 March 2010 to 23 March 2011	Baseline Emissions (tCO _{2e})	Project Emissions (tCO _{2e})	Net Reductions (tCO _{2e})
As per PDD	25 511	0	25 511
As per MR	34 766	0	34 766
Percentage of variation	+36.28%	0	+36.28%

The project activity is implemented on a natural stream and the water flow in the stream is highly dependent on inflows from reservoirs situated upstream and rain fall during the season. Uneven availability of water from the sources has been main contention for the project over



the years since start of the project activity, which was also envisaged and projected as one of main concern as part of registered PDD. The electricity generation data from the start of the project activity has been verified and the same is indicating a substantial variation from year to year. The amount of rain fall in the region during the current verification (covering both pre & post monsoon apart from monsoon season) has been verified from the Indian meteorological department website confirming that there has been excess rain fall in the region compared to the normal /21/. The excess water inflow from upstream, leading to operation of project turbines at higher plant load factor throughout the season. This resulted in excess generation than envisaged in the registered PDD. This is verified by comparing annual plant load factor so far since start of crediting period confirming that the higher PLF is because of higher water availability only but not because of any design change.

S.No	Verification period	Plant load factor
1	06 Feb 2002 to Mar 2006	19.26%
2	Mar 2006 to Mar 2007	34.22%
3	Mar 2007 to Mar 2008	37.86%
4	Mar 2008 to Mar 2009	28.33%
5	Mar 2009 to Mar 2010	16.81%
6 (current)	Mar 2010 to Mar 2011	47.06%

However it has been verified from the month wise plant load factor for each plant and confirmed that the project activity has been operated within the installed capacity throughout the verification period.

3.4 Compliance of monitoring plan with monitoring methodology

DNV is able to confirm that the monitoring plan contained in the registered PDD of 12 October 2006 is in accordance with the approved methodology applied by the project activity, i.e. AMS-I.D (version 09).

3.5 Compliance of monitoring with the monitoring plan

The monitoring has been carried out in accordance with the monitoring plan contained in the registered PDD of 12 October 2006 /2/.

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

- Ex-post grid emission factor for southern India electricity grid.
- Electricity generation
- Electricity export to grid
- Import from grid during off season and auxiliary consumptions



In accordance with AMS-I.D, the baseline for the project activity has been calculated ex-post by determining the CO₂ emissions from the electricity generation from the southern regional grid using the weighted average of current generation mix approach.

The registered PDD considers an emission factor as 739.14 tCO₂/GWh, while estimating ex-ante emission reductions for the period of 2010-2011. In line with the monitoring plan in the registered PDD, the project considered the ex-post monitored grid emission factor (as per CO₂ database from official CEA website /9/ which is the authentic and reliable source) that was available at the time of receipt and webhosting of the initial monitoring report. Since the emission factor for the year 2010-11 was not available, the emission factor for the most recent year (2009-10) at 746.83tCO₂/GWh has been considered for computing the baseline emissions. This is considered acceptable and conservative.

DNV confirms that the information provided in the monitoring report has been cross-checked with other sources such as plant log books, electricity export records like Joint meter reading certificates issued by the APTRANSCO.

Daily gross generation at each location is measured continuously using exclusive energy meters installed at each turbo generator and is recorded in the production log sheets for each location on daily basis. These records have been verified by DNV during site visit. During the chosen verification period the project activity has generated a cumulative quantity of 47 504 150 kWh between all three units.

The export and import of power to/from the grid is monitored continuously using energy meters which are under the purview of the state electricity board and maintained and calibrated by them. The joint meter reading is taken at each individual location and recorded by both representatives of KM Power and the electricity board officials on monthly basis. The Joint meter reading certificates form the basis for verification of the claimed emission reductions. During the verification period the project activity has recorded a cumulative export of 46 599 400 kWh and electricity import from grid during off seasons and emergencies up to 20 000 kWh.

Though auxiliary consumptions are measured using exclusive meters at each unit, it is also reported as difference of gross electricity and electricity export which also includes the transmission and transformer losses. This is accepted as conservative approach.

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.

Based on the validated emission factors and actual electricity generation and net power export to grid, the emission reductions have been verified to be 34 766 tCO₂ equivalent for the period 24 March 2010 to 23 March 2011.

Parameter No.1	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	Gross Electricity generation (at each location)
Measuring frequency:	Measured hourly and aggregated for daily
Reporting frequency:	Daily
Is measuring and reporting frequency in	Yes.



accordance with the monitoring plan and monitoring methodology? (Yes / No)	
Type of monitoring equipment:	Two energy Meters (one each for two turbines) located at each location
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?	Not specified in PDD. However 0.2 Class accuracy meter for the gross generation, which represents a good practice.
Calibration frequency /interval:	Annual
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?	Not defined in the PDD. But annual calibration represents a good industrial practice and also meets the small scale projects criteria for calibration interval.
Company performing the calibration:	M/s. TRANSERECT consultant testing & Commissioning Engineers, Bangalore, performed the calibration of gross generation meters at each location.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes. Calibration confirms the proper function of each of monitoring equipment.
Is(are) calibration(s) valid for the whole reporting period?	Yes. The calibration records confirm that the validity of calibration is for whole verification period.
If applicable, has the reported data been cross-checked with other available data?	Data has been cross verified from the daily Log sheets for turbine operations
How were the values in the monitoring report verified?	From the daily generation reports
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. Plant in-charges of each unit are responsible for proper transfer of data and reporting to management on emission reductions. Periodical quality checks through internal audits are practiced.
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:

Auxiliary electricity (at each location)



(as in monitoring plan of PDD):	
Measuring frequency:	Measured hourly and aggregated for daily
Reporting frequency:	Daily
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
Type of monitoring equipment:	Energy Meters located at each location
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?	Not specified in PDD. However 0.2 Class accuracy meter for the auxiliary electricity, which represents a good practice.
Calibration frequency /interval:	Annual
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?	Not defined in the PDD. But annual calibration represents a good industrial practice and also meets the SSC criteria for calibration interval.
Company performing the calibration:	M/s. TRANSERECT consultant testing & Commissioning Engineers, Bangalore performed the calibration of auxiliary meters at each location.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes. Calibration confirms the proper function of each of monitoring equipment.
Is(are) calibration(s) valid for the whole reporting period?	Yes. The calibration records confirm that the validity of calibration is for whole verification period.
If applicable, has the reported data been cross-checked with other available data?	Data has been cross verified from the daily Log sheets for turbine operations.
How were the values in the monitoring report verified?	From the daily generation reports
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. Plant in-charges of each unit are responsible for proper transfer of data and reporting to management on emission reductions. Periodical quality checks through internal audits are practiced.
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.3	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	Electricity Export and Import (at each location)
Measuring frequency:	Measured continuously and aggregated for monthly
Reporting frequency:	Monthly
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. Joint Meter Readings Reports certified by APTRANSCO officials
Type of monitoring equipment:	Tri-vector Meters located at connected substation in each location
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?	Not specified in PDD. However 0.2 Class accuracy meter for the Export electricity meter, which represents a good practice.
Calibration frequency /interval:	Annual
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?	Not defined in the PDD. But annual calibration represents a good industrial practice and also meets the SSC criteria for calibration interval. Meters are replaced every year by APTRANSCO officials as a procedure with calibrated meters and removed meters are calibrated annually and kept ready for use.
Company performing the calibration:	Govt of India, STQC, Electronic Test and Development Centre Hyderabad, performed the calibration of export electricity meters at each location.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes. Calibration confirms the proper function of each of monitoring equipment.
Is(are) calibration(s) valid for the whole reporting period?	No. Calibration of meters used during certain period was delayed at least for a period up to one month for each of the meter at every location. However subsequent calibration of these meters conforms to the accuracy limits, in line "Guidelines for assessing compliance with calibration frequency requirements" EB52 annex60, emission reductions have been adjusted accordingly. This is further explained in this section below:
If applicable, has the reported data been cross-checked with other available data?	Data has been cross verified from the daily reports and also sales invoices raised by KM Power.
How were the values in the monitoring report verified?	Values in the Monitoring report have been verified from the Joint meter reading certificates jointly signed by APTRANSCO authorities and KM Power 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. Plant in-charges of each unit are responsible for proper transfer of data and reporting to management on emission reductions. Periodical quality checks through internal audits are practiced.



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
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It has been verified that the export/import meters used in each unit were or certain specified period not covering the valid calibration period. Hence CAR has been raised to address the delayed calibration period in line with the EB 52 annexure 60 guidance/8/. A brief summary on the validity of these calibrations has been added in below table:

Unit location	Meter No.	Period of usage of the meter during current verification period	Calibration Validity	Comments
Guntakandala	01988419	24 March 2010 to 28 October 2010	19 October 2009 to 18 October 2010. Another calibrated meter (serial no. 01988399) /18/ has been installed after this period.	Meter was operated without calibration between 18 October 2010 and 28 October 2010. Since there was a delay in the calibration period covering the two Joint meter readings certificates and subsequent calibration results confirmed the error limit within permissible limits for the meter, the export/import electricity measured has been adjusted the applying the maximum permissible error percentage, for the period of 21 September 2010 to 24 November 2010. This resulted in reduction of 9 tCO ₂ e.
Velpanur	01988435	23 December 2009 to 21 January 2011	13 November 2009 to 12 November 2010. Another calibrated meter (serial no. 01988419) /19/ has been installed after this period.	Meter was operated without calibration between 13 January 2010 and 21 January 2011. Since delayed calibration period covering the two Joint meter readings certificates, and subsequent calibration results confirmed the error limit within permissible limits for the meter, the export/import electricity measured has been adjusted the applying the maximum permissible error percentage for the period of 23 October 2010 to 21



				January 2011. This resulted in reduction of 9 tCO ₂ e.
Madhavaram	06607932	24 March 2010 to 23 April 2010	01 April 2009 to 31 March 2010 Another calibrated meter (serial no. 07033700)/20/ has been installed after this period.	Meter was operated without calibration between 1 April 2010 to 23 April 2010. Since delayed calibration period covering Joint meter readings certificate for the month of April 2010, and subsequent calibration results confirmed the error limit within permissible limits for the meter, the export/import electricity measured has been adjusted the applying the maximum permissible error percentage for the period of 24 March 2010 to 23 April 2010. This resulted in reduction of 1 tCO ₂ e.

All subsequent calibrations of above meters have been confirmed to be with in the specified error limits.

3.6 Assessment of data and calculation of emission reductions

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 spread sheets 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.

Baseline emissions are calculated as a product of net electricity export and ex-post monitored southern grid emission factor. During the verification period the project activity has recorded a cumulative export of 46 599 400 kWh and electricity import from grid during off seasons and emergencies up to 20 000 kWh. This results in baseline emissions equivalent to 34 785 tCO₂.

The project activity being a small hydro project has not resulted in any **Project emissions** and **Leakage** for the activity which is in-line with the registered PDD.

It has been noticed that there has been delay in calibration of export meters for few days. Though the registered PDD does not confirm the calibration frequency the project activity practices an annual cycle in order to have good industrial practice. This is also with specified three year limit of SSC guidelines. Since subsequent calibration confirms the meters are within specified accuracy limits the CERs have been adjusted for the delayed calibration period is in accordance with EB52 annexure 60 guidance. This has resulted in reduction of 19 tCO₂e CERs leading to net emissions reductions of 34 766 tCO₂e.

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 (0.2 class accuracy) 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.

3.7 Quality of evidence to determine emission reductions

The emission reductions reported per month in the period 24 March 2010 to 23 March 2011 was verified to be 34 766 tCO₂e.

Sufficient evidence was presented for the reported net emission reductions.

3.8 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 CERTIFICATION STATEMENT

DNV Climate Change Services AS (DNV) has performed the verification of the emission reductions that have been reported for the “11.3 MW Renewable Energy project for a grid system by K.M. Power (P) Limited” (UNFCCC Registration Reference No. 0750) for the period 24 March 2010 to 23 March 2011.

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 09), the monitoring plan contained in the registered Project Design Document of 12 October 2006 and the monitoring report (Version 03) dated 08 November 2011. 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 “11.3 MW Renewable Energy project for a grid system by K.M. Power (P) Limited” (UNFCCC Registration Ref. No. 0750) for the period 24 March 2010 to 23 March 2011 are fairly stated in the monitoring report (Version 03) dated 08 November 2011.

The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology AMS (version 09) and the monitoring plan contained in the registered PDD of 12 October 2006.

DNV Climate Change Services 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” during the period 24 March 2010 to 23 March 2011 amount to 34 766 tonnes of CO₂ equivalent.

Bangalore and Oslo, 05 December 2011

Astakala Vidyacharan
CDM Verifier
DNV India

Edwin Aalders
Approver,
DNV Climate Change Services 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/	K.M. Power Private Limited: "11.3 MW Renewable Energy project for a grid system by K.M. Power (P) Limited" Monitoring report version 02 dated 20 June 2011 and version 03 dated 08 November 2011 and excel sheet calculations.
/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/	Verification/Certification report for "11.3 MW Renewable Energy project for a grid system by K.M. Power (P) Limited". Report No. 2010-0528 dated 18 February 2011.

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 01.2
/6/	Appendix B of the simplified modalities and procedures for small-scale CDM project activities: <i>Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories - AMS-ID</i> , version 9.
/7/	Joint Meter reading certificates issued by APTRANSCO authorities and monthly sales invoices raised by KM Power for the electricity exported during each month for the verification period covering all months for each unit.
/8/	EB52 annex 60: Guidelines for assessing compliance with the calibration frequency requirements version 01
/9/	CO ₂ database Version 06 March 2001 on Official CEA website: http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm
/10/	Daily Generation records (log sheets and daily reports) including down times
/11/	Production log records, Maintenance records, Internal calibration records, Internal audit reports
/12/	Gross electricity meters at Guntakandala unit I&II (meter serial no. A3211033 & A3211032), calibrated by 1) M/s. Sai Ram Engineering works, Kurnool, dated 15 July 2009 2) dated 13 July 2010 by TRANSERECT consultant testing & Commissioning Engineers, Bangalore covering the verification period from 24 March 2009 to 23 March 2010.
/13/	Gross electricity meters at Velpanur unit I&II (meter serial no. A3220424 & A3220426), calibrated by 1) M/s. Sai Ram Engineering works, Kurnool, dated 16 July 2009 2) dated 14 July 2010 by TRANSERECT consultant testing & Commissioning Engineers, Bangalore covering the verification period from 24 March 2009 to 23 March 2010.
/14/	Gross electricity meters at Madhavaram unit I&II (meter serial no. B3281357 & B3281359) calibrated on 1) dated 07 February 2010 by M/s. Sai Ram Engineering works, Kurnool and 2) 15 July 2010 by TRANSERECT consultant testing & Commissioning Engineers, Bangalore covering the verification period from 24 March 2010 to 23 March 2011
/15/	Auxiliary Electricity meter at Guntakandala unit (serial No.F40/853-502) calibrated by 1) M/s. Sai Ram Engineering works, Kurnool, dated 15 July 2009 2) dated 13 July 2010 by TRANSERECT consultant testing & Commissioning Engineers, Bangalore covering the



	verification period from 24 March 2009 to 23 March 2010.
/16/	Auxiliary Electricity meter at Velpanur unit (serial No.F40/853-502/1) calibrated by 1) M/s. Sai Ram Engineering works, Kurnool, dated 16 July 2009 2) dated 14 July 2010 by TRANSERECT consultant testing & Commissioning Engineers, Bangalore covering the verification period from 24 March 2009 to 23 March 2010
/17/	Auxiliary Electricity meter at Madhavaram unit (meter serial no. 191747/104806-4909 calibrated on 1) dated 07 February 2010 by M/s. Sai Ram Engineering works, Kurnool and 2) 15 July 2010 by TRANSERECT consultant testing & Commissioning Engineers, Bangalore covering the verification period from 24 March 2010 23 March 2011
/18/	Export/Import Electricity Meter for Guntakandala Unit (serial no. 01988419) calibrated on dated 19 October 2009 and used for the verification period covering from 24 March 2010 to 28 October 2010 and (serial no. 01988399) calibrated on dated 19 October 2008 and used for the verification period covering from 28 Oct 2010 to 23 March 2011 by Govt of India, STQC, Electronic Test and Development Centre Hyderabad.
/19/	Export/Import Electricity Meter for Velpanur Unit (serial no. 01988435) calibrated on dated 13 November 2009 and used for the verification period covering from 23 December 2009 to 21 January 2011 and (serial no. 01988419) calibrated on dated 09 November 2010 and used for the verification period covering from 22 January 2011 to 23 March 2011 by Govt of India, STQC, Electronic Test and Development Centre Hyderabad.
/20/	Export/Import Electricity Meter for Madhavaram Unit (serial no. 06607932) calibrated on dated 1 April 2009 and used for the verification period covering from 24 March 2010 to 23 April 2010 and (serial no. 07033700) calibrated on dated 7 April 2010 and used for the verification period covering from 23 April 2010 to 23 March 2011 by Govt of India, STQC, Electronic Test and Development Centre Hyderabad.
/21/	Web links for Indian meteorological Department rainfall data: http://www.imd.gov.in/section/hydro/dynamic/rfmaps/seasonal/premon2010.jpg http://www.imd.gov.in/section/hydro/dynamic/rfmaps/seasonal/mon2010.jpg http://www.imd.gov.in/section/hydro/dynamic/rfmaps/seasonal/postmon2010.jpg

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APPENDIX A

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	Impact of delayed calibration for the meter used at Madhavaram unit (meter no. 06607932) has not been reported	The revised MR reported impact on CERs. This lead to reduction of 1 CER.	The corrections have been reviewed and accepted. CAR closed.

Clarification requests

CL ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants
CL 1	Excess generation during the verification period resulting in 36% higher CERs than envisaged in registered PDD requires a substantiation with proper evidences.	Detail explanation on rain fall data and analysis on varied electricity generation from year to year justifying the uncertainty has been added in revised MR.	The justification provided based on the excess rain fall data during pre, and post monsoon apart from during the rainy season, have been referred from the Indian meteorological department data. The varied electricity generation over a period of past 8 years has also noted to assess the uncertainty involved in the water availability and electricity generation. CL closed.

Forward action requests from previous verification

FAR ID	Forward action request	Summary of how FAR has been addressed in this reporting period	Assessment of how FAR has been addressed
FAR 1	No FARs in the previous verifications		

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Forward action requests from this verification

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

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APPENDIX B

CURRICULA VITAE OF THE VERIFICATION TEAM MEMBERS

Astakala Vidyacharan is a chemical engineer and prior to joining DNV in 2005, has had 11 years of direct work experience in various chemical industries. His work experience covers 4 years in project implementations in pesticide and fine chemical industries , including environment management activities; 7 years in process operations of pesticide, natural products and fine chemical industries.

He has received extensive training in the CDM validation and verification process. He is an appointed validator for the CDM validation and verification program of DNV and has performed validation of several CDM projects. He is also a trained auditor for GHG accounting standards and involved audit of Corporate GHG accounting. He is a qualified ISO 9001, ISO 14001 Lead auditor and OHSAS 18001 auditor who has performed several audits for various industrial sectors under these management systems.

His qualification, industrial experience and experience in CDM facilitate him to assess renewable energy based on Hydro and Biomass, Energy Efficiency sectors, in particular to sufficient degree.

Murali Govindarajulu holds a Bachelor's Degree in Chemical Engineering and has done a Short term diploma course in Management. Having an overall experience of around twelve years. Prior to joining DNV having around seven years experience in Chemical process industry covering production, energy efficiency improvement and equipment design erection and commissioning. His experience also covers the fields of environmental management and resource conservation including identification of alternative fuels. He has also been actively involved in implementation of Management Systems such as ISO 14001 and OHSAS 18001 standards in chemical process industry for more than three years.

He has experience of around 5 years in validation and verification of numerous CDM projects in DNV, both in India & abroad. His qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in energy generation from renewable energy sources.