

VCS 2007.1 Verification Report of the GHG emission reduction project entitled
"86 MW Hydro Project in Himachal Pradesh"



Voluntary Carbon Standard Version 2007.1
Verification Report

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TÜV NORD CERT GmbH	2009-06-03
Report Title:	Approved by:
86 MW Hydro Project in Himachal Pradesh	Mr. Rainer Winter
Client:	Project Title:
Malana Power Company Limited.	86 MW Hydro Project in Himachal Pradesh
Summary:	
Malana Power Company Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the verification of the project "86 MW Hydro Project in Himachal Pradesh", with regard to the relevant requirements of VCS 2007.1 standard. The project activity is generation of electricity by installation of renewable hydropower project to displace electricity generated by fossil fuel based thermal power plants in Northern regional Grid, thus achieves GHG emission reduction. In the course of the verification 2 Corrective Action Requests (CAR) and 1 Forward Action Request (FAR) were raised. The verification is based on the monitoring report, PDD, VCS1 Validation report and other supporting documents made available to the verifiers by project proponent. As a result of the verification, the verifiers confirm that: The GHG emission reduction in the crediting period (2008-04-01 to 2009-03-31) is: 266,898 tCO₂e.	
Work carried out by:	Number of pages:
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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Energy Authority
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CP	Certification Program
CL	Clarification Request
GHG	Greenhouse gas(es)
HPSEB	Himachal Pradesh State Electricity Board
kW	Kilowatt
kWh	Kilowatt hour
m	Meter
MPCL	Malana Power Company Limited
MW	Megawatt
MWh	Megawatt hour
NEWNE	The North-East-West-North East Grid of India
PDD	Project Design Document
QC/QA	Quality control/Quality assurance
UNFCCC	United Nations Framework Convention on Climate Change
VCU	Voluntary Carbon Unit
VER	Verified Emission Reductions

1 Introduction

1.1 Objective

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

- To verify that the project is implemented as described in the project design document^{/PDD/};
- To confirm that the monitoring system is implemented and fully functional to generate voluntary carbon units (VCUs¹ 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.

1.2 Scope and Criteria

The verification of this VCS project is based on the VCS v1 project design document^{/PDD/}, the monitoring report^{/MR1/MR2/}, 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 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 VCS project Description

The purpose of the project activity is to generate electricity by using the renewable energy source (hydro) for a grid system in the state of Himachal Pradesh, India. The project activity displaces electricity and green house gas (GHG) emissions currently produced by fossil fuel-burning Power plants. The generated electricity by the project activity is being exported to the Northern regional grid (now a part of NEWNE grid) in India.

The project is located at Jari village in Kullu district of Himachal Pradesh, about 25 Km from Bhunter, which is the nearest airport. The project power house coordinates are uniquely identified as: Latitude-32 degrees 0.2 minutes north; Longitude-77 degrees 14.5 minutes east. The nearest railway station from the project site is Kiratpur Sahib, about 198 Km from Bhunter. Bhunter has an airport and is connected to Delhi.

¹ As per VCS, Verified Emission Reductions (VERs) are considered to be VCUs only after the successful registration in an approved VCS registry.

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The electricity generation facility is installed on Malana Nallah, a tributary of Parbati River. The project activity entails installation of two turbines of capacity 43MW each along with other auxiliary devices at Jari village, Kullu District, Himachal Pradesh.

The project activity has the capacity to generate about 370 million units per annum and this estimation is based on 95% power plant availability for a 90% dependable year based on the hydrological data for the last 24 years provided by the Government of Himachal Pradesh.

The achieved annual GHG emission reduction during the crediting period is **266,898 tCO₂e**.

1.4 Level of assurance

The verification report is based on VCS v1 PDD^{/PDD/}, monitoring report^{/MR1/MR2/}, supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment. The verification opinion is assured through the credibility of all documents checked.

2 Methodology

The verification of the project was carried out from April 2009 to May 2009.

Preparations	:	2009-04-24 to 2008-05-08
On-site verification	:	2008-05-09 to 2008-05-10
(Draft) Reporting	:	2009-05-10
(Final) Reporting	:	2009-05-26

The verification consisted of the following steps:

- A desk review of the VCS v1 PDD^{/PDD/} and supporting documents against the requirements of the VCS 2007.1;
- A desk review of the Monitoring Report^{/MR1/MR2/} and additional supporting documents which were submitted by the client.
- Verification audit planning,
- 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 include the relevant rules and steps as set out in the VCS 2007.1.

3 Verification Findings

3.1 Remaining issues, including any material discrepancy, from previous validation.

There are no remaining issues including any material discrepancy, from the previous validation.

3.2 Project Implementation

The project has been implemented as described in the project Design Document^{/PDD/} as per VCS v1 and is grandfathered to VCS 2007.1^{/VCS/}. There are no major changes in the key equipment since the validation of the project.

During the monitoring period covering 01/04/2008 to 31/03/2009 the project displaced 355,864,651kWh of Northern regional grid in India (which is now the NEWNE grid). This was verified by the verification team during the on site visit by checking the recorded generation data^{/LOG/}, plant records, joint metering report^{/JMR/} and invoices raised against the power supplied to the grid^{/INV/}.

For the monitoring purpose, there are two meters (main and check) for measuring electricity generated by the two generators, and another two meters for measuring electricity transferred from the plant to the substation at the outgoing point. The auxiliary electricity consumed by the plant is estimated by subtracting the above meter readings of generating point and outgoing point. Further there are two meters at the substation for measuring the electricity supplied to the grid. The difference between the outgoing point at the plant and the reading at the substation accounts for the transmission losses. The meter readings were recorded daily, weekly and summarized monthly.

Monthly and weekly invoices^{/INV/} of additional electricity fee with the grid company were available for verification.

All required equipment and procedures are available and implemented as mentioned in the PDD except the deviation in the calibration frequency.^{/PDD/}

The submitted monitoring report^{/MR1/MR2/} which forms the basis of the verification was prepared by summarizing consolidated monthly data over the whole monitoring period in accordance with the monitoring plan.

All necessary monitoring instruments are installed. The measuring devices are well known and calibrated by authorised agency.

The following CAR and FAR were raised in the context of the deviation in the calibration frequency, which were subsequently closed.

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	CAR 1			
Classification	☒ CAR	☐ FAR	☐ CR	☐ None
Findings	As per the description on reliability stated in monitoring plan, Annex -4 of the validated VCS v1 PDD, the frequency of calibration of energy meters is once in six months. Nevertheless during the verification site visit it was found that the frequency of the calibration is more than one year, which is deviating from the monitoring plan of the validated PDD. /CAL/			
Corrective Action # 1	The meters used for monitoring the electricity exported to the grid by the project activity are under the control of Himachal Pradesh State Electricity Board (HPSEB). The meters are tested and calibrated as per the requirements of HPSEB. The calibration frequency for the meters as acceptable to HPSEB is annual and same is being maintained by the Project Participant. Following meters were calibrated in April 2007 and installed in December 2007. 1) Main meter Line 1 - Sl. no.AB0001A 2) Check meter of Line 1- Sl. no.AB0002A 3) Main meter of Line 2 - Sl. no.AB0003A 2) Check meter of Line 2- Sl. no.AB0004A Considering that these meters were installed only in December 2007 hence there calibration status is valid till December 2008 as the calibration certificate says the validity of calibration is for one year. The same is also acceptable to the HPSEB. A certificate to this effect is being provided to the DOE. However these meters were replaced with calibrated meters before their calibration expiry (December 2008): Meter no AB0001A, AB000 2A and AB0004A were replaced with meter no AB00010A , AB00011A and AB00012A respectively on 1st Sep'08 While meter no AB0003A was replaced with meter no AB0005A on 28th July'08			

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Corrective Action # 1	The newly installed meters were calibrated as given below: AB00010A, AB00011A, AB00012A were calibrated on 11/08/08 AB0005A was calibrated on 17/07/08. The proper functioning of the energy meters can also be deduced from the fact that the Gross electricity generated by the project and the electricity exported by the project are comparable throughout the monitoring period. This also proves that meters were working fine throughout the period. Also the meters are observed on weekly basis by HPSEB who report for any malfunctioning of the meter. This should also be noted that HPSEB makes payment to the PP based on the same meter readings. Hence it can be deduced that though the calibration of meter was not as per the PDD though the data being measured is accurate and acceptable.
DOE Assessment # 1	It is quite evident from the calibration certificates that the validity of the certificate is one year. Hence the verification team is convinced that the calibration frequency of 1 year is acceptable and it will not affect the data reliability though it is mentioned as twice in a year in the monitoring plan of the validated PDD. The stated meter nos. and date of calibration were cross checked with calibration certificates^{/CAL/} and found correct as stated by the PP above. The verification team confirms that the meters which were calibrated in April 2007 and installed in December 2007 were kept spare as it was cross checked with the previous year's calibration certificates and meters used.^{/CAL/}

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	The verification team has assessed the data reliability of the net electricity supplied to the grid and confirms the same is reliable and of adequate quality due to the following reasons though the calibration frequency is more than 1 year : 1. As stated above by the PP, a certificate from the state electricity board stating the validity of the calibration certificate for 1 year from the date of installation is provided to the DOE^{/CAL/}. During the site visit the verification team has understood the same from the interviewed electricity board personnel^{/IM03/}. 2. During site visit it was confirmed that there is a weekly billing mechanism based on the daily generation and which aggregates to the monthly bills. During the billing the state electricity board (HPSEB) will check the meters. Then only they will be sending the daily data to the PP for billing and other government bodies^{/IM03/IM01/}. 3. The net electricity supplied to the grid is also cross checked with the generation data at the plant and plant's outgoing point meter readings and found the data is consistent^{/LOG/JMR/INV/}. 4. The meters were calibrated by an authorised agency M/s Electronics Regional Test Laboratory which is accredited by National Accreditation Board for Testing and Certification Laboratories.^{/CAL/}
Conclusion	☐ To be checked during the next periodic verification ☒ Appropriate action was taken ☐ Project documentation was corrected correspondingly ☐ Appropriate was action not taken ☐ The project complies with the requirements

	FAR 1
Classification	☐ CAR ☒ FAR ☐ CL ☐ None
Findings	In the context of CAR 1 the frequency of calibration of the all energy meters shall be defined by the project participant and it shall be verified during the next periodic verifications.
Corrective Action # 1	The calibration frequency would be annual and the calibration certificates of all energy meters would be made available to DOE for verification.

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	FAR 1
DOE Assessment # 1	It is evident from the provided calibration certificates that the calibration certificate is valid for one year. certificates. ^{/CAL/} Moreover the Central Electricity Regulatory Commission, which has the authority to regulatory the metering and calibration frequency has also made one year calibration mandatory ^{/CERC/} . Hence the verification team agrees to revise the calibration frequency as 1 year. Nevertheless, it will be assessed during the next periodic verification.
Conclusion	☒ To be checked during the next periodic verification ☐ Appropriate action was taken ☐ Project documentation was corrected correspondingly ☐ Appropriate action was not taken ☐ The project complies with the requirements

3.3 Completeness of Monitoring

The reporting^{/MR1/MR2/} is in line with the requirements of the validated monitoring plan of the VCS v1 PDD as well as with the applied methodology ACM0002 (version 06)^{/ACM0002/}.

The reporting procedures reflect the requirements of the monitoring plan^{/MR1/MR2/}. The net electricity replaced is recorded everyday, summarized every week and month, and stored appropriately during the whole monitoring period. These data form the basis of emission reduction calculation.

The verification team has verified the monthly generation reports^{/JMR/}, log books^{/LOG/}, invoices^{/INV/} and found they are recorded and maintained in line with monitoring plan of the validated VCS v1 PDD and methodology ACM0002. Thus the DOE confirms the completeness of the monitoring.

3.4 Accuracy of Emission Reduction Calculations

The approved CDM baseline and monitoring methodology ACM0002 version 06^{/ACM0002/}, is applied to the project activity. GHG emission reduction is calculated as baseline emission minus project emission.

Baseline emission is net electricity delivered to the grid multiplied with emission factor (EF), in compliance with ACM0002 version 06. EF is calculated as 0.750 tCO₂e/MWh.

As referred in section 3.2, the calibration frequency is defined as once in 6 months which is deviating from the

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monitoring plan of the validated VCS v1 PDD^{/PDD/}. In this regard CAR 1 and FAR were raised, which are discussed in section 3.2, and are closed successfully. The generation records were found to be of adequate quality. The verification team has cross checked the net electricity exported to the grid with the measurements observed at plant's generation and transmission (outgoing) points. The readings were found within the limit. Moreover the verification team has interviewed the local electricity board engineer^{/IMO3/} and understood the net electricity supplied to the grid is recorded daily and weekly data will be sent to higher authorities and also there is mechanism of weekly billing. During the site visit the verification team has verified the daily, weekly and monthly generation reports to cross check the reliability of data and were satisfied.

Thus the verification team is convinced that the net electricity supplied to the grid and the generation reading are of adequate quality though the calibration frequency is more than 1 year. Moreover the energy meters were calibrated by Electronics Regional Test Laboratory (North), which is an authorised testing and calibration laboratory^{/CAL/}.

It was verified in the course of this verification that the above mentioned methodology has been correctly and accurately applied in calculating the total emission reductions and the emission reduction calculation is accurate and conservative.

Nevertheless, the below mentioned CAR was raised which was subsequently resolved.

	CAR 2			
Classification	☒ CAR	☐ FAR	☐ CL	☐ None
Findings	The monitoring report (MR) and Emission Reduction (ER) Sheet shall include the generation unit meter readings and the transmission line meter readings. Hence, the MR and ER sheet shall be revised.			
Corrective Action # 1	MR and ER sheet both have been revised to include the Energy Generated and Energy sent out by the plant.			
DOE Assessment # 1	OK. The respective changes are reflected in the MR and ER.			
Conclusion	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☐ Project documentation was corrected correspondingly ☐ Appropriate action was not taken ☐ The project complies with the requirements			

3.5 Quality of Evidence to Determine Emission Reductions

Several documents were submitted by the project proponent as evidence to determine emission reductions which form apart of Table 5-1. Apart from the documents there is an electronic device i.e. Data collection device (DCD) found to be in place. DCD records the data in the electrical format from the meters and this data is archived electronically. This recorded data was verified on sample basis and found to be matching with the other recorded data. The net electricity supplied to the grid, gross generation and energy measured at outgoing point are collected using the DCD as stated above which completely avoids the manual errors. Moreover the net electricity generated was cross checked with gross generation and the energy measurements observed at outgoing point and found that measured energy is found matching after deducting the normally observed transmission losses. Furthermore competent employees are recruited, who are found knowledgeable not only about the plant operations but also ensuring the quality of the data and recording and maintaining^{/IM01/}.

As discussed in the above Para and referred in section 3.2 and 3.4 the quality is found of appropriate quality. Hence the verification team concludes that the evidence and the data are of good quality.

3.6 Management and Operational System

During the verification site visit it was found the operational structure and operation of the structure is found as stated in the monitoring plan of the VCS v1 PD and the monitoring report. Moreover the competent staff is employed to ensure the data quality as discussed in section 3.5.

As stated in the monitoring plan of the validated VCS v1 PDD, internal audits were conducted and the reports were made available during veritifacation^{/LOG/}.

An operational structure was established with responsibilities identified. A monitoring mechanism was found to be in place by Himachal State Electricity Board (HSEB). Personnel are also sent for training as against the identified requirements.

The weekly and monthly summary report is submitted to the head office located at Noida, Uttar Pradesh.

4 Verification conclusion

The scope of this verification covers the determination of voluntary greenhouse gas emission reductions generated by the above mentioned project in the period between 01/04/2008 and 31/03/2009. The verification is based on the submitted PDD^{/PDD/}, monitoring report^{/MR1/MR2/} and supporting documents made available to the verifiers by the project proponent.

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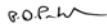
As a result of the verification, the verifier confirms that;

- all operations of the project are implemented and installed as planned and described in the validated project design document.
- The monitoring plan is in accordance with the applied approved CDM methodology, ie, ACM0002 Ver 06.
- The installed equipment essential for measuring parameters required for calculating emission reductions are calibrated appropriately.
- The monitoring system is in place and functional. The project has generated GHG emission reductions.
- As the result of the 3rd periodic verification, the verifier confirms that 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 follows:

Reporting period: From 01-04-2008 to 31-03-2009

Verified emission in the above reporting period: 266,898 t CO₂ equivalents

Project emissions	: 0	t CO ₂ equivalents
Baseline emissions	: 266,898	t CO ₂ equivalents
Emission reductions	: 266,898	t CO ₂ equivalents



Pankaj Patel
Verification Team Leader
Mumbai, 2009-05-26



Rainer Winter
Final approval
Essen, 2009-05-26

5 References

Table 5-1: Documents in yellow highlight are yet to be provided by the project participant

Reference	Document
/CAL/	Calibration records for the generation, transmission and sub station energy meters for the monitoring period from 2008-April-01 to 2009-March-31. Letter from HPSEB, confirming the validity of calibration for one year from the date of installation.
/CON/	The signed contract between TUV NORD and Malana Power Company Limited for carrying out verification of voluntary emission reduction dated 24- April-2009.
/INV/	• Sample monthly invoice copies to cross check the energy supplied to the grid. • Sample weekly invoice copies to cross check the energy supplied to the grid.
/JMR/	Joint Meter Reading (JMR) certificates indicating main and check meter numbers and the energy injected at Sarabai Sub-station at Bajaura by HPSEB covering entire reported monitoring period (2008-04-01 to 2009-03-31).
/LOG/	• Sample of daily log book records showing generation. • Sample of weekly data from the Data Collecting Device (DCD). • Sample of daily reports sent to the head office (HO). • Records of the training of the personnel. • Records of internal audits that were done during the period from 01-April-2008 to 31-March-2009.
/MR1/	Monitoring Report “86 MW Hydro project in Himachal Pradesh” for the period 2008 April 01 to 2009 March 31, version 1 dt. 24.04.2009
/MR2/	Monitoring Report “86 MW Hydro project in Himachal Pradesh” for the period 2008 April 01 to 2009 March 31, version 2 dt. 14.05.2009
/XLS1/	Excel-Calculation sheets provided by the project

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Reference	Document
	participant explaining the emission reductions achieved during the monitoring period (related to MR1).
/XLS2/	Excel – Calculation sheets provided by the project participant explaining the emission reductions achieved during the monitoring period (related to MR2).

Table 5-2: Background investigation and assessment documents

Reference	Document
/ACM0002/	ACM0002: “Consolidated baseline methodology for grid connected electricity generation from renewable sources” (Version 6 dt. 2006-05-19)
/CEA/	CO ₂ Baseline Database for the Indian Power Sector, December 2006, published by Central Electricity Authority, Ministry of Power, Government of India
/FVR/	2 nd Periodic Final Verification Report for the CDM project: “86MW Hydro Project in Himachal Pradesh” for the period 2007 April 01 to 2008 March 31, dated 05-June-2008.
/GHG/	The GHG protocol for project accounting; 2005
/ISO/	ISO 14064-3:2006, ISO 14065:2007
/KP/	Kyoto Protocol (1997)
/MA/	Decision 17/CP.7 (Marrakech Accords)
/PDD/	Project Design Document for project: “86 MW Hydro Project in Himachal Pradesh” Version 2 dated 2006-12-25
/TN- VOS/	TUV Nord JI/CDM CP voluntary off-set standard.
/VAL/	Validation Report and opinion for the project “86 MW Hydro Project in Himachal Pradesh” issued by TUV Nord, Report number 53213807-07/36 dated 2007-04-25
/VCS/	• The Voluntary Carbon Standard 2007.1 dated 18 November 2008. • The Voluntary Carbon Standard Program

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Reference	Document
	Guidelines dated 18 November 2008. • VCSA Rules and VCS Guidance Document
/VVM/	CDM Validation and Verification Manual, Annex-3, EB44

Table 5-3: 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
/mpcl/	http://www.malanamodelhep.com/	Malana Power Company Limited
/unfccc/	http://cdm.unfccc.int	UNFCCC-CDM
/vcs/	www.v-c-s.org	The Voluntary Carbon Standard

Table 5-4: Interviewed Persons

Reference	MoI ¹		Name	Organisation / Function
/IM01/	V	☒ Mr. ☐ Ms.	Mr. J. K. Beri	Malana Power Company Limited- General Manager, Operation& Maintenance
/IM01/	V	☒ Mr. ☐ Ms.	M. A. Rafiq	Malana Power Company Limited- Assistant Manager-Electrical
/IM01/	V	☒ Mr. ☐ Ms.	Chandan Thakur	Malana Power Company Limited- Electrical Engineer

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Reference	MoI ¹		Name	Organisation / Function
/IM02/	V	☒ Mr. ☐ Ms	Vishal Kumar	Emergent Ventures India Private Limited, Consultant
/IM03/	T	☒ Mr. ☐ Ms	Ramlal Bodh	Himachal Pradesh State Electricity Board, Bajoura, Additional Assistant Engineer

1- Means of Interview (MoI): Telephone (T), E-Mail (E), Visit(V)