

GAP VALIDATION AND PRE-CDM VERIFICATION OF “GRID CONNECTED ELECTRICITY GENERATION USING NATURAL GAS BY LANCO KONDAPALLI POWER PRIVATE LIMITED”



EPIC Sustainability Services Pvt. Ltd.

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Summary:

EPIC Sustainability Services Pvt. Ltd. ,(hereinafter called ESSPL) has conducted the Gap Validation and Pre-CDM verification of the “Grid Connected Electricity Generation Using Natural Gas By Lanco Kondapalli Power Private Limited” . The NG power plant consists of 234 MW natural gas-run turbines, one heat recovery steam generator and a 132 MW steam turbine. It is a green field project developed by Lanco Kondapalli Power Private Limited,(hereinafter called LKPPL), located at Krishna district, Andhra Pradesh, India.

The project activity supplies electricity to the southern and NEWNE Grid by means of Merchant power The Gap validation and verification scope is defined as a periodic independent review and ex post determination by the verification team of the monitored reductions in GHG emissions during defined verification period, and consisted of the following three phases:

1. Desk review of the registered project document including the baseline and the monitoring plan;
2. Physical site inspection and follow-up interviews with project stakeholders;
3. Resolution of outstanding issues and the issuance of the final verification report including verification opinion.

The overall verification, from Contract Review to Verification Report & Opinion, was conducted using ESSPL's internal procedures. On the basis of the physical site inspection of the project activity and review of the documents submitted by the project participant, the Verification team confirms that, for the pre-CDM verification period from 01/08/2010 to 31/07/2012, the project has been implemented as planned and described in the registered CDM PDD. The necessary equipments, installed for generating emission reductions in the project activity, runs reliably and the measuring equipments, essential for the measurement of Gas flow and electricity have been verified to be in line with the calibration procedures in the registered CDM PDD. This verification report pertains to the pre-CDM monitoring period starting from 01/08/2010 to 31/07/2012 (including both days). Corrective Action Requests (CARs) and Clarification Requests (CLs) were raised during this verification activity. All the CARs and CLs have been successfully closed by the verification team based on the satisfactory response from the project participant. The verification team confirms that total GHG reductions achieved during the current monitoring period are 14, 60, 844 tCO₂e and that emission reductions are calculated without material misstatements.

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1 INTRODUCTION

1.1 Objective

Lanco Kondapalli Power Private Limited (LKPPL) has contracted EPIC Sustainability Services Pvt. Ltd.(ESSPL) to verify the Verified Emission Reduction (VERs) of the project “Grid Connected Electricity Generation Using Natural Gas By Lanco Kondapalli Power Private Limited” (hereafter referred to as “the Project”), which is located at Kondapalli near Vijayawada in the state of Andhra Pradesh, India for the period from 1/08/2010 to 31/07/2012, prior to its first CDM crediting period.

The verification under VCS standard version 3.3 /1/ and UNFCCC criteria refers to Article 12 of the Kyoto Protocol, the CDM rules and modalities and the subsequent decisions by the CDM Executive Board, as well as the host country criteria is the independent ex-post quantification and certification of the greenhouse gas (GHG) emission reductions achieved by a project activity which has completed validation under Clean Development Mechanism (CDM). The above work is carried out through an independent assessment and a written assurance is provided on the GHG emission reductions achieved for the period specified.

1.2 Scope and Criteria

The scope of the verification covers independent objective review and ex-post determination of the monitored GHG emission reductions by the project activity “Grid Connected Electricity Generation Using Natural Gas By Lanco Kondapalli Power Private Limited”.

The Pre-CDM Verification is based on verification of information in the CDM Project Design Document (CDM-PDD), the Project’s baseline study and Monitoring Report (MR) and other relevant documents. The information in these documents is reviewed against VCS Version 3 requirements, UNFCCC rules and associated interpretations.

The specific scope of the verification work involves:

- I. To verify that the project activity is implemented as per the project details of the validated project design document (CDM PDD) 2nd January 2012, version 04 /2/.
- I. To assess whether the emissions reductions determined are in conformance with the monitoring plan of the CDM PDD and the approved methodology. To express a conclusion whether reported data are accurate, complete, consistent, and transparent with a reasonable level of assurance and free of omission or material error, based on the review of the reported data and emission reduction calculations.

The project is assessed against the verification requirements of VCS standard version 3.3 including the criteria that the emission reductions are real, measurable, transparent and conservative. The approach adopted by ESSPL verification team is risk-based, drawing on an understanding of the risks associated with reporting of GHG emissions data and the controls in place to mitigate these.

The verification scope is defined as an independent and objective review of the voluntary emission reductions not meant to provide any consulting towards the client. However, stated requests for forward actions and/or corrective actions may provide input for improvement of the Project monitoring towards reductions in the GHG emissions. The work carried out by ESSPL is free from any conflict of interest.

The request for issuance of Verified Carbon Units (VCUs), verified and certified by ESSPL, shall be made by the project proponent to the VCS registry in accordance with the most recent version of the "VCS Guidance Document: VCS Project Registration and VCU Issuance process". In view of the above, ESSPL's responsibility is limited only to verification and certification of the GHG emission reductions achieved during the specified period.

1.3 Level of Assurance

In line with VCS standard version 3.3 requirements and as per ISO 14064-3:2006 paragraph A.2.3.2, a "reasonable level of assurance" is defined for the verification of the project.

This implies that, based on the process and procedures conducted, review of the VCS-PD, the VCS Monitoring Report (MR), CDM-PDD, supporting evidences made available to the verifier and information collected through performing interviews and during the on-site assessment, ESSPL confirms that the GHG assertion in the monitoring report.

- is materially correct and is a fair representation of the GHG data and information, and
- is prepared in accordance with VCS requirements, the validated CDM PDD and the approved methodology for information pertaining to GHG quantification, monitoring and reporting.

The verification work is carried out as per this requirement and details are presented in the Verification statement in section 2 below.

1.4 Summary Description of the Project

The Project is owned by Lanco Kondapalli Power Private Limited (LKPPL) (hereafter referred to as "the PP") and is located in Kondapalli Village of Krishna district in the state of Andhra Pradesh, India.

The purpose of the project activity is to set up and operate a natural gas based combined cycle power plant with a total installed capacity of 366 MW. The plant consists of Gas Turbine of 234 MW and Steam Turbine of 132MW. Hence, the combined generation capacity of the project is 366 MW.

The entire power generated by the project activity is sold on merchant basis to the state utilities in southern, western and northern India. The annual expected electricity supplied to southern regional grid of India and the annual estimated emission reductions, as per the registered CDM-PDD and the validated VCS-PD are 2,487,880 MWh and 8,30,133 tCO₂e respectively after accounting for the leakage and project emissions.

The Project has been registered on 05/09/2012 (UNFCCC ref. No. 5554) under approved CDM methodology AM0029 "Baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas. The Project Start Date is 01/08/2010, when the Combined cycle Project was commissioned. In line with the guidelines for Pre-Validation Assessment (refer section 3.1 of VCS Validation verification manual, Version 3.1), the following was verified by ESSPL verification team:

1. CDM Validation has been completed within the relevant validation deadline, relative to the project start date and complies with para 3.11.9 (iii) of the VCS Standard version 3.4
2. The Project applies the valid version of a CDM approved methodology
3. The project has been registered but not issued credits under the CDM, and the submission date of the validation report dated 1st March 2012, used to request CDM registration is on March 09, 2012 (referred from project history at UNFCCC website) which makes the project eligible for claiming VERs under Pre-CDM Verification as for Non-AFOLU projects the validation has been completed within two years of the VCS project start date in line with the para 3.7.2 of the VCS Standard version 3.4.

The Pre-CDM crediting period for the Project under the VCS is from 01/08/2010 to 31/07/2012.

Provided below is the summary of the project details:

Project Title	Grid Connected Electricity Generation Using Natural Gas By Lanco Kondapalli Power Private Limited
UNFCCC Ref No.	5554
Monitoring Period	01/08/2010 to 31/07/2012
Project Participant	Lanco Kondapalli Power Private Limited
Methodology	AM0029, Version 03
Location	Kondapalli Village, Krishna District, Andhra Pradesh
Geo-coordinates	As provided in Table 1 in VCS PD under section 1.7
UNFCCC link	http://cdm.unfccc.int/Projects/DB/RWTUV1323884893.28/view

2 VERIFICATION PROCESS

The overall verification process, beginning from the Contract Review to Verification report, certification statement & opinion, was conducted using internal procedures of EPIC Sustainability Services Pvt. Ltd. (ESSPL). The project is already validated and registered as a CDM project with UNFCCC (Project ID 5554). Hence the Pre-CDM verification was based on criteria as per VCS Standard 3.4.

The project activity applies approved baseline and monitoring methodology AM0029, Version 03 "Baseline Methodology for Grid Connected Electricity Generation Plants Using Natural Gas"./3/

For verification of emission reductions the following steps were undertaken:

1. Completeness check of the Monitoring Report and desk review of the supporting documents
2. Onsite inspection and issuance of findings
3. Resolution of findings and preparation of Final Verification Report

2.1 Method and Criteria

The team members involved in the VCS verification of the project activity are as follows:

Team member	Qualification	Competency	Document review	Site Visit	Resolution of issues	Final Technical Review approval
Dr. G. Vishnu	Lead Auditor	NA	Yes	Yes	Yes	NA
Mr. K. Sudheendra	Technical Expert	TA 1.1 – Electricity generation from Fossil fuel (Natural gas)	Yes	Yes	Yes	NA
Mr. K. Padmanabhan	Technical Reviewer	TA 1.1 – Electricity generation from Fossil fuel (Natural gas)	Yes	NA	NA	Yes

2.2 Document Review

On receipt of the monitoring report from the PP, the completeness of information was checked as per VCS standard version 3.4 /1/. A desk review was further carried out to assess the following:

- The validated CDM PDD dated 2nd January 2012, version 04 /2/ .
- The CDM validation report dated 1st March 2012 version 0 /4/
- The emissions reduction calculation method /5/ used in the applied methodology AM0029, version 03 /3/ and the CDM PDD /1/.
- The monitoring report version 01 dated 07th October 2013 /5/, updated monitoring report version 2.0, dated 13th January 2014 /6/, including frequency of monitoring and the calculation of emission reductions for the period.
- Other external documents like SRPC data /7/, calibration certificates for Gas flow meters for Stream A/8/ and Stream B /9/, document indicating combined cycle commissioning /10/, grid emission factor from CEA database Version 08 /11/, and Gas Tickets/13/ etc.

A complete list of all documents reviewed is attached in Appendix I of this report

2.3 Interviews

Multiple level interviews were conducted to assess understanding of project requirements and to determine if monitoring conducted in the field was implemented in accordance with the requirements in the validated PDD.

The following lists of persons were interviewed on the relevant topics by the verification team which visited onsite and office on December 04 to 06, 2013.

Name and Designation	Company / Entity	Topics covered
1. Mr. S. Sundaramoorthy, General Manager- Operations	LANCO Kondapalli Power Pvt. Ltd.	• Project Description • Monitoring Plan implementation • Operational procedures • Archiving of data • QA/ QC procedures • Internal review mechanisms • Emission reduction calculation procedures
2. Mr. A. Suresh Babu, General Manager – Finance		
3. K. Jagannadha Rao – Sr. Manager, Operations		
4. M. Ramachandra Rao – Sr. Manager		
5. P. Venkatasai Kumar- Engineer (O&M)		
6. V.N.N. Venugaopala Rao, Plant Manager		

2.4 Site Inspections

The physical site inspection was performed by the verification team to cover the scope on:

1. Verification of physical location of the site and confirm the boundaries of the project activity
2. Implementation and operation of the project activity as per the description in the validated PD.
3. Recording and monitoring of data in line with the applied monitoring methodology AM0029, Version 03

The methods to verify the above mentioned information involved visit to the power generation facility premises, interaction with the plant personnel, verification of monitoring and recording aspects related to Gas supply and power generation. While the gas supply monitoring was verified from the gas skid maintained by Reliance Gas in the plant premises, the recording of the electricity generated was verified from the Nunna Substation located 18 km away from the plant.

2.5 Resolution of Findings

Based on the site inspection and review of records including the monitoring plan, a list of non-conformities; Corrective Action Requests (CAR) – 6 No.s and Clarification Requests (CLs) – 2 No.s were raised. The non-conformities could be related to lack of adherence to the VCS standard version 3.4 requirements, non-conformance to the monitoring plan of as defined in the CDM validated PDD or where evidence provided is found insufficient to prove conformity. They could also be mistakes in applying data/ assumptions and in calculation of emission reductions.

- If information made available is insufficient to transparently arrive at the stated conclusion, a Clarification request (CL) is raised and communicated to the project proponent.
- Observations may also be raised which are for the benefit of future verification period. These, however, have no impact upon the completion of the current verification activity.
- On receipt of response from the project developer, the adequacy with compliance with VCS requirements is checked along with a revised monitoring report. Closure of comments raised occurs only if the response provided and correction made fully complies with the stated requirements of the methodology applied.

The list of CARs/ CLs raised and the response provided and reasons for closure are provided in Appendix-2.

2.5.1 Forward Action Requests

There were no Forward Action requests raised during the course of this verification.

2.6 Eligibility for Validation Activities

AS ESSPL is a Designated Operational Entity (DoE) accredited by UNFCCC for Sectors 1-11 and 13-15, it is eligible to conduct both validation and verification for the project activity. In this regard EPIC has conducted the Gap validation and pre-CDM verification of the Project activity as per the requirements of VCS.

3 VALIDATION FINDINGS

According to the VCS standard Version 3.4 for projects validated under the CDM, the cover page and sections 1.2, 1.3, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12.1, 1.12.2, 1.12.3, 1.12.4 and 1.13 of the VCS Project Description Template shall be completed and a validation/verification body shall undertake a validation of same to provide a gap validation for the project's compliance with the VCS rule.

ESSPL verified the information reported in the VCS-PD version 01 dated 19/10/2013 /12/ against the registered CDM-PDD /2/, CDM validation report /4/, Project Host country (India) LOA /14/ and document indicating commissioning/10/

The detailed validation process is documented in the Table below:

VCS criteria as in VCS PD requirement	Reference	Validation Opinion	Draft Conclusion	Final Conclusion
Sec 1.2 – Sectoral Scope and Project type	VCS-PD, CDM-PDD, CDM Final validation report	As a Natural Gas fired power plant the project falls under Sectoral Scope 1.1 – Energy generation from fossil fuels	OK	OK
Sec 1.3- Project participant	VCS-PD, CDM-PDD, CDM Final validation report, LoA, UNFCCC website	The Project participant is Lanco Kondapalli Power Pvt. Ltd.	OK	OK
Sec 1.5 - Project start date	VCS-PD,	The project starting date in VCS Version 3.5 is	OK	OK

	CDM-PDD, Document indicating combined cycle commissioning date	defined as the date when the Project began generating GHG emission reduction or removals. As per commissioning details, the COD of the Combined Cycle plant was achieved on 1st August 2010 which is the VCS start date. The CDM validation report is issued on March 01, 2012, which meets the requirement that 'Non- AFOLU projects shall complete validation within two years of the project start date.		
Sec 1.6- Project crediting period	VCS-PD, CDM-PDD, Document on Commissioning, UNFCCC website	The Project starting date is 1st August 2010 and the CDM validation report is issued on March 01, 2012. Consequently the Pre-CDM, VCS crediting period is from 1/08/2010 to 31/07/2012.	OK	OK
Sec 1.7 Project Scale and estimated GHG emissions reductions or removals	VCS-PD, CDM-PDD, CDM Final validation report	The Project is expected to achieve 8,30,133 tCO ₂ e per year. It is thus categorized as 'Large Scale' as per VCS 3.5 definition.	OK	OK
Sec 1.9 Project location	VCS-PD, CDM-PDD, CDM Final validation	The location details are provided as latitude and longitude under section 1.9 of the VCS-PD. The project is located in kondapalli village in	OK	OK

	report	Krishna district of Andhra Pradesh which has been verified from the site visit.		
Sec 1.10 Conditions prior to project initiation	VCS-PD, CDM-PDD, CDM Final validation report, Uploaded calculation sheets to UNFCCC website	Based on AM0029 requirements levelised cost was used to calculate the most economically attractive alternative amongst the following: Scenario 1: Power plant based on natural gas using CCPP Scenario 2: Power plant based on coal using sub-critical technology Scenario 3: Power plant based on coal (Imported fuel) with super-critical technology Scenario 4: Power plant based on coal (Domestic fuel) with super Scenario 5: Power plant (s) based on lignite Scenario 6: Power plant (s) based on naphtha Option 2 – Subcritical coal power plant was selected as most appropriate baseline scenario.	OK	OK
Sec 1.12.1 Right of use	LoA	Natural Gas power project of 366 MW capacity is developed in Krishna district of Andhra	OK	OK

		Pradesh by LKPPL. The Letter of Approval issued by NCDMA, India is provided to demonstrate the right of use of the Project.		
Sec 1.12.2 Emission trading programs and other binding limits	VCS-PD, CDM-PDD, CDM Final validation report,	The Project has been registered as a CDM project on 5 th September 2012 while validation report has been issued on March 01, 2012. Hence GHG emission reductions achieved for two years from the starting date of the Project which is 1st August 2010 could be verified as VCUs under the VCS version 3.4.	OK	OK
Sec 1.12.3 participation under other GHG programs	VCS-PD, CDM-PDD, CDM Final validation report, UNFCCC website	The project neither has nor intends to generate any other form of GHG related environmental credit for GHG emission reductions or removals claimed under the VCS Program. The Project only will generate Certified Emission Reduction (CER) under CDM from 5th September 2012 onwards. Hence it is assured that there is no double counting of emission reductions.	OK	OK
Sec 1.13 – Other relevant information:		it is not a grouped project; leakage is calculated	OK	OK

Eligibility Criteria	VCS-PD,	based on applicable equations as per AM0029 which has been verified		
Leakage	CDM-PDD,			
Commercially sensitive information	CDM Final validation report,	no commercially sensitive information has been excluded for public access		
Other sensitive information		there is not any additional relevant legislative, technical, economic, sectoral, social, environmental, geographic, site-specific and/or temporal information that may have a bearing on the eligibility of the project, the net GHG emission reductions or removals, or the quantification of the project's net GHG emission reductions or removals		

3.1 Participation under Other GHG Programs

The Information as per the requirement of the Gap validation is provided below:

Name of the Approved GHG Program	Clean Development Mechanism (CDM)
Registration Number	5554
Project Details	The purpose of the project activity is to set up and operate a natural gas based combined cycle power plant with a total installed capacity of 366 MW. The plant consists of Gas Turbine of 234 MW and Steam Turbine of 132MW. Hence, the combined generation capacity of the project is 366 MW.

	The entire power generated by the project activity is sold on merchant basis to the state utilities in southern, western and northern India.
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ESSPL has performed the gap validation of Natural Gas Power project near Vijayawada, Andhra Pradesh which is a CDM registered project (ref No. 5554) which is owned by LKPPL. The baseline and monitoring methodology applied was AM0029 which is an approved CDM methodology. The validation was performed based on the requirements set by VCS Standard Version 3.4, UNFCCC criteria for the CDM and relevant guidance provided by CMP and the CDM Executive Board.

The Gap validation consisted of the following three phases:

- i) desk review of the project design and the baseline and monitoring plan;
- ii) follow-up interviews with project stakeholders and onsite visit;
- iii) resolution of outstanding issues and the issuance of the final validation report

The management of LKPPL is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions of the project on the basis set out within the project Monitoring Plan in the registered CDM-PDD. 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.

ESSPL has verified the project Description in the MR, version 02 dated 13/01/2014. Analysis as provided by the applied VCS program approved methodology demonstrates that the project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity. Given that the project is implemented as designed as per the requirements of the registered CDM -PDD, the project is likely to achieve the estimated amount of emission reductions as specified within the VCS-PD version 01 dated 19/10/2013 as observed from the Gap validation performed as per VCS 3.4 requirements stated above. The review of the PD version 01 and the information made available to the verification team determined the fulfillment of stated criteria. According to the verification team, the project correctly applies and meets the relevant VCS requirements and the relevant host country criteria and qualifies as a VCS project.

3.2 Methodology Deviations

No Methodology deviation has been applied to the Project activity.

3.3 Project Description Deviations

No project deviations have been observed during the gap validation process. Hence there is no impact on the following in relation to the implementation of project and its conformance to VCS 3.4 requirements:

- The applicability of the methodology.
- Additionality.
- The appropriateness of the baseline scenario.

3.4 Grouped Project

Not Applicable as the project activity is not a grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

To Identify the implementation status of the project activity(s) the following steps were taken for assessment:

- The project activity involves implementation and operation of a new natural gas fired grid-connected Combined Cycle Power Plant (CCPP) of 366 MW capacity. The project comprises of the following major equipment's:
- One advanced class, heavy duty, Gas turbine generator with a nominal output of about 234 MW at site condition and with Gas turbine Inlet air-cooling system under operation.
- One Heat Recovery, natural circulation, three pressure vertical type Steam Generator.
- One Steam Turbine Generator of around 132 MW (@ 30 deg C, 60% RH), multistage, intermediate injection, condensing, type.
- It is a green field project developed by Lanco Kondapalli Power Pvt. Ltd., located at kondapalli, Andhra Pradesh, India. The generated power is exported to the various regional grids (NEWNE, Southern) via PGCIL (Power Grid Corporation of India Ltd.) by merchant power agreements. The project activity meets the base load requirement of the southern grid and NEWNE grids.
- Date on which project activity achieved COD (Commercial Operation Date) is 01st August 2010 as verified from the document indicating commissioning/10/. The verification team after the site visit and from operational commissioning date confirms that there is only single site for the project activity and there was no phase wise implementation of the project activity.
- The power generated is stepped up to 400 kV level by using 15/420 kV generator transformers by means of a 400 kV Gas Insulated Switchgear (GIS) type substation located at the project site. Project activity is connected to the grid by a double circuit 400 kV transmission line which is commissioned to export power to 400 kV receiving end substation of the Power Grid Corporation of India Limited (PGCIL) located at Nunna.

The implementation of the project activity was as described in the CDM validated PDD, checked against supportive documents presented. The verification team was able to verify that there was no change in project design compared to the design presented in the CDM validated PDD, dated 2nd January 2012, version 04.

- The GHG emission reductions are calculated based on the net electricity exported to the regional grids (Southern grid and NEWNE grids of India). The main and check meter system were used to measure the various parameters used in the calculation of emission reductions.
- Complete data of Net electricity supply to the grid and Gas consumption was available for the entire verification period (01/08/2010 to 31/07/2012) which was verified by ESSPL.
- The verification team also confirms that there is no existence of any material discrepancies between the actual monitoring system, and the monitoring plan set out in the project description and the applied methodology.
- The project is registered as a CDM project with UNFCCC (Ref No. 5554) and as per VCS rules is eligible to claim Pre-CDM VERs. As CDM verification has not yet begun it is assured that the project does not generate double counting of emission reductions.

4.2 Accuracy of GHG Emission Reduction and Removal Calculations

The verification team assessed the different areas (as mentioned below) which can affect the accuracy of the final emission reduction calculations:

Electricity exported by the project plant, EGExport,y, Mega Watt hour (MWh):

- The Net electricity export is measured in the Tariff metering room through two lines i.e. Line 1 and Line 2, each line has one main meter and check energy meter. The energy meters are 3 phase 4 wire meters of standard make having an accuracy class of 0.2 S.
- The meters record net electricity generation on continuous basis and on monthly basis as Joint Meter Reading at the Nunna Substation. The readings are displayed on the SRPC (southern regional power committee) website which is publically accessible. The readings are also stored in log books on daily basis for PP's record purpose.
- The calibration of meters as per CEA guidelines referred in the CDM PDD is done once every five years. Considering the installation date of the energy meters, the calibration is not applicable for the monitoring period under verification.

The details of the energy meters is as follows:

Main Meter (PGCIL substation, Nunna, Vijayawada)

Serial Number	Accuracy Class	Calibration frequency	Calibration date	Correction factor (applied due to delayed calibration)
NP-5533-A	0.2 S	As per Central Energy Authority regulation, 2006 calibration of energy meters are to be done	Not Applicable	Not Applicable

		once in five years from the date of installation		
NP-5543-A	0.2 S	As per Central Energy Authority regulation, 2006 calibration of energy meters are to be done once in five years from the date of installation	Not Applicable	Not Applicable

Check Meter (PGCIL substation, Nunna, Vijayawada)

Serial Number	Accuracy Class	Calibration frequency	Calibration date	Correction factor (applied due to delayed calibration)
NP-5489-A	0.2 S	As per Central Energy Authority regulation, 2006 calibration of energy meters are to be done once in five years from the date of installation	Not Applicable	Not Applicable
NP-5627-A	0.2 S	As per Central Energy Authority regulation, 2006 calibration of energy meters are to be done once in five years from the date of installation	Not Applicable	Not Applicable

PP has calculated the “Net electricity exported to the grid” based on both the main meter and check meter. The lower value between the two values has been chosen on conservative basis for the calculation of emission reduction calculations. The net electricity supplied to the grid is 3968888.29 MWh during the monitoring period which has been used for the calculation of emission reductions. The Net electricity exported to the grid has been crosschecked with the data for net electricity supplied by the project activity as recorded by SRPC in publically available document.

Quantity of NG consumed in the project activity, FCNG SCM:

The Natural gas supplied to the plant is measured on daily basis by the gas flow meters installed at the gas supplier terminal (of Reliance Gas Transportation Infrastructure Ltd. - RGTIL) at the project site by the Gas supplier. The gas consumption is measured through two streams i.e Stream 1 and Stream 2. The readings are reported through fortnightly Joint Ticket Readings received from RGTIL. The flow meters are Ultrasonic-Flow Meters (USM) of Daniel make (Model-Mark 3, 3400) and have a flow accuracy class of 0.10%.

The Gas flow values are correlated and crosschecked with fortnight joint ticket received from RGTIL fortnightly. The mode of archiving data is both electronic and paper. The calibration is done once per month jointly by the gas supplier (RGTIL) and the PP (LANCO). The frequency of calibration is acceptable and conservative for the monitoring period under verification as according the monitoring plan in the validated CDM PDD requirements the Gas flow meters need to be calibrated annually. The calibration certificates /18/ for the Gas flow meters has been checked during the site visit and no error which required the application of correction factor was noted. The summary of calibration of meters is as follows:

Gas flow meter (RGTIL skid)

Serial Number	Accuracy Class	Calibration frequency	Calibration dates*	Correction factor (applied due to delayed calibration)
Sr.no: 08-040024 (Stream 1)	0.10 S	Annual	29 th June 2010, 15 th June 2011, 24 th May 2012	Not Applicable
Sr.no: 08-040025 (Stream 2)	0.10 S	Annual	29 th June 2010, 15 th June 2011, 24 th May 2012	Not Applicable

**sourced from the monthly calibration certificates of the entire monitoring period relevant to the calibration frequency indicated in registered CDM PDD.*

The natural gas consumption is 850666966.00 SCM during the monitoring period which has been used for the emission reduction calculations. The gas consumed (daily basis) has been crosschecked with the fortnightly gas ticket issued to the PP by RGTIL.

NCV of the Natural Gas consumed in the project activity:

The average net calorific value of natural gas consumed is provided by gas supplier (RGTL) and recorded by LKPPL for verification on a daily basis. The document verified for this purpose is the fortnightly basis gas ticket provided by the Gas supplier to LKPPL. The verification team accepts the monitoring and recording of the data is in line with the requirements as per the description in the validated CDM PDD. The average NCV of the gas is 8185 kCal/SCM for the monitoring period under verification.

Build Margin emission factor of Southern grid, EFBM , y:

The value has been sourced from the database developed by Central Electricity Authority (CO2 Baseline database for the Indian power sector, Version 8.0). This data is computed annually as ex-post parameter as per requirement of methodology AM0029, based on latest available information from the national database and are archived in electronic/paper form. The build margin values for the monitoring period under verification are:

1. August 2010- March 2011 - 734 tCO2/GWh
2. April 2011- March 2012 - 852 tCO2/GWh
3. April 2012- July 2012 - 852 tCO2/GWh

The verification team accepts the monitoring and recording of the data is in line with the requirements as per the description in the validated CDM PDD.

CO2 emission coefficient of fuel (Natural gas), COEF_{f,y}:

The parameter is a calculated parameter based on the “Net Calorific Value of Natural Gas”, “Emission factor of the Natural gas” and “Oxidation factor”. The following formula has been used for the calculation of COEF_{f,y}: $COEF_{f,y} = NCV_{f,y} * EFCO_2, f,y * OXID_f$. The calculated value is 0.001923 tCO2/ cum which is verified as correct from the baseline emission calculation sheet.

Emission factor for upstream fugitive methane emissions occurring in the absence of the project activity, EFBL,upstream,CH4:

EF BL,upstream,CH4 is calculated for power plants included in the Build Margin, inline with the baseline emission factor selection. Therefore in line with the AM0029 requirement of ex-post determination of the Build Margin, the Emission factor for upstream fugitive methane emissions occurring in the absence of the project activity electricity generation (tCH4 or tCO2e/MWh) is determined ex-post. This data is computed annually based on latest available information available in the National CEA database and are archived in electronic/paper form. The emission factor values for the monitoring period under verification are:

1. August 2010 - March 2011 – 21.18 tCO2e/GWh
2. April 2011 - March 2012 – 15.15 tCO2e/GWh
3. April 2012 - July 2012 – 15.15 tCO2e/GWh

The verification team accepts the monitoring and recording of the data is in line with the requirements as per the description in the validated PDD.

Project emission under project activity (PE_y):

Project emission due to combustion of fuel is calculated using (i) Total volume of natural gas combusted in the project plant and (ii) CO2 Emission coefficient for natural gas as follows:

$$PE_y = \sum FC_{f,y} * COEF_{f,y}$$

The project emissions calculated for the project activity (for the current monitoring period) based on the consumption of Natural gas and CO₂ emission coefficient of Natural gas comes out as 16,34,406 tCO₂. The verification team accepts the monitoring and recording of the project emission data is in line with the requirements as per the description in the validated CDM PDD.

Leakage emissions (LE_y)

Total leakage emissions is calculated using the equation in line with AM0029,

$$LE_y = LE_{CH_4,y} + LE_{LNG,CO_2,y}$$

Where,

$LE_{LNG,CO_2,y}$ = Leakage emissions due to fossil fuel combustion / electricity consumption associated with the liquefaction, transportation, re - gasification and compression of LNG into a natural gas transmission or distribution system ($LE_{LNG,CO_2,y}$), which in this case is “zero” as there is no LNG consumption by the project activity as verified from the gas supplier data.

$LE_{CH_4,y}$ = Leakage emissions due to fugitive upstream CH₄ emissions, which is calculated as 1,12,061 tCO₂.

The verification team accepts the monitoring and recording of the leakage emission data is in line with the requirements as per the description in the validated CDM PDD.

4.3 Quality of Evidence to Determine GHG Emission Reductions and Removals

- The main data required for emission reduction calculations is the “Quantity of Natural Gas consumed in the project activity”, Net Calorific Value of the Natural Gas”, “Net Electricity exported to the Southern grid of India” and “Build Margin emission factor for Southern grid of India”.
- The Quantity of Natural Gas has been sourced from the fortnightly Joint Ticket Readings received from RGTIL. This is based on the monitored values from calibrated flow meters jointly monitored by the PP and RGTIL located at the plant site at RGTIL terminal. The calibration frequency of the Gas flow main meter (annually) was followed during the monitoring period under verification.
- The Net Calorific Value (NCV) of Natural Gas is recorded based on the fortnightly Joint Ticket Readings received from RGTIL by the PP which is in line with the requirements of the methodology.
- The calibration frequency of the Electricity meters As per Central Energy Authority regulation, 2006 are to be done once in five years from the date of installation and hence this aspect was not applicable for the monitoring period under verification.
- The Build Margin emission factor for Southern grid of India has been calculated annually based on the latest CEA CO₂ Baseline Database, version 08; available at the submission of documents for Verification. The value applied for the respective monitoring period is acceptable and appropriate.

- **Baseline Emissions:** It is the product of net electricity supplied to the grid and Build margin emission factor of the Southern regional grid of India. Based on the above two figures (for the net electricity supplied and grid emission factor), the baseline emissions for the current verification period has been calculated to be 3207311 tCO₂e.
- **Project Emissions:** The project emissions have been calculated as the product of total volume of natural gas combusted in the project plant and CO₂ emission coefficient for fuel. The project emissions have been calculated 1634406 tCO₂e.
- **Leakage Emissions:** This includes Leakage emissions due to fugitive upstream CH₄ emissions with Natural gas and emissions resulting from fuel extraction, processing, liquefaction, transportation, re- gasification and distribution of fossil fuels outside of the project boundary. This includes mainly fugitive CH₄ emissions and CO₂ emissions from associated fuel combustion and flaring. The leakage emissions have been calculated as 112061tCO₂
- **CO₂ emissions from fuel combustion/electricity consumption associated with liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system is considered as zero as LNG has not been used during the current monitoring period under verification.**

The calculated emission reductions for the monitoring period under verification are 1460844 tCO₂

Management and Operational System

- The key responsibility of the project activity lies with the project proponent. A project team consisting of General Manager, Electrical Engineer, Operators and Operation & Maintenance Contractor was responsible for monitoring of project activity. The project team has been entrusted with the responsibility of storing, recording the data related to the project activity. The project team is also responsible for calculation of actual creditable emission reduction in the most transparent and relevant manner. Installed meters are calibrated according to the maintenance schedule programmed at the start of the operation and recalibrated according to the plants performance requirement
- The individual plants record data related to their respective project activity. The natural gas based power project abides by all regulatory and statutory requirements as prescribed under the state and central laws and regulations.
- All the monitoring data is stored, recorded and kept under safe custody of the Project Proponent at the plant site for a period of crediting period + 2 years. The data is achieved in both hard copies and electronic format (excel sheets). Also, any change within the project boundary, such as change in spare and or equipment is recorded and any change in the emission reduction due to such alteration is studied and recorded. Thus it can be confirmed that the management system for the VCS project is in place; with the responsibilities appropriately identified.

- The project management at the corporate level is basically engaged in overall project monitoring. The team at corporate level reviews power plant operations and also the data related to CDM activity of the project. AGM – Finance (Corporate) is responsible for overall project coordination between the plant level and corporate office. Information pertaining to plant operation including CDM related data is reviewed by AGM Finance. AGM – Finance will report to CFO. In the event of any disconnect, AGM – Finance suggests the corrective action to the plant officials in discussion with the COO and CFO. Director and CEO is responsible for overall plant operation. COO and CFO will report to the Director.

The site visit and interviews indicated that the monitoring responsibility was implemented in line with the description in the validated PDD.

4.4 Non-Permanence Risk Analysis

Non-Permanence risk analysis is applicable to AFOLU projects and hence is not applicable to the project activity.

5 VERIFICATION CONCLUSION

ESSPL's verification approach basically included the desk review of the project design (as stated in the registered CDM PDD, ver04 and dated 1st January 2012); monitoring report version 02 dated 13th January 2014; approved baseline and monitoring methodology AM0029, version 03, site verification of the reported emission reductions and resolution of outstanding issues and issuance of final verification report. The verification team also requested for the evidences, relevant information and explanations that were considered necessary to give a reasonable assurance of the reported emission reductions during the period from 01/08/2010 to 31/07/2012.

In ESSPL's opinion, the GHG emission reductions for "Grid Connected Electricity Generation Using Natural Gas By Lanco Kondapalli Power Private Limited" for the period from 01/08/2010 to 31/07/2012 are fairly stated in the monitoring report, version 2.0, dated 13th January 2014. The GHG emissions were calculated correctly on the basis of approved baseline and monitoring methodology AM0029, version 03 and the monitoring plan as included in the registered CDM PDD, dated 1st January 2012, version 04. Based on the VCS Verification conducted, ESSPL is of the opinion that the project complies with the Verification criteria for projects set out in VCS Version 3.4.

The Gap validation was based on the review of the registered CDM – PDD dated January 02, 2012, CDM Final Validation report dated 1st March 2012 and the VCS PD dated 19th October 2013, Version 01. Based on the Gap validation conducted, ESSPL is of the opinion that the project complies with the validation criteria for projects set out in VCS Version 3.4.

Based on the information provided, verified and assessed, ESSPL is able to certify the following statement:

Verification period: From 01-August-2010 to 31-July-2012.

Verified GHG emission reductions and removals in the above verification period:

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2010	737196	407411	23868	305917
Year 2011	1865131	891567	61785	911779
Year 2012	604984	335428	26408	243148
Total	3207311	1634406	112061	1460844

Prepared by	Approved by
	
Dr. G. VISHNU	Mr. G. T. KUMAR
(LEAD AUDITOR)	(MANAGING DIRECTOR)

6 LIST OF REFERENCES

REF NO.	DOCUMENT TITLE
/1/	VCS standard version 3.4
/2/	(CDM PDD) 2 nd January 2012, version 04
/3/	Baseline Methodology for Grid Connected Electricity Generation Plants Using Natural Gas, AM0029, version03
/4/	CDM Validation report dated 1 st March 2012 version 0
/5/	Initial monitoring report version 1.0 dated 07 th October 2013
/6/	Revised monitoring report version 2.0, dated 13 th January 2014
/7/	Southern Regional Power Committee database for electricity supplied by LANCO Phase II for monitoring period from 1 st August 2010 to July 31, 2010.
/8/	Calibration certificates for Gas flow meter –Stream A for the monitoring period from 1 st August 2010 to July 31, 2010.
/9/	Calibration certificates for Gas flow meter –Stream A for the monitoring period from 1 st August 2010 to July 31, 2010.
/10/	Document indicating commercial operation start date of combined cycle August 27 th 2011
/11/	Grid emission factor from CEA database Version 08
/12/	VCS-PD version 01 dated 19 th October 2013
/13/	Fortnightly Gas tickets issued by RGTIL to LANCO for the monitoring period from 1 st August 2010 to July 31, 2010.
/14/	Project Host country (India) LOA

EPIC SUSTAINABILITY SERVICES PVT. LTD.

Verification checklist

Project name : Grid Connected Electricity Generation Using Natural Gas By Lanco Kondapalli Power Private Limited

TABLE 1: VERIFICATION PROTOCOL

Checklist Questions	Ref.	§	Comments by verifier	Draft Concl	Final Concl
1. Compliance of the project implementation with the registered project design document					
1.1 Was an on-site visit conducted for this verification? If no, please justify the rationale of the decision.	VVS	227	Yes, on onsite visit was conducted from Dec 04-06, 2013.	OK	OK

Checklist Questions	Ref.	§	Comments by verifier	Draft Concl	Final Concl
1.2 Are all physical features of the VCS project activity proposed in the registered CDM PDD in place?	VVS	227	Yes, all the physical features of the VCS project activity are as in the registered CDM PDD. The Combined Cycle Gas power plant project comprises of the following major equipments: • One advanced class, heavy duty, Gas turbine generator with a nominal output of about 234 MW at site condition and with Gas turbine Inlet air-cooling system under operation. • One Heat Recovery, natural circulation, three pressure vertical type Steam Generator. • One Steam Turbine Generator of around 132 MW (@ 30 deg C, 60% RH), multistage, intermediate injection, condensing, type. On –site visit confirms the same.	OK	OK
1.3 Have the project participants operated the proposed VCS project activity as per the registered PD or any approved revised PD?	VVS	227 & 230	The project is operated as per the registered CDM- PDD as it is a merchant power plant. The onsite visit and review of the electricity sale invoices confirmed the same.	OK	OK

Checklist Questions	Ref.	§	Comments by verifier	Draft Concl	Final Concl
1.4 For this monitoring period, what is the status of the implementation of the project? For project activities that consist of more than one site, the DOE shall describe the status of implementation and starting date of operation for each site.	VVS	228 (a)	The project activity involves implementation and operation of a new natural gas fired grid-connected Combined Cycle Power Plant (CCPP) of 366 MW capacity at Kondapalli near Vijayawada, Andhra Pradesh by Lanco Kondapalli Power Private Limited (LKPPL). It does not involve implementation at more than one site.	OK	OK
For project activities with phased implementation, what is the progress of the proposed project activity achieved in each phase under verification. If the phased implementation is delayed, describe the reasons and present the expected implementation dates;	VVS	228 (a)	Project activity does not involve phased implementation. The combined cycle gas power plant was commissioned on 1st August 2010. The commissioning certificate for the same has not been provided.	CAR-1	OK
1.5 Describe the actual operation of the project activity.	VVS	228 (b)	The project activity involves implementation and operation of a new natural gas fired grid-connected Combined Cycle Power Plant (CCPP) of 366 MW capacity at Kondapalli near Vijayawada, Andhra Pradesh by Lanco Kondapalli Power Private Limited (LKPPL). The CCPP is operational from August 2010 and the power generated from the project activity is sold on merchant basis to the state utilities in Southern, Western & Northern India.	OK	OK

Checklist Questions	Ref.	§	Comments by verifier	Draft Concl	Final Concl
1.6 Any information (data and variables) provided in the monitoring report that is different from that stated in the registered PDD or any approved revised PDD? (that has caused an increase in estimates of the emission reductions in the current monitoring period or is highly likely to increase the estimates of emission reductions in the future monitoring)	VVS	228 (c)	Data and variables that have a bearing on emission reductions, mentioned in the monitoring report are verified to identical with the registered CDM PDD.	OK	OK

2. Compliance of the monitoring plan with the monitoring methodology including applicable tool(s) The monitoring plan of the proposed VCS project activity shall comply with the applied methodology.					
2.1 For monitoring aspects that are not specified in the methodology, particularly in the case of small-scale methodologies (e.g. additional monitoring parameters, monitoring frequency and calibration frequency), these should be brought to the attention of the Board issues which may enhance the level of accuracy and completeness of the monitoring plan.	VVS	231	Monitored parameters (ex-post) in the project activity are as per the applied monitoring methodology AM0029 Version 03.	OK	OK
2.1 Is the monitoring plan of the VCS project activity complying with the methodology applied by the registered VCS project activity or an approved registered PDD?	VVS	232	The monitoring plan applied by the VCS project activity is in accordance with the applied methodology in the registered CDM PDD.	OK	OK

3. Compliance of monitoring activities with the registered monitoring plan. Determine whether the monitoring of parameters related to the GHG emissions reductions in the project activity has been implemented in accordance with the monitoring plan contained in the registered PD or any accepted revised monitoring plan.					
3.1 Has the monitoring plan been properly implemented and followed by the project participants?	VVS	234 (a)	Yes, the implementation of the monitoring is in line with the plan stated in registered CDM PDD, meeting the requirements of the applied methodology. According to Annex 4 of the CDM PDD under section “metering equipment for natural gas consumption” it is mentioned that <i>-The accuracy of the ultrasonic meters for monitoring of Natural gas combusted will be maintained at less than 0.1% -</i> based on the onsite visit it was observed that accuracy class of the ultrasonic meters are of 0.1% accuracy class. Clarify	CL-1	OK
3.2 Have all parameters stated in the monitoring plan, and relevant VCS Executive Board decisions been sufficiently monitored and updated as applicable, including: i) project emission parameters	VVS	234 (b)	Yes, all parameters related to project emission parameters stated in the monitoring plan, applied methodology and relevant VCS board decisions have been sufficiently monitored and updated as applicable Natural Gas Consumption (FCf,y): Based on daily meter reading for the total natural gas consumption Net Calorific Value of Natural Gas (NCVf,y): Based on daily arithmetic average value of net calorific value.	OK	

ii) baseline emission parameters		The baseline emission parameters for establishing the baseline emissions, are sufficiently monitored and reported in the monitoring report, the verification teams deems it is reasonable and in line with the applied monitoring methodology in the registered PDD. Net Electricity Generation (EGy): Based on the energy meter readings at the grid interconnection point at 400kV PGCIL substation. Emission Factor based on Build Margin (EFBM,y) for the Southern regional grid of India (This value would be taken from the database published annually by Central Electric Authority) The Build Margin emission factor of Southern grid as provided in section 4.1 of the Monitoring report mentions four values which however are not provided with the relevant source.	CAR-2	OK
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iii) leakage parameters			The leakage is calculated based on AM0029 Version 03 as follows: Leakage emissions: $LE_y = LE_{CH_4,y} + LE_{LNG,CO_2,y}$ where: LE_y = Leakage emissions during the year y in tCO $LE_{CH_4,y}$ = Leakage emissions due to fugitive upstream CH $LE_{LNG,CO_2,y}$ = Leakage emissions due to fossil fuel combustion / electricity consumption associated with the liquefaction, transportation, redistribution system during the year y in t CO The Emission factor for upstream fugitive methane emissions as provided in section 4.3 of the Monitoring report mentions four values which however are not provided with the relevant source.	CAR-3	OK
iv) Management and operational system: the responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the monitoring plan?			Yes, the responsibilities and authorities for monitoring and reporting is in accordance with the responsibilities and authorities stated in the Section 3.3 of the monitoring plan in the Monitoring Report and is in line with the description in the CDM PDD. The onsite visit and interviews conducted confirmed the same.	OK	OK

3.3 Has the equipment used for monitoring is in accordance with section 4 below and is controlled and calibrated in accordance with the monitoring plan, the applied methodology, the Board guidance, local/national standards, or as per the manufacturer's specification?	VVS	234 (c)	Yes, the gas flow and energy meters are used for monitoring the NG consumption and electricity supplied by the project activity as follows: The Energy (kWh) delivered to the grid is measured by energy meters (0.2 class accuracy) at the grid interconnection point at the 400 kV PGCIL Nunna substation. The meter reading will be recorded by PGCIL. Metering equipments for natural gas consumption consists of ultrasonic meters along with, pressure transmitters and temperature transmitters. The Natural Gas Consumption metering is done using a main meter. The main meter is located at the supplier gas conditioning/metering skid. The main meter is installed and owned by the Gas Supplier. The metering equipment is maintained in accordance with OEM guidelines as per relevant standards. The Nunna Substation is connected by both Line -1 and Line -2 from the NG Power Plant and separate Main and check meters are provided in the substation to monitor the electricity supplied from the power plant. The VCU calculation sheets however do not contain data relating to energy generated for Line 2 under "summary of data" sheet. Clarify if only Line 1 was used for electricity supply to Nunna Substation.	Depends on closure of CAR-1 CL-2	OK OK
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3.4 Are monitoring results consistently recorded as per approved frequency?	VVS	234 (d)	Yes, monitoring results are consistently recorded as per the approved frequency. Log book records maintained at the site and Gas bills and electricity bills are verified to meet the requirements of the monitoring plan as mentioned in the Monitoring report and the CDM PDD. The Documents pertaining to the Net electricity generated by the plant as per actual meter readings taken jointly by L KPPL and PGCIL has not been provided.	CAR-4	OK
3.5 Have quality assurance and quality control procedures been applied in accordance with the monitoring plan or revised monitoring plan?	VVS	234 (e)	The meters are calibrated as per the standard procedures and documents for the same are maintained throughout in line with the details mentioned in the monitoring report and the CDM PDD. The onsite visit and subsequent review of the calibration records of the NG flow meters and the Energy meters confirmed the same.	OK	OK
4. Compliance with the calibration frequency requirements for measuring instruments. Determine whether the calibration of those measuring equipments that have an impact on the claimed emission reductions is conducted by the project participants at a frequency specified in the applied monitoring methodology and/or the monitoring plan.					

4.1 Identify if there is any monitoring equipment not calibrated in accordance with the monitoring plan, the applied methodology, the Board guidance, local/national standards, or as per the manufacturer's specification?	VVS	238	Monitoring equipment i.e energy meter is calibrated at a frequency and as per procedures defined in the monitoring plan in the registered PD. All the related energy meters used to record energy delivered to the grid undergoes periodical calibration (i.e. once in every five year) as per Central regulation, 2006 on installation and operation of energy meters. The natural gas flow meters are tested at site for accuracy periodically against an accepted laboratory standard meter in accordance with prescribed standards. The consumption registered by the meter will hold well as long as the error in the meters is within the permissible limits. The calibration frequency of natural gas flow meters are maintained at once in a year. As verified from the onsite visit the calibration is done monthly which is well within the limits prescribed in the PDD.	OK	OK
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4.2 If there is delayed and the calibration has been implemented after the monitoring period in consideration (i.e. the results of delayed calibration are available), has the following conservative approach adopted in the calculation of emission reductions: (a) Applying the maximum permissible error of the instrument to the measured values taken during the period between the scheduled date of calibration and the actual date of calibration, if the results of the delayed calibration do not show any errors in the measuring equipment, or if the error is smaller than the maximum permissible error; or (b) Applying the error identified in the delayed calibration test, if the error is beyond the maximum permissible error of the measuring equipment.	VVS	238	For this monitoring period, It is observed that calibration is in line with the relevant regulations and standards. Hence there is no delay observed in calibration frequency for this monitoring period.	OK	OK
4.3 Confirm that the error has been applied: (a) In a conservative manner, such that the adjusted measured values of the delayed calibration shall result in fewer claimed emission reductions; (b) For all measured values taken during the period between the scheduled date of calibration and the actual date of calibration.	VVS	239	Not applicable as For this monitoring period, It is observed that calibration is in line with the relevant regulations and standards.	OK	OK

4.4	In cases where the results of the delayed calibration are not available, or the calibration has not been conducted at the time of verification, the verification team, prior to finalizing verification, shall request the project participants to conduct the required calibration and shall determine whether the project participants have calculated the emission reductions conservatively using the approach mentioned in paragraph 4.3 above.	VVS	240	Not applicable as For this monitoring period, It is observed that calibration is in line with the relevant regulations and standards.	OK	OK
4.5	In cases where the verification team determines that it is not possible for the project participants to conduct the calibration at a frequency specified by either the applied methodology, guidance provided by the Board, and/or the registered monitoring plan due to reasons beyond the control of project participants (For example, due to the contractual terms between the project participant and purchasing/selling entities), the verification team, shall follow the requirements for post registration changes in section of E of the VVS.	VVS	241	Not applicable as For this monitoring period, It is observed that calibration is in line with the relevant regulations and standards.	OK	OK

4.6	In cases where neither the monitoring methodology nor the monitoring plan specify any requirements for calibration frequency for measuring equipments, the verification team shall determine whether the equipments are calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification. If neither local/national standards nor the manufacturer's specification are available, international standards may be used. Refer to appendix 1 of the VVS for an illustrative example to apply the above requirements.	VVS	242	Monitoring plan in the registered PDD specifies calibration frequency for both the energy meters and the gas flow meters. For this monitoring period It is observed that calibration is in line with the relevant regulations and standards as mentioned in the Monitoring Report and the CDM PDD.	OK	OK
5.0 Assessment of data and calculation of emission reductions Assess the data and calculations of GHG emission reductions achieved by/resulting from the project activity by the application of the selected approved methodology.						
5.1	Is a complete set of data for the specified monitoring period is available?	VVS	245 (a)	The data relating to the following for the monitoring period under verification has not been provided: 1. In the VCU calculation sheet provided, the data for the daily gas consumption is not in line with the gas ticket provided 2. The period from 14- January 2011 to 25 January 2011, the reason for "No generation" is not provided. Also for similar instances in other days of the monitoring period, the reason is not provided. 3. For the period from 1st October 2011 – 15th October 2011, the fortnightly gas tickets are not provided. 4. For the period from 16th June 2012 – 31st August 2012, the fortnightly gas tickets are not provided.	CAR-5	OK

5.2	If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, the verification team shall raise a CAR for the project participants to comply with the requirements of Appendix 1 of the Project Standard or submit a request for deviation prior to submitting the request for issuance, if appropriate;	VVS	245 (a)	Please refer to CAR 5 for further resolution..	Depends on closure of CAR 5	OK
5.3	Has information provided in the monitoring report been crosschecked with other sources such as plant log books, inventories, purchase records, laboratory analysis?	VVS	245 (b)	Yes, the information provided in the monitoring report has been cross checked with the log books, electricity bills, Invoices, and calibration certificates. Please refer to CAR 5 for further resolution..	Depends on closure of CAR 5	OK
5.4	Have calculations of baseline emissions, proposed VCS project activity emissions and leakage, as appropriate, been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document?	VVS	245 (c)	Yes, the calculations of baseline emissions, project emissions and Leakage emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan and the applied methodology AM0029 Version 03.	OK	OK
5.5	Any assumptions used in emission calculations? If yes, they been justified?	VVS	245 (d)	Please refer to CAR 5 for further resolution	Depends on closure of CAR 5	OK
5.6	Have appropriate emission factors, IPCC default values and other reference values been correctly applied?	VVS	245 (e)	The appropriate emission factors, IPCC default values and other reference values has been applied in line with the guidance in AM0029 version 03 for calculation of Baseline, Project and leakage emissions.	OK	OK

6.0 Have all sections in MR as per MR Template guidelines been completed?		Corrective action is raised on the identified discrepancies which are listed below - Details regarding Appendix 2 is not provided as part of the Monitoring report - As per requirements of Section 3.3 of the VCS verification template the line diagrams to display the GHG data collection and management system has not been included	CAR-6	OK
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TABLE 2 : RESOLUTION OF CORRECTIVE ACTION AND CLARIFICATION REQUESTS

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Verification team conclusion
CAR 1 The commissioning certificate for the Combined cycle gas power plant has not been provided	1.4	The document indicating commissioning for the combined cycle gas power plant is submitted as attachment 1	The commissioning certificate for the combined cycle power plant has been verified to be 1st August 2010 from the document submitted. <i>Conclusion: CAR 1 Resolved</i>
CAR 2 The Build Margin emission factor of Southern grid as provided in section 4.1 the monitoring report mentions four values which however are not provided with the relevant source.	3.2	The build margin emission factor of southern grid is monitored ex-post as per the registered monitoring plan. Build Margin Emission Factor is taken from the CO2 baseline database version 8 published by the Central Electricity Authority, Ministry of Power, Government of India. This information is detailed in section 3.2 of the monitoring report.	The Build Margin is sourced from CEA version 08 database which is appropriate. Also as it is ex-post, it is monitored whenever the database is updated and hence builds margin values for the year 2010-2011 and 2011-2012 is applied correctly. <i>Conclusion: CAR 2 Resolved</i>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Verification team conclusion
CAR 3 The Emission factor for upstream fugitive methane emissions as provided in section 4.3 of the monitoring report mentions four values which however are not provided with the relevant source.	3.2	EF _{BL,upstream,CH4} is calculated for power plants included in the Build Margin, inline with the baseline emission factor selection. Therefore in line with the AM0029 requirement of ex-post determination of the Build Margin, the Emission factor for upstream fugitive methane emissions occurring in the absence of the project activity electricity generation (tCO ₂ e/MWh) is determined ex-post. This data is computed annually based on latest CO ₂ baseline database, version 8, published by the Central Electricity Authority, Ministry of Power, Government of India. This information is detailed in section 3.2 of the monitoring report.	In line with the AM0029 requirement of ex-post determination of the Build Margin, the Emission factor for upstream fugitive methane emissions occurring in the absence of the project activity electricity generation (tCO ₂ e/MWh) is determined also determined ex-post on an annual basis. it is monitored whenever the database is updated and hence CO ₂ emission coefficient values for the year 2010-2011 and 2011-2012 is applied correctly. <i>Conclusion: CAR 3 Resolved</i>
CAR 4 The Documents pertaining to the Net electricity generated by the plant as per actual meter readings taken jointly by LKPPL and PGCIL has not been provided.	3.4	The document for the 'net electricity injected to the grid' by the project activity for the entire monitoring period is submitted as attachment 2	The document for net electricity supplied to the grid is sourced from the Joint Meter readings as entered in the SRPC database which is publically accessible. Hence the source is appropriate. <i>Conclusion: CAR 4 Resolved</i>
CAR 5 The data relating to the following for the monitoring period under verification has not been provided: 1. In the VCU calculation sheet provided, the data for the daily gas consumption is not in line with the gas ticket provided 2. The period from 14- January 2011 to 25	5.1	1. The daily gas consumption data, in VCU calculation sheet, is revised inline with the gas ticket document.	1. The daily gas consumption data is now correctly sourced from the fortnightly gas ticket documents 2. The period for maintenance and

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Verification team conclusion
January 2011, the reason for “No generation” is not provided. Also for similar instances in other days of the monitoring period, the reason is not provided. 3. For the period from 1st October 2011 – 15th October 2011, the fortnightly gas tickets are not provided. 4. For the period from 16th June 2012 – 31st August 2012, the fortnightly gas tickets are not provided		2. There was no power generation during this period due to Gas turbine outage and it is taken for maintenance. The complete operational data of the project activity for the entire monitoring period indicating the outage period with reason is submitted as attachment 3. 3. The gas ticket for the period 1st October 2011 – 15th October 2011 is submitted as attachment 4 4. The gas ticket for the period 16th June 2012 – 31st August 2012 is submitted as attachment 5	shutdown is provided in the attachment which is acceptable. 3. The gas ticket for the period 1st October 2011 – 15th October 2011 is submitted which is acceptable 4. The gas ticket for the period 16th June 2012 – 31st August 2012 is submitted which is acceptable. <i>Conclusion: CAR 5 resolved</i>
CAR 6 - Details regarding Appendix 2 is not provided as part of the Monitoring report - As per requirements of Section 3.3 of the VCS verification template the line diagrams to display the GHG data collection and management system has not been included	6.0	- Mention of Appendix 2 in the monitoring report is wrong, kindly read Appendix 2 as Appendix 1. Appendix 1 is included in the revised monitoring report. - Line diagram detailed the monitoring points is included in section 3.3 of the revised monitoring report	- Appendix 1 with details of leakage calculations is included now which is acceptable - Line diagram is included in section 3.3 of the revised monitoring report which is acceptable <i>Conclusion: CAR 6 Resolved</i>
CL 1 According to Annex 4 of the CDM PDD under section “metering equipment for natural gas consumption” it is mentioned that -<i>The accuracy of the ultrasonic meters for monitoring of Natural gas</i>	3.1	The accuracy class of the implemented ultrasonic meters for natural gas flow measurement is + or -0.1% which is as per man-	The manufacturer specification sheet of Daniel Make ultrasonic flow meters which is installed for gas flow measurements has

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Verification team conclusion
<i>combusted will be maintained at less than 0.1% - based on the onsite visit it was observed that accuracy class of the ultrasonic meters are of 0.1% accuracy class. Clarify</i>		ufacturer standard for the equipment. (the manufacturer specification sheet is provided) Revised Monitoring report reflects the actual implementation scenario.	been reviewed and the accuracy class of + or – 0.1% as mentioned is correct and acceptable. <i>Conclusion: CL 1 Resolved</i>
CL 2 The Nunna Substation is connected by both Line - 1 and Line -2 from the NG Power Plant and separate Main and check meters are provided in the substation to monitor the electricity supplied from the power plant. The VCU calculation sheets however do not contain data relating to energy generated for Line 2 under “summary of data” sheet. Clarify if only Line 1 was used for electricity supply to Nunna Substation	3.3	The project activity is connected to the Nunna substation by both Line 1 and Line 2 and the electricity is transmitted by both the lines. The attachment 2 submitted mentions the net electricity supplied from both Line 1 and 2 which is sourced from SRPC data which clearly details the electricity transmitted through each line.	The VCU calculation sheets mention the source document as SRPC database which mentions electricity supplied from Line 1 and Line 2 to Nunna Substation. Hence the justification is acceptable. <i>Conclusion: CL 2 Resolved</i>