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# VERIFICATION / CERTIFICATION REPORT

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## SRGEL NON CONVENTIONAL ENERGY SOURCES BIOMASS POWER PROJECT

(CDM REGISTRATION REFERENCE NO.0546)

Verification Period:  
2006/04/01 to 2007/06/23

REPORT No. 2007-2006-1  
REVISION No. 01

DET NORSKE VERITAS



## VERIFICATION / CERTIFICATION REPORT

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Approved by: Michael Lehmann Technical Director	Organisational unit: DNV Certification, International Climate Change Services
Client: Sree Rayalaseema Green Energy Limited	Client ref.: Mr. Madhusudan Chairman & Managing Director

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**Summary:**

Det Norske Veritas Certification AS has performed a verification of the emission reductions reported for the period 01 April 2006 to 23 June 2007 for the “SRGEL Non conventional Energy Sources Biomass Power Project” at Pandipadu village Kallur Mandal, Kurnool district, Andhra Pradesh in India managed by Sree Rayalaseema Green Energy Limited.

In our opinion, the GHG emissions reductions reported for the project in the monitoring report submitted to DNV on 18 September 2007 are fairly stated.

The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology AMS-I.D (version 08) and the monitoring plan and formulae provided in the validated PDD of 5 May 2006. During the course of verification, DNV identified one corrective action request, which has been closed by DNV following appropriate clarification by Sree Rayalaseema Green Energy Limited.

Det Norske Veritas Certification AS is able to certify that the emission reductions from the “SRGEL Non conventional Energy Sources Biomass Power Project” for the period 01 April 2006 to 23 June 2007 amount to 32 616 tCO<sub>2</sub> equivalent.

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Work verified by: Kumaraswamy Chandrashekara	
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**Table of Content****Page**

1	INTRODUCTION.....	3
1.1	Objective	3
1.2	Scope	3
1.3	Description of the Project Activity	3
2	METHODOLOGY .....	4
2.1	Review of Documentation	4
2.2	Site Visits	5
2.3	Assessment	5
2.4	Reporting of Findings	5
3	VERIFICATION FINDINGS.....	6
3.1	Remaining Issues, CARs, FARs from Previous Validation or Verification	6
3.2	Project Implementation	6
3.3	Completeness of Monitoring	6
3.4	Accuracy of Emission Reduction Calculations	7
3.5	Quality of Evidence to Determine Emission Reductions	8
3.6	Management System and Quality Assurance	8
4	CERTIFICATION STATEMENT.....	9
5	REFERENCES.....	11

**Abbreviations**

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction(s)
CH <sub>4</sub>	Methane
CO <sub>2</sub>	Carbon dioxide
CO <sub>2e</sub>	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
ERU	Emission Reduction Units(s)
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MNES	Ministry of Non-conventional Energy Sources
MVP	Monitoring and Verification Plan
N <sub>2</sub> O	Nitrous oxide
NGO	Non-governmental Organisation
NEDCAP	The Non-Conventional Energy Development Corporation of Andhra Pradesh
ODA	Official Development Assistance
PDD	Project Design Document
SRGEL	Sree Rayalaseema Green Energy Limited
UNFCCC	United Nations Framework Convention for Climate Change



## 1 INTRODUCTION

Sree Rayalaseema Green Energy Limited has commissioned Det Norske Veritas Certification AS (DNV) to carry out the verification of emission reductions reported for the “SRGEL Non conventional Energy Sources Biomass Power Project” in Pandipadu, Kurnool district, Andhra Pradesh, India, for the monitoring period 01 April 2006 to 23 June 2007. This report contains the findings from the verification and a certification statement for the certified emission reductions.

### 1.1 Objective

Verification is the periodic independent review and *ex-post* determination by the Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the registered CDM project activity during a defined verification period.

Certification is the written assurance by the DOE that, during a specific period in time, a project activity achieved the emission reductions as verified.

### 1.2 Scope

The verification scope is:

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

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

The verification team has, based on the recommendations in the Validation and Verification Manual / 6/, employed a risk based approach, focussing on the identification of significant reporting risks and verifying the mitigation measures for these.

### 1.3 Description of the Project Activity

Title of project activity:	<i>SRGEL Non conventional Energy Sources Biomass Power Project</i>
UNFCCC registration No:	<i>UNFCCC reference No: 0546.</i>
Project Entity:	<i>Sree Rayalaseema Green Energy Limited</i>
Location of the project activity:	<i>Pandipadu village, Kallur mandal, Kurnool District, Andhra Pradesh state, India</i>
Project's crediting period:	<i>10 years starting from 18 February 2001</i>
Project first CER issuance:	<i>18 February 2001 to 31 March 2006</i>



Verification period: *01 April 2006 to 23 June 2007*  
 Project's actual starting date: After trial operations, commercial power generation started on 17 February 2001 and the project has reported emission reductions from 18 February 2001.

The project is a 5.5 MW (gross) capacity grid-connected biomass based power project. The project was commissioned in February 2001. The project utilises the available renewable biomass in the Andhra Pradesh region, such as rice husk, cotton stalk, groundnut shell, bengal gram husk etc, for generation of electricity that is exported to the Andhra Pradesh state electricity grid and selling to third parties. It uses a condensing type steam turbo generator with a matching boiler of travelling grate type technology, capable of firing multiple fuels. The technology used in this project is indigenous.

## 2 METHODOLOGY

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

### *Verification Team:*

Kakaraparthi Venkataraman	DNV, India	Team Leader, CDM Verifier
Astakala Vidyacharan	DNV, India	GHG Auditor
Michael Lehmann	DNV, Oslo	Energy Sector Expert
Chandrashekara Kumaraswamy	DNV, India	Technical Reviewer

### *Duration of verification:*

Preparation (review of monitoring report, emission reduction estimations, etc.):	24 August- 01 September 2007
Site visit:	10 – 11 September 2007
Reporting:	20 September- 10 October 2007

### 2.1 Review of Documentation

The monitoring reports / 1/ and the emission reduction calculations, provided in the form of spreadsheets submitted by Sree Rayalaseema Green Energy Limited, were assessed as a part of the verification. In addition the Project Design Document / 2/, the monitoring plan contained in the PDD as well as the validation report / 3/ and verification/certification report / 4/ for the first issuance were also assessed. Other documents were also assessed as evidence.



## 2.2 Site Visits

On 10 & 11 September 2007, DNV carried out a site visit at Sree Rayalaseema Green Energy Limited. During the site visit, DNV verified the actual operation of the project as described in the PDD. The instruments used for monitoring electricity and biomass fuels were checked, including the calibration records for these instruments and these were found to be in order.

## 2.3 Assessment

The data presented in the monitoring report were assessed in detail through a review of the detailed project documentation and production records, interviews with personnel at Sree Rayalaseema Green Energy Limited, collection of measurements, observation of established monitoring and reporting practices and assessment of the reliability of monitoring equipment. This has enabled the verification team to assess the accuracy and completeness of reported monitoring results and verify the correct application of the approved monitoring methodology. Data from other sources include the grid emission factor which is fixed throughout the crediting period and the analysis of carbon content in coal used, have been verified and assessed.

## 2.4 Reporting of Findings

Findings established during the verification may be that:

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

A Forward Action Requests (FAR) should be issued, where:

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

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



### 3 VERIFICATION FINDINGS

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

According to the validation report / 3/, no CAR or CL's were required to be closed out during verification. There was one CAR and two FARs identified during the previous verification as per the first verification/certification report / 4/. The forward action requests were found to be addressed effectively during this verification period by DNV.

#### 3.2 Project Implementation

The project was commissioned in February 2001. The project boundaries and all key equipments are in line with the registered PDD. The project boundary covers source of biomass supply, electricity generation and the grid to which the generated electricity is exported. The following equipment is operational as mentioned in the PDD:

- 5.5 MW capacity steam turbine
- Travelling grate type boiler of capacity (22t/hr steam at 44kg/cm<sup>2</sup> and 485°C temperature)
- Ash handling system for effective disposal of fly ash
- DM water plant for boiler feed water supply
- Electro static precipitator
- Energy meters for monitoring electricity

The project has all statutory clearances like consent for establishment, valid consents for operation including air and water consents from the pollution control board, and clearance from NEDCAP a nodal agency for MNES for monitoring of renewable energy power projects. These facts have been verified by DNV during the site visit. In addition the verification of air and effluent reports confirm that relevant pollution parameters as specified in the consents are within the specified limits. The project has already been issued with CERs for the period 18 February 2001 to 31 March 2006.

The following plant outages during the chosen verification period (01 April 2006 to 23 June 2007) have been recorded and verified to be correct:

- |                              |   |           |
|------------------------------|---|-----------|
| ▪ Total forced outage        | : | 200.3 hrs |
| ▪ Total planned outage hours | : | 90.3 hrs  |
| ▪ Total outage hours         | : | 290.6 hrs |

#### 3.3 Completeness of Monitoring

The approved baseline methodology AMS-I.D (version 08) has been applied for the project activity. In accordance with AMS-I.D, the baseline for the project activity has been estimated by determining the CO<sub>2</sub> emission factor from the electricity generation from the southern regional grid using the combined margin approach. The ex-ante figure of 0.8345 kg CO<sub>2</sub> e/ kWh in the validated and registered PDD has been used. Based on the validated emission factor and net





electricity generation, the emission reduction has been verified to be 32 616 tCO<sub>2</sub> equivalent for the period 01 April 2006 to 23 June 2007.

As required by the monitoring methodology AMS-I.D, version 08, monitoring of parameters comprises:

- Electricity generation - net export to grid, export to direct third party and auxiliary consumptions
- Biomass fuel used
- Project emissions due to usage of coal as a fuel and due to usage of diesel.

During the monitoring period, the consumption of diesel was also contributing to project emissions, which has been taken into account during calculations. It was observed during previous verification that the project has third party sales and the power exported to neighbouring industry as a third party sale through a direct calibrated meter (not using APTRANSCO lines for wheeling) is **now** included in the monitoring plan and being monitored on daily basis. There is a variation observed between verified quantity of coal used in the project and version 1 of the monitoring report. A CAR was raised to calculate and include emissions due to the correct use of coal and revise the monitoring report. Accordingly, the project participant has deducted emissions due usage of actual quantity of coal. This has been arrived at using actual carbon percentage in coal consumed in the project.

An annual assessment on surplus biomass availability has been conducted by the project proponent and presented for verification. The assessment is based on data for the year 2005-06, which is the most recent data available. According to the assessment, it has been confirmed that the surplus biomass available in the region is around 92%.

The parameters reported, including source, frequency and review criteria as indicated in the monitoring plan were verified to be correct and in line with the validated monitoring plan of the PDD. Necessary management system procedures including responsibility and authority of monitoring activities have been verified to be consistent with the PDD. Knowledge of personnel associated with the project activity was also found to be satisfactory.

Nonetheless, if found necessary by the Board, DNV will request a revision of the monitoring plan prior to verifying and certifying emission reductions from the next monitoring period to include the monitoring of the direct sale of power to the neighbouring industry.

### 3.4 Accuracy of Emission Reduction Calculations

No significant reporting risks have been identified for the data reported. All the data required for emission reduction calculations are manually recorded in log sheets once in each shift i.e., after every 8 hours. These are then transferred to spread sheets for emission reduction calculations. Fuel consumption particulars such as biomass type, quantity and source are maintained at their point of entry and recorded on 'weighing slips'. These have been verified by DNV



All other data are culled out either from the log books or daily power generation and fuel consumption reports. The biomass consumption data is recorded on a daily basis. The log books also have provisions for recording coal consumption data.

An assessment on CAR/FARs raised during this periodic verification of the project is provided below.

FAR/CAR	Description of finding	Response	Conclusion
CAR1	Variation in coal consumptions have been observed during this verification period against claimed quantities in case of few months. This is required to be corrected in revised monitoring report.	Coal quantities have been verified again and correctly included now in the revised report.	Accepted.

The calibration of monitoring equipments is being maintained and same has been verified by DNV. The quantity of biomass received is weighed twice during entry and exit on duly calibrated and checked weigh bridges and subjected to quality check and rejection criteria of Sree Rayalaseema Green Energy Limited. Daily power generation data (including total power and auxiliary power) is monitored and recorded from duly calibrated energy meters, and APTRANSCO officials monitor the export/import power meters on monthly basis. The electricity exported as a third party to neighbouring industry is monitored through a dedicated calibrated meter. All the power generation, fuel receipt and consumption data are maintained daily in electronic as well as hard print form, and have been assessed for correctness.

### 3.5 Quality of Evidence to Determine Emission Reductions

The emission reductions reported per month during 01 April 2006 to 23 June 2007 was verified to be 32 616tCO<sub>2</sub>e.

Sufficient evidence was presented for the reported net emission reductions.

### 3.6 Management System and Quality Assurance

Sree Rayalaseema Green Energy Limited has established management procedures and implemented them effectively to ensure that the process is consistent. The procedures cover management responsibilities, data monitoring procedures, training procedures, periodical internal audits, management reviews and corrective actions in case of any deviations effectively. Calibration process is followed as per defined procedures and carried out annually and the calibration certificates of the instruments used for data monitoring and recording were also verified during the site visit.



## 4 CERTIFICATION STATEMENT

### Introduction

Det Norske Veritas Certification AS has been engaged by Sree Rayalaseema Green Energy Limited to examine the greenhouse gas (GHG) emission reductions reported from the “SRGEL Non conventional Energy Sources Biomass Power Project” (CDM registration reference no. 0546) for the period 01 April 2006 to 23 June 2007, equating to 32 616 tonnes of CO<sub>2</sub> equivalents.

The project has applied the approved baseline and monitoring methodologies AMS-I.D, version 08, and emissions and emissions reductions are as reported in the monitoring report received on 18 September 2007.

### **Responsibilities of the SRGEL Non conventional Energy Sources Biomass Power Project management of Sree Rayalaseema Green Energy Limited and DNV Certification Limited.**

The management of the “SRGEL Non conventional Energy Sources Biomass Power Project” is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project’s monitoring plan. The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of GHG emission reductions from the project is the responsibility of the management of the project.

It is DNV’s responsibility to express an independent verification statement on the reported GHG emission reductions from the project for the period 01 April 2006 to 23 June 2007.

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

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

Our approach is risk-based, drawing on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. Our examination includes assessment, on a test basis, of evidence relevant to the amounts and disclosures in relation to the project’s GHG emissions for the period from 01 April 2006 to 23 June 2007.

We planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that the amount of GHG emission reductions for the period 01 April 2006 to 23 June 2007 are fairly stated.

We conducted our verification on the basis of the monitoring methodology AMS-I.D, version 08, and the monitoring plan included in the PDD of the project. The verification included:

- Collection of evidence supporting the reported data,
- checking whether the provisions of the monitoring methodology AMS-I.D, version 08, and the monitoring plan in the PDD were consistently and appropriately applied.

We have verified that the information included in the monitoring report of version 01 dated 25 July 2007 and version 02 dated 18 September 2007 is correct and that the emissions reductions achieved have been determined correctly.

**Opinion**

In our opinion, GHG emissions reported for the project reported in monitoring report version 02 dated 18 September 2007 / 1/ are fairly stated.

The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology AMS-I.D, version 08, and the monitoring plan and formulae provided in the validated PDD of 5 May 2006.

Det Norske Veritas Certification AS is able to certify that the emission reductions from the "SRGEL Non conventional Energy Sources Biomass Power Project" for the period 01 April 2006 to 23 June 2007 amount to 32 616 tCO<sub>2</sub> equivalent.

Bangalore & Oslo, 12 March 2008

Deleted: 22 January

Chandrashekhara Kumaraswamy  
Manager (South Asia)

Michael Lehmann  
Technical Director  
Climate Change Services  
Det Norske Veritas Certification AS



## 5 REFERENCES

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

- / 1/ Sree Rayalaseema Green Energy Limited: "SRGEL Non conventional Energy Sources Biomass Power Project" Monitoring report for the period of 01 April 2006 to 23 June 2007 of version 01 dated 25 July 2007 and version 02 dated 18 September 2007
- / 2/ Sree Rayalaseema Green Energy Limited: CDM-PDD for "SRGEL Non conventional Energy Sources Biomass Power Project", version 2 of 5 May 2006
- / 3/ DNV Validation Report – "SRGEL Non conventional Energy Sources Biomass Power Project" Report No. 2005-9008 revision 02 dated 21 July 2006.
- / 4/ DNV Verification/Certification report – "SRGEL Non conventional Energy Sources Biomass Power Project" Report No. 2007-2006 revision 01 dated 10 May 2007.

### Category 2 Documents:

*Background documents related to the design and/or methodologies employed in the design or other reference documents.*

- / 5/ Appendix B of the simplified modalities and procedures for small-scale CDM project activities: *Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories*. Version 08: 03 March 2006.
- / 6/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>
- / 7/ Air and Water consent from Andhra Pradesh Pollution Control Board Consent No. APPCB/KNL/KNL/290/HO/W&A/2007-811 dated 13.07.2007.
- / 8/ [www.scclmines.com](http://www.scclmines.com)
- / 9/ Calorie meter calibration report dated 04 April 2007.
- / 10/ Energy meters calibration certificates dated 25 April 2006.
- / 11/ Copies of APTRANSCO generation Certificates for all months for verification period.
- / 12/ Weighbridge certificate from Office of controller of legal metrology dt.14.9.06
- / 13/ Third party coal analysis reports for verification period from Vitro Labs Hyderabad
- / 14/ Production log books, Boiler log books, Turbine log sheets, Maintenance records.
- / 15/ CDM Manual, Standard operating procedures, formats.
- / 16/ Ambient air analysis reports of AP pollution control board.

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

- / 17/ Mr. Madhusudan                      Chairman & Managing Director  
Mr. Bharat Kumar                      Director - Administration



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VERIFICATION / CERTIFICATION REPORT

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Mr. M.P. Nazar  
Mr. Suresh

General Manager (Technical)  
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