



VALIDATION REPORT

SHALIVAHANA NON CONVENTIONAL RENEWABLE SOURCES BIOMASS POWER PROJECT IN INDIA

REPORT No. 2006-9056

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DET NORSKE VERITAS



VALIDATION REPORT

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Approved by: Einar Telnes Director	Organisational unit: DNV Certification, International Climate Change Services
Client: Shalivahana Projects Limited.	Client ref.: Mr. M. Komaraiah Director

DET NORSKE VERITAS
CERTIFICATION LTD

Palace House
3 Cathedral Street
London SE19DE
United Kingdom
Tel: +44 (0)20 7357 6080
Fax: +44 (0) 20 7407 1239
<http://www.dnv.com>

Summary:

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “Shalivahana Non-conventional Renewable Sources Biomass power Project” project in India on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, the simplified modalities and procedures for small-scale CDM project activities and the subsequent decisions by the CDM Executive Board.

The validation consisted of the following three phases: i) a desk review of the project design document, ii) follow-up interviews with project stakeholders and iii) the resolution of outstanding issues and the issuance of the final validation report and opinion.

In summary, it is DNV’s opinion that the project, as described in the revised project design document of 05 May 2006, meets all relevant UNFCCC requirements for the CDM is eligible as category I.D small-scale CDM project activity and correctly applies the approved simplified baseline and monitoring methodology AMS-I.D, Version 08, 03 March 2006. Hence, DNV requests the registration of the “Shalivahana Non-conventional Renewable Sources Biomass power Project” project as a CDM project activity.

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Abbreviations

AP	Andhra Pradesh
APERC	Andhra Pradesh Electricity Regulatory Commission
APFDC	Andhra Pradesh Forest Development Corporation Limited
APPCB	Andhra Pradesh Pollution Control Board
APTRANSCO	Andhra Pradesh Transmission Company
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electrical Authority
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CH ₄	Methane
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
DPR	Detail Project Report
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
kWh	Kilo Watt hour
MW	Mega Watts
MNES	Ministry of Non-conventional energy sources
MoEF	Ministry of Environment and Forest
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
NEDCAP	The Non-Conventional Energy Development Corporation of Andhra Pradesh
N ₂ O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PPA	Power Purchase Agreement
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change



1 INTRODUCTION

Shalivahana Projects Limited has commissioned Det Norske Veritas Certification Ltd. (DNV) to perform a validation of the “Shalivahana Non-conventional Renewable Sources Biomass power Project” in India (hereafter called “the project”). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for small-scale CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation team consisted of the following personnel:

Chandrashekara Kumaraswamy	DNV, India	Team Leader
Astakala Vidyacharan	DNV, India	GHG Auditor
K.Venkata. Raman	DNV, India	Technical Reviewer

1.1 Validation Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant UNFCCC and host Party criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords, the simplified modalities and procedures for small-scale CDM project activities / 4/ and the relevant decisions by the CDM Executive Board. The validation team has, based on the recommendations in the Validation and Verification Manual / 5/ employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

1.3 Description of Proposed CDM Project

The project is a 6 MW (gross) capacity grid-connected biomass based power project. The project was commissioned in December 2002. The project utilises the available biomass in the region, such as rice husk, cotton stalks, paddy straw, prosopis juliflora etc, for generation of electricity that is exported to the Andhra Pradesh state electricity grid, which forms a part of the Southern regional grid. It uses a condensing type steam turbo generator with a matching boiler of travelling grate technology capable of firing multiple fuels. The technology used in the project is indigenous.

The objective of the project is to reduce anthropogenic GHG emissions by displacing fossil fuel based electricity generation with renewable biomass. The project thereby helps in reducing the



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power deficit in the state of Andhra Pradesh and also contributes towards conservation of natural resource like coal.

Based on a baseline emission factor determined to be to be 0.834 kgCO₂ per kWh (for the southern regional grid), the project is expected to result in emission reductions of 23 121 tonnes of CO₂ per year during the ten year crediting period.

2 METHODOLOGY

The validation of the project started in the month of December 2005 with hosting the PDD on the UNFCCC website and inviting stakeholders' comments.

The validation consisted of the following three phases:

- i) a desk review of the project design document
- ii) follow-up interviews with project stakeholders
- iii) the resolution of outstanding issues and the issuance of the final validation report and opinion.

In order to ensure transparency, a validation protocol was customised for the project, according to the Validation and Verification Manual / 5/. The protocol shows in transparent manner criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The validation protocol consists of three tables. The different columns in these tables are described in Figure 1.

The completed validation protocol for the "Shalivahana Non-conventional Renewable Sources Biomass power Project" is enclosed in Appendix A to this report.

Findings established during the validation can either be seen as a non-fulfilment of validation protocol criteria or where a risk to the fulfilment of project objectives is identified. Corrective action requests (CAR) is issued, where:

- i) mistakes have been made with a direct influence on project results;
- ii) validation protocol requirements have not been met; or
- iii) There is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

The term Clarification may be used where additional information is needed to fully clarify an issue.



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Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities			
Requirement	Reference	Conclusion	Cross reference
<i>The requirements the project must meet.</i>	<i>Gives reference to the legislation or agreement where the requirement is found.</i>	<i>This is either acceptable based on evidence provided (OK), a Corrective Action Request (CAR) of risk or non-compliance with stated requirements or a request for Clarification (CL) where further clarifications are needed.</i>	<i>Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.</i>

Validation Protocol Table 2: Requirement Checklist				
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
<i>The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in seven different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.</i>	<i>Gives reference to documents where the answer to the checklist question or item is found.</i>	<i>Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.</i>	<i>The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.</i>	<i>This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) due to non-compliance with the checklist question (See below). A request for Clarification (CL) is used when the validation team has identified a need for further clarification.</i>

Validation Protocol Table 3: Resolution of Corrective Action Requests and Requests for Clarification			
Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
<i>If the conclusions from the draft Validation are either a Corrective Action Request or a Clarification Request, these should be listed in this section.</i>	<i>Reference to the checklist question number in Table 2 where the Corrective Action Request or Clarification Request is explained.</i>	<i>The responses given by the project participants during the communications with the validation team should be summarised in this section.</i>	<i>This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".</i>

Figure 1 Validation protocol tables



2.1 Review of Documents

The PDD / 1/ submitted by the Shalivahana Projects Limited (version 1 dated 20 October 2005 and version 2 dated 5th May 2006) and additional background documents related to the project design and baseline, such as the baseline calculation data , local stakeholder's comments and the monitoring plan were assessed during the validation.

2.2 Follow-up Interviews

On 17 and 18 February 2006, DNV performed interviews with representatives of Shalivahana Projects Limited and local stakeholders to confirm selected information and to resolve issues identified in the document review. The main topics of the interviews are summarised in Table 1.

Table 1 Interview topics

Interviewed organisation/persons	Interview topics
Shalivahana Projects Limited.	<ul style="list-style-type: none"> ➤ Further clarifications that the project activity itself is not a likely baseline scenario due to the existence of one or more of the following barriers: investment barriers, barriers due to prevailing practice or other barriers. ➤ Clarifications on establishment of baseline, monitoring plan and emission reduction calculations. ➤ Resources, training needs and procedures for operation and maintenance. ➤ Benefits from CDM registration.
Environment engineer, APPCB Nizamabad division	<ul style="list-style-type: none"> ➤ Over all impact of Shalivahana projects on local environment ➤ Job opportunities ➤ Any complaints on project
Municipal Chairman Mancherial	<ul style="list-style-type: none"> ➤ Local people reaction to the project ➤ Economic impact on local population
Village President Mulkala – Surrounding village	<ul style="list-style-type: none"> ➤ Implications due to biomass plant associated activities ➤ Local benefits due to project
Local Administrators	<ul style="list-style-type: none"> ➤ Overall impact of project ➤ Revenue benefits to village ➤ Job opportunities, direct, indirect
Divisional Manager - APFDC	<ul style="list-style-type: none"> ➤ Usage of permitted woody biomass and impact
Biomass suppliers	<ul style="list-style-type: none"> ➤ Availability of biomass ➤ Cost of biomass ➤ Benefits due to project activity
Forest Range Officer Nizamabad Range	<ul style="list-style-type: none"> ➤ Impact of project on forest conservation
Surrounding farmers	<ul style="list-style-type: none"> ➤ Impact due to project emissions on crops ➤ Benefits out of project

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve any outstanding issues which needed to be clarified for DNV's positive conclusion on the project design. The initial validation identified three Corrective Action Requests and five requests for Clarification. These requests



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were presented to the project participants in DNV's draft validation report and the project participants were invited to provide a response to these requests. The project participants' response, which included the submission of a revised PDD dated 05 May 2006, addressed the corrective action requests and requests for clarification to DNV's satisfaction.

To guarantee the transparency of the validation process, the concerns raised by DNV and the responses given by the project participant are documented in the validation protocol in Appendix A to this report.

3 VALIDATION FINDINGS

In the following sections the findings of the validation are stated. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

The final validation findings relate to the project design as documented and described in the revised and resubmitted project design documentation dated 05 May 2006.

3.1 Participation Requirements

The project activity is being proposed as a unilateral project by Shalivahana Projects Limited, which is the only project participant. The host Party, India meets all participation requirements, and the DNA of India has approved the project vide its letter of approval dated 17 January 2006 and has provided confirmation that the project assists in achieving sustainable development.

3.2 Project Design

The project has a rated generation capacity of 6 MW and aims to export the electricity to the Andhra Pradesh state electricity grid, which is part of the southern regional electricity grid. The project is connected to APTRANSCO grid through 132/33 KV substation which is located about 1.0 km away from the project.

The technology used is available in India and no transfer of technology is envisaged. The biomass based power plant will generate electricity utilizing the available biomass in the region, which will be primarily rice husk along with cotton stalks, paddy straw and some quantities of juliflora. The rice husk, cotton stalks, paddy straw used in the project are renewable biomass. The rice husk and ground nut shell used in the project are renewable biomass. Small quantities of juliflora twigs constitute renewable woody biomass as per the definition of renewable biomass provided in the 23rd meeting by the CDM-EB. The source of any other woody biomass, if used, is to be verified during verification stage. It has been verified from official documentation (Administrative Staff College of India (ASCI) report on "Socio-economic impacts of biomass power plants") that surplus biomass is available in the region and that the project activity will not lead to leakage effects elsewhere due to the usage of fossil fuel.

The project consists of a condensing type steam turbo generator coupled with matching boiler of travelling grate type technology capable of firing multiple fuels. The capacity generation of boiler is 35 tones of steam per hour at a pressure of 79 Kg/cm² and a temperature of 485⁰C equivalent to 28.4 MW thermal.

The project results in reduction of GHG emissions by capacity addition to the grid, which is dominated by fossil fuel based power generators. The added advantage of the project will be in



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terms of additional income generated for the farmer and also in terms of jobs generated by the project. The technology applied is deemed current food practice and is not expected to be replaced within the crediting period.

The project implementation was started on 15 December 2000 with a contract order between Shalivahana Projects Limited and Sriram EPC Limited, Chennai India for design, engineering and supply of the equipments. The expected operational lifetime of the project is estimated around 20 years and a fixed crediting period of 10 years has been chosen with the starting date of crediting period as 08 December 2002.

The validation did not reveal any information that indicates that the project can be seen as a diversion of official development assistance (ODA) funding towards India.

3.3 Project Baseline

Since the projects capacity is less than 15 MW, the project is eligible as type I small-scale CDM project activity and can apply the simplified baseline methodology. The project applies the baseline methodology stipulated for category I.D of the “simplified modalities and procedure for small scale CDM project activity” (AMS-I.D). The simplified baseline methodology AMS-I.D is applicable for grid connected renewable electricity generation projects and includes biomass projects. The application of AMS-I.D is justified as the project generates electricity using biomass and it displaces the grid electricity.

In accordance with AMS-I.D the biomass power plant may co-fires fossil fuels. As per the guidelines of the Non-conventional Energy Development Corporation of Andhra Pradesh Limited, (NEDCAP) the project can use coal up to 25% as support fuel. To arrive at the ex-ante GHG emission reduction estimates, it was assumed that the project will co-fire about 8000 tons of coal per annum (13%), which is the actual average quantity of coal used so far. The CO₂ emissions due to the usage of about 6500 t of coal per annum (with about 50% carbon content) will be within the threshold limit of 15 Kt as specified by the small-scale CDM modalities. The emissions resulting from use of coal is incorporated as project emissions and the capacity of the unit including coal and biomass is 6 MW.

As the project activity is feeding power to Andhra Pradesh state electricity grid which is a part of southern region electricity board, the baseline for this project activity is the function of the generation mix of southern region grid. The selection of the southern region grid as the grid system boundary for the project activity is in line with the recent EB guidance for large countries such as India. Using the methodology available for small-scale project activities as applicable for category I.D, the average of the “approximate operating margin” and the “build margin” emission coefficient for southern grid of India has been estimated to be 0.834 kg CO₂e / kWh. The operating margin emission factor has been estimated based on the simple OM approach and based on the generation-weighted average emissions per electricity unit of all fossil-fuelled generating sources serving the system over a three year period. For the build margin, the 20% most recently installed plants have correctly been chosen, in terms of electricity generation. The calculation worksheets have been verified by DNV.

While actual calorific values of coal and lignite have been used, IPCC default values have been used for power plants using other fuels such as naphtha and natural gas. The completeness of the set of power plants as well as the correctness of the reported fuel consumption and electricity generation data has been verified. All data has been sourced from data published by the Central Electricity Authority.



3.4 Additionality

As per the Attachment A to Appendix B of simplified modalities and procedures for small-scale CDM project activities, the project demonstrates additionality through the existence of the prevailing practice and other barriers.

DNV was able to verify that CDM revenues were considered at the time of project conceptualisation. Company annual reports were verified as evidence for this claim.

DNV could verify that the power generation using renewable sources like biomass is not a prevailing practice and that it constitutes less than 1% of total generation mix of APTRANSCO, thereby confirming that power generation using non-conventional sources is not a common practice in spite of governmental promotion for such projects at the stage of project initiation.

It was also demonstrated that the estimated IRR of 6.88% for the project with out CDM benefits could increase to 9.75% with support of CDM benefits, thereby establishing that the project is not viable even with low cost of raw material at the time of detailed project report (DPR).

DNV was also able to verify the presented steep increase in the cost of biomass with the suppliers.

The project also faces barrier due to policy changes related to the tariff rates. At the time of project conceptualisation the tariff rates were INR.3.48 per unit on 100% power generation. In April 2004 (2004-2005), the policy changes related to the tariff rates in Andhra Pradesh reduced the tariff to INR 2.88. The policy change takes in to account an annual increase of 5 % for the variable cost of power generation. The fixed cost has a gradual decrease over a period of 10 years, from the fixed cost of INR 1.61 per unit from the year of project commissioning. The increasing cost of the raw material creates an imbalance in the sanctioned percentage increase of the variable cost and the actual variable cost. The policy change by which electricity units generated at plant load factors greater than 80 % are priced at only the variable cost applicable thus constitutes a barrier to the project. The arguments presented in the PDD are assessed and deemed to be justified.

Based on the above, it is substantiated that the project faces barriers compared to normal generation sources and thus is deemed additional.

3.5 Monitoring Plan

The project applies AMS-I.D baseline and monitoring methodology. Since the project also co-fires coal, the amount of biomass and fossil fuel is monitored apart from electricity generated and supplied to grid.

In line with the Executive Board's recommendation (para 67 (b) of the meeting report) in the EB 28th meeting, the monitoring of different kinds of biomass fuel used in the project activity has been included in the table D.3.4 (section D.3) of the PDD and also in the monitoring plan (annex 4) of the PDD.

It was verified that, in line with the regulation, the project participant provides the monthly fuel consumption (coal and biomass) data to NEDCAP as a mandatory requirement.

The baseline emission is being calculated as the product of the electricity supplied to the grid and the grid emission factor of the southern regional grid, which is fixed ex-ante for the crediting period.



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Direct emissions due to usage of coal (based on the carbon content of the coal used) as fuel are considered as project emissions. The project participant receives the requirement of a specific grade of coal from a single supplier on the directions of NEDCAP. Indirect emissions due to the transportation of the biomass have been considered. It has been demonstrated that the emissions due to the transportation of biomass constitute only 1% of the annual emission reductions and hence have been neglected. The quantity of fly ash generated and needed to be transported is also small and the emissions are negligible.

Maintenance and calibration of electricity meters are carried out as per the internal procedures and in accordance with the power purchase agreement with APTRANSCO. All data will be archived in paper / electronic form until two years after the crediting period.

While the Director (Operations) of Shalivahana Projects Limited is responsible for project management, the plant manager is responsible for data recording and archiving and reporting. Procedures for internal audits, performance reviews and corrective actions have also been established. The provided monitoring plan is adequate to provide the necessary information for the calculation of electricity generated, the fuel consumed and analysis of the biomass used.

3.6 Calculation of GHG Emissions

The GHG emissions have been calculated as the difference of the baseline emissions and the project emissions and leakages. The baseline emissions have been estimated as the product of the electricity supplied to the grid and the grid emission factor of the Southern regional grid, which has been estimated *ex-ante* at 0.834 kgCO₂ per kWh.

Direct onsite emissions are restricted to the use of fossil fuels in the boiler, when used during shortfall in rice husk supply. Transportation of biomass occurs from within a 50 km radius of the power plant. The emissions due to transportation have been estimated to be as 246 t CO₂/year, which amounts to only 1% of the annual emission reductions. It has been argued that the same types of GHG emissions occur during transportation of coal from coal mines for which transport distances are much longer. Hence, emissions due to transportation of biomass in comparison are considered negligible and therefore not considered.

Since the energy generating equipment is not transferred from another activity and no existing equipment is transferred to another activity, no leakage needs to be considered.

Uncertainty is expected to be only on account of non availability of biomass. The substitute will be usage of coal up to the limits specified, and the monitoring of coal has been addressed in the PDD.

The project replaces fossil fuel-based electricity generation. Baseline emissions are determined to be 0.834 kgCO₂ per kWh, *ex-ante*, and the project is expected to result in emission reductions of 231,215 tonnes of CO₂, during the 10 years of fixed crediting period under the following criteria.

3.7 Environmental Impacts

The environmental impacts of the project are sufficiently assessed. The project's environmental impacts relate to suspended particulate matter, nitrogen oxides and sulphur dioxide emissions as well as the generation of fly ash. An electrostatic precipitator (ESP) has been installed and the project is designed to adhere to the stipulations as per the state pollution control board. Ash collected is disposed for manufacturing of fly ash bricks. Procedures for handling environment



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impacts due to post emergency scenarios like generation of effluent and debris are addressed as a part of emergency preparedness.

As per the MoEF, an EIA is not required for projects costing less than USD 22 million, which is the case for this project.

3.8 Comments by Local Stakeholders

The comments from local stakeholders like local village bearers, biomass suppliers, local NGOs were invited through personal communications. No adverse comments were received from local stakeholders.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD version of 20.10.2005 was made publicly available on DNV's climate change website (www.dnv.com/certification/climatechange) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 30 December 2005 to 28 January 2006

One comment was received. The comment received (in unedited form) is given in the below text box.

Comment by:

[Perumal, Carbon watch](#)

Inserted On:

2006-02-15

Subject:

Consideration of CDM revenue

Comment:

The fundamental doubt arise would be that if the CDM revenue was seriously considered in the decision to proceed with the project activity (which is an underlying principle for consideration of a project under CDM) what were the steps taken by the project promoter for these six year since the starting date of the project to avail the carbon credits. Suitable evidence would become desirable on account of this and what was the date by which the project has availed the host country endorsement etc to be considered.

Even though the starting date as per the laid procedures the CDM is the commercial date of operation the project ground breaking has started in Dec 2000 so all other clearances would be much before that so the concrete evidence would become quiet essential.

Investment barrier:

Also the entire capital of the project has been recovered in two years of the operation and the equity is realized with in 10 months of the plant operation as per the generation data provided in the PDD.

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The project participants' response:

Shalivahana Power projects have considered CDM revenue before commencing the project construction. It is evidenced in the supporting document already provided for CDM revenue consideration. The decision regarding the same was taken during year 2000 and the same was reflected in the annual report. The board members considered the same and the corresponding CDM revenue consideration document are submitted to DOE during site validation. It is well known that the concept of Kyoto protocol was not well established and was in the stage of evolving during period 2000 to 2004. At the same time, some multilateral organizations with the help of local consultants promoted the concept of CDM in India through seminars and workshops. One of the senior officials in the company attended one of those seminars and consulted some reputed organizations in the field on the same to avail the carbon credits. One of the representatives from the Project attended the conference organized on "India's Initial National Communication to the United Nations Framework Convention on Climate Change during November 2001.

As there were no established guidelines and procedures on the process, no consultant was ready to ensure the guarantee of availing the credits for the project. With this background, company had no option than to wait till 2004 when first project got registered and brought confidence in many project proponents on CDM concept. This is when again plant initiated the process of appointing consultant to avail the carbon credits to the project. The host country endorsement has been availed during the month of January 2006 and a copy of the same is submitted to the validator during validation.

The project construction start date is 15/12/2000. All the procedures to obtain the clearances and placing orders have taken place after year 2000 only. Plant had obtained some of the clearances after start of the project construction and before the commissioning of the project. Some of the mile stones like PPA signing (during March 2002) and EPC award (during December 2000) etc happened after year 2000 only. This indicates the start of all main activities after year 2000.

Investment Barrier:

It is quite unclear how the recovery of the project revenue can be estimated based on the generation data provided in the PDD. It is not possible for any biomass based project to recover all the capital within two years under the dynamic conditions where in there is continuous increase in fuel prices and with uncertainty in tariff structure from APTRANSCO. With the IRR of 6.88% (evidence for the same is submitted), it is not possible to recover the revenue within two years and equity within 10 months time. It takes more than 5 years to recover the investment with the current level of earning from the project. The cash flows from the project are at the level of Rs 350 lakh per annum against the capital investment of Rs. 2500 lakh. This is as per the cash flows mentioned in balance sheet. This is evidenced in the IRR calculation sheet. This indicates higher payback period and the need for CDM revenues for the project.

The financial analysis of the plant at concept stage itself reflected the vulnerability of the project to fluctuations in biomass fuel prices and tariff from the APTRANSCO. It was also evidenced that the project can be sustainable only if other revenue such as CDM revenue is considered. The same is reflected in the IRR calculation.



How DNV has considered the comment received in its validation:

DNV was able to verify that CDM revenues were considered at the time of project conceptualisation. The company's annual report was verified as evidence for this claim. The host country has approved the project with a letter dated on 17 January 2006.

DNV could also verify that the project implementation was started on 15 December 2000 with a contract order between Shalivahana Projects Limited and Sriram EPC Limited, Chennai India for design, engineering and supply of the equipments. Evidence related to some of the officials of the project attending the CDM promotional seminars have been witnessed and accepted by DNV.

Although investment barrier is not the primary barrier for the project, based on IRR analysis, it was clear that the return on investment is not attractive for the project, without the support of CDM revenues. It has been verified that the IRR could go up to 9.75% from 6.88% with the support of CDM benefits.



5 VALIDATION OPINION

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “Shalivahana Non-conventional Renewable Sources Biomass power Project in India” in Mancherial village and mandal, Adilabad district, Andhra Pradesh in India, on the basis of UNFCCC criteria for the Clean Development Mechanism and host country criteria as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures and the subsequent decisions by the CDM Executive Board.

The project participant is Shalivahana Projects Limited. The host Party India meets all participation requirements and the DNA of India approved the project.

The validation has confirmed that the project is eligible as category I.D, Version 08, 03 March 2006 small-scale CDM project activity and correctly applies the simplified baseline and monitoring methodology AMS-I.D, Version 08, 03 March 2006. The determination of the baseline is well elaborated, transparent and sufficiently supported with facts. The selected baseline scenario is reasonable for the selected 10 year crediting period. Moreover, an analysis of the barriers facing the project demonstrates that project is not a likely baseline scenario.

The project will contribute to sustainable development by generating renewable energy, providing benefits such as employment generation during construction and operation of the project, ensuring environmental well being and aid in bridging the gap between demand and supply of power. The DNA of India has confirmed that the project assists in achieving sustainable development and has accorded the approval for the project on 17 January 2006.

The validation did not reveal any information indicating that the project can be seen as a diversion of ODA funding towards India.

The project results in the reduction of GHG emissions those are real, measurable and give long-term benefits and that are additional to what would have occurred in the absence of the project.

The monitoring plan makes sufficient provision for monitoring relevant project and baseline emission indicators. Responsibilities and authorities for project management, monitoring and reporting and QA/QC procedures have also been addressed.

A local stakeholder consultation process has been carried out by the project participant. DNV published the PDD on the DNV climate Change web site and comments by Parties, stakeholders and UNFCCC accredited NGOs were invited through the CDM web site. One comment was received and DNV has taken due account of this comment in its validation of the project.

In summary, it is DNV’s opinion that the project, as described in the project design document of 5 May 2006, meets all relevant UNFCCC requirements for the CDM, is eligible as category I.D, Version 08, 03 March 2006 small-scale CDM project activity and correctly applies the approved simplified baseline and monitoring methodology AMS-I.D, Version 08, 03 March 2006. Hence, DNV requests the registration of the “Shalivahana Non-conventional Renewable Sources Biomass power Project in India” as a CDM project activity.



REFERENCES

Documents provided by the project proponent that relate directly to the project:

- / 1/ Shalivahana Projects Limited: CDM PDD for “Shalivahana Non-conventional Renewable Sources Biomass power Project” Version 1 of 20 October 2005 and version 2 of 5 May 2006.
- / 2/ Shalivahana Projects Limited – Calculation for grid emission factor
- / 3/ Ministry of Environment and Forest (DNA of India): Letter of Approval dated 17 January 2006.

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

- / 4/ International Emission Trading Association (IETA) & the World Bank’s Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>
- / 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/ Revised 1996 IPCC guidelines for national green house gas inventories – Reference manual (volume 3)

Persons interviewed during the validation, or persons who contributed with other information that are not included in the documents listed above:

- Mr. M. Komaraiah, Director, Shalivahana Projects Limited
- / 7/ Mr. Rajababu, Director-Operations, Shalivahana Projects Limited
Mr. Krishna, Plant Manager, Shalivahana Projects Limited

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APPENDIX A

VALIDATION PROTOCOL FOR SMALL-SCALE CDM PROJECT ACTIVITIES

Table 1 Mandatory Requirements for Small Scale Clean Development Mechanism (CDM) Project Activities

Requirement	Reference	Conclusion	Cross Reference/ Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art. 12.2	The project has been proposed as a unilateral project	Table 2, Section E.4.1
2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof	Kyoto Protocol Art. 12.2, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	Written approval from the DNA of India has been obtained on dated 17 January 2006	Table 2, Section A.3
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art. 12.2.	OK	Table 2, Section E.4.1
4. The project shall have the written approval of voluntary participation from the designated national authority of each party involved	Kyoto Protocol Art. 12.5a, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	OK	Written approval from the DNA of India has been obtained dated 17 January 2006
5. The emission reductions should be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	OK	Table 2, Section E.1 to E.4
6. Reduction in GHG emissions must be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5.c, Simplified Modalities and Procedures for Small Scale CDM Project Activities §26	OK	Table 2, Section B.2.1
7. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance	Decision 17/CP.7	OK	The project is being proposed as a unilateral project

Requirement	Reference	Conclusion	Cross Reference/ Comment
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures § 29	OK	DNA of India: National Clean Development Mechanism Authority, Ministry of Environment and Forests
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities and Procedures § 30, 31b	OK	India ratified Kyoto Protocol on 26 August 2002
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	Annex I Party has not been identified yet	The project is being proposed as a unilateral project
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7	CDM Modalities and Procedures §31b	As Above	The project is being proposed as a unilateral project
12. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakesh Accords and shall not be a debundled component of a larger project activity	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	OK	Table 2, Section A.1
13. The project design document shall conform with the Small Scale CDM Project Design Document format	Simplified Modalities and Procedures for Small Scale CDM Project Activities, Appendix A	OK	
14. The proposed project activity shall conform to one of the project categories defined for small scale CDM project activities and uses the simplified baseline and monitoring methodology for that project category	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	OK	Table 2, Section A.1.3, B and D
15. Comments by local stakeholders are invited, and a summary of these provided	Simplified Modalities and Procedures for Small	GAR-1	Table 2, Section G OK

Requirement	Reference	Conclusion	Cross Reference/ Comment
	Scale CDM Project Activities §22b		
16. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	OK	Table 2, Section F
17. Parties, stakeholders and UNFCCC accredited NGOs have been invited to comment on the validation requirements and comments have been made publicly available	Simplified Modalities and Procedures for Small Scale CDM Project Activities §23b,c,d	OK	<p>The PDD was be made publicly available on www.dnv.com/certification/climatechange and Parties, stakeholders and NGOs will through the CDM website be invited to provide comments during the 30 day period from 30 December 2005 to 28 January 2006.</p> <p>One comment was received</p>

Table 2 Requirements Checklist

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A. Project Description The project design is assessed.					
A.1. Small scale project activity It is assess whether the project qualifies as small scale CDM project activity.					
A.1.1. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?	/ 1/	DR	The Project is a 6.0 MW power generation unit using renewable energy as source of fuel. This falls under Type I of SSC CDM projects and the energy generated is below the cap of 15 MW. Thus this project qualifies under small scale project.		OK
A.1.2. The small scale project activity is not a debundled component of a larger project activity?	/ 1/ / 7/	DR I	No other project is registered by the Project proponent under same category since last 2 years and with in 1 km radius		OK
A.1.3. Does proposed project activity confirm to one of the project categories defined for small scale CDM project activities?	/ 1/	DR	Yes, the project conforms to the project type I of small scale CDM projects as it is an renewable energy generation unit using biomass as fuel		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A.2. Project Design Validation of project design focuses on the choice of technology and the design documentation of the project.					
A.2.1. Are the project's spatial (geographical) boundaries clearly defined?	/ 1/ / 7/	DR I	The Boundaries are clearly defined in PDD The spatial boundary of the project includes the project site (up to the dispatch point of electricity to state grid) and includes biomass collection and storage. The project is located at Mancherial Village & Mandal, Adilabad District, Andhra Pradesh. The dispatch point to APTRANSCO will be at the Mancherial substation, located approximately 1 km from the project.		OK
A.2.2. Are the project's system (components and facilities used to mitigate GHG's) boundaries clearly defined?	/ 1/ / 7/	DR I	The project boundary covers fuel storage, travelling grate type boiler, condensing steam turbo generator unit and related auxiliary equipment.		OK
A.2.3. Does the project design engineering reflect current good practices?	/ 1/	DR	Yes, the project design engineering reflects good practices. The boiler is designed to burn 100% agricultural residue (rice husk, cotton stalks and paddy straw). The turbine is of condensing type.		OK
A.2.4. Will the project result in technology transfer to the host country?	/ 1/	DR	The technology is already available in the country and thus no technology transfer is envisaged in the project		OK
A.2.5. Does the project require extensive initial training and maintenance efforts in order	/ 1/	DR	The project will require minimal additional training for project maintenance since the primary		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
to work as presumed during the project period? Does the project make provisions for meeting training and maintenance needs?			technologies applied in this project are already established in India and there is no technology transfer involved.		
A.3. Contribution to Sustainable Development The project's contribution to sustainable development is assessed					
A.3.1. Will the project create other environmental or social benefits than GHG emission reductions?	/ 1/ / 7/	DR I	Yes, the proposed project provides benefits such as generating employment during construction and operation of the project, ensuring environmental wellbeing and in bridging the gap between demand and supply of power.		OK
A.3.2. Will the project create any adverse environmental or social effects?	/ 1/ / 7/	DR I	Andhra Pradesh Pollution Control Board has issued the consent for establishment. Order No.56/PCB/C.Est/RO-NZM/EE-N/282-99 As per the consent order the project is permitted to use agricultural residues as fuel. During site visit, it was found that woody biomass like root wood was being used in high quantities. A clarification as how the issue is being dealt with and mechanism to ensure continual supply of permitted biomass material for the project needs further elaboration. Also demonstration that the root wood that is used in the project is renewable.	CL1	OK
A.3.3. Is the project in line with sustainable development policies of the host country?	/ 1/	DR	Approval from the DNA of India has been obtained.		OK
A.3.4. Is the project in line with relevant legislation and plans in the host country?	/ 1/	DR	Refer F.1.1	CL5	OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
B. Project Baseline The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.					
B.1. Baseline Methodology It is assessed whether the project applies an appropriate baseline methodology.					
B.1.1. Is the selected baseline methodology in line with the baseline methodologies provided for the relevant project category?	/ 1/	DR	Yes. The project applies one of the simplified baseline methodologies proposed for the small-scale project activity category I.D, i.e., for renewable energy that displaces electricity. The simplified baseline is the electricity consumption times the relevant emission factor calculated as the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kgCO ₂ /kWh).		OK
B.1.2. Is the baseline methodology applicable to the project being considered?	/ 1/	DR	AMS ID is applicable to renewable energy projects and as the project is a biomass based power plant it conforms to this methodology as applicable to the project.		OK
B.2. Baseline Determination It is assessed whether the project activity itself is not a likely baseline scenario and whether the selected baseline represents a likely baseline scenario.					
B.2.1. Is it demonstrated that the project activity itself is not a likely baseline scenario due	/ 1/	DR	The additionality of the project activity has been demonstrated through the existence of the barriers	OK	

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
to the existence of one or more of the following barriers: investment barriers, technology barriers, barriers due to prevailing practice or other barriers?			<p>of prevailing practice, financial and policy. In spite of financial barriers and policy barriers the project is initiated and there was no regulatory requirement for the project. This supports the additionality clearly.</p> <p>It has been demonstrated that at the time of the project implementation the installed capacity of renewable energy projects was only about 5% of the projected potential by the official agencies.</p> <p>The adequate references for the data used for demonstrating the additionality is to be provided</p> <p>To substantiate the financial barrier analysis, a more detailed report on the IRR/NPV of the project is required to be evaluated for further clarity.</p> <p>Policy barrier identified is mainly based on the fluctuations in the wheeling charges on third party sale and price of electricity. A sensitivity analysis is required to show that even a positive fluctuation in electricity price and wheeling charges in future would make the project non-viable. It also needs a demonstration how the reduction in tariff during 2004-05 is a barrier for the starting of project which was started during the year 2001-02.</p>	CL2	OK
B.2.2. Is the application of the baseline methodology and the discussion and determination of the chosen baseline transparent and conservative?	/ 1/	DR	Combined Margin approach is used for arriving at baselines emissions calculations.		OK
B.2.3. Are relevant national and/or sectoral policies and circumstances taken into account?	/ 1/	DR	Yes, national policy favours the renewable energy		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
B.2.4. Is the baseline selection compatible with the available data?	/ 1/	DR	Yes.		OK
B.2.5. Does the selected baseline represent the most likely scenario describing what would have occurred in absence of the project activity?	/ 1/	DR	Yes.		OK
C. Duration of the Project / Crediting Period It is assessed whether the temporary boundaries of the project are clearly defined.					
C.1.1. Are the project's starting date and operational lifetime clearly defined?	/ 1/ / 7/	DR I	Yes. The project starting date is 15 December 2000. It is the date of EPC contract agreement with M/s. Sri ram EPC limited. The expected operational life time is 20 years.		OK
C.1.2. Is the assumed crediting time clearly defined (renewable crediting period of seven years with two possible renewals or fixed crediting period of 10 years with no renewal)?	/ 1/ / 7/	DR I	Yes, the crediting period is for 10 years starting from 8 December 2002.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D. Monitoring Plan The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed.					
D.1. Monitoring Methodology It is assessed whether the project applies an appropriate monitoring methodology.					
D.1.1. Is the selected monitoring methodology in line with the monitoring methodologies provided for the relevant project category?	/ 1/	DR	Yes, The monitoring methodology – Metering the electricity generated by the renewable technology - adopted for the project activity is in accordance with Category I.D. contained in Appendix B of the simplified M&P.		OK
D.1.2. Is the monitoring methodology applicable to the project being considered?	/ 1/	DR	Yes.		OK
D.1.3. Is the application of the monitoring methodology transparent?	/ 1/	DR	Yes, the application of the monitoring methodology is simple and transparent. In section D.3 the period for which the data has to be archived is given as 2 yrs but the guideline for SSC-PDD as given in “Guidelines for completing CDM-PDD, CDM-NNB and CDM-NNM” specifies that the period of archiving has to be up to a period of 2 yrs in excess of the end of crediting period. Monitoring of average calorific value of biomass as mentioned in the monitoring plan is not performed	CL3	OK
D.1.4. Will the monitoring methodology give opportunity for real measurements of achieved emission reductions?	/ 1/ / 7/	DR I	The monitoring methodology is through metering and a separate CDM team for periodic monitoring and also periodic analysis of fuel also plans recording. This is expected to give real time results.	CL4	OK

* MoV = Means of Verification, DR= Document Review, I= Interview

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			The implementation of effectiveness has to be checked, as evidence of CDM team is to be given.		
D.2. Monitoring of Project Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.2.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/ 1/	DR	Since the project is renewable energy based, there will be no other project emissions, except emissions due to usage of permitted percentage of coal The monitoring of quantity of coal used has been included in the monitoring plan. Indirect emissions arising out of biomass transportation has been considered and estimated to be negligible.		OK
D.2.2. Are the choices of project GHG indicators reasonable?	/ 1/	DR	Yes.		OK
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/ 1/	DR	Yes.		OK
D.2.4. Will the indicators give opportunity for real measurements of project emissions?	/ 1/	DR	Yes.		OK
D.3. Monitoring of Leakage If applicable, it is assessed whether the monitoring plan provides for reliable and complete leakage data over time.					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?			Since the energy generating equipment is not transferred from another activity and no existing equipment is transferred to another activity, no		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			leakage needs to be considered.		
D.3.2. Are the choices of leakage indicators reasonable?	/ 1/	DR	Not applicable.		OK
D.3.3. Will it be possible to monitor / measure the specified leakage indicators?	/ 1/	DR	Not applicable.		OK
D.3.4. Will the indicators give opportunity for real measurements of leakage effects?	/ 1/	DR	Not applicable.		OK
D.4. Monitoring of Baseline Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/ 1/ / 7/		Yes, the baseline indicators have been chosen in line with the small-scale methodologies approved by the CDM EB.		OK
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/ 1/	DR	Yes.		OK
D.4.3. Will it be possible to monitor / measure the specified baseline indicators?	/ 1/ / 7/	DR I	Yes, techniques do comply with good industry practice.		OK
D.4.4. Will the indicators give opportunity for real measurements of baseline emissions?	/ 1/	DR	Yes.		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D.5. Project Management Planning It is checked that project implementation is properly prepared for and that critical arrangements are addressed.					
D.5.1. Is the authority and responsibility of project management clearly described?	/ 1/ / 7/	DR I	The authority and responsibility for project management has not been clearly described.	CAR2	OK
D.5.2. Is the authority and responsibility for registration monitoring measurement and reporting clearly described?	/ 1/ / 7/	DR I	The PDD addresses the formation of a special group who will have assigned responsibilities for monitoring of all the parameters. Evidence of this team is not available.	CL4	OK
D.5.3. Are procedures identified for training of monitoring personnel?	/ 1/ / 7/	DR I	Procedures for training of monitoring personnel need to be elaborated.	CAR2	OK
D.5.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/ 1/ / 7/	DR I	Emergencies like fire in storage area can cause unintended emission. The emergency preparedness in such situation needs to be elaborated.	CAR3	OK
D.5.5. Are procedures identified for calibration of monitoring equipment?	/ 1/ / 7/	DR I	The MP does not describe procedures for calibration of instruments to be used. Procedures for calibration must be defined to ensure later verification of CERs.	CAR2	OK
D.5.6. Are procedures identified for maintenance of monitoring equipment and installations?	/ 1/ / 7/	DR I	No. As per D.5.1	CAR2	OK
D.5.7. Are procedures identified for monitoring, measurements and reporting?	/ 1/ / 7/	DR I	Yes.		OK
D.5.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how	/ 1/ / 7/	DR I	Yes.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
to process performance documentation)					
D.5.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/ 1/ / 7/	DR I	As in D.5.1	CAR2	OK
D.5.10. Are procedures identified for internal audits of GHG project compliance with operational requirements as applicable?	/ 1/ / 7/	DR I	Procedures for internal audits have not been established.	CAR2	OK
D.5.11. Are procedures identified for project performance reviews?	/ 1/ / 7/	DR I	Procedures for performance reviews have not been established.	CAR2	OK
D.5.12. Are procedures identified for corrective actions?	/ 1/ / 7/	DR I	No	CAR2	OK
E. Calculation of GHG emission It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.					
E.1. Project GHG Emissions The validation of predicted project GHG emissions focuses on transparency and completeness of calculations.					
E.1.1. Are all aspects related to direct and indirect project emissions captured in the project design?	/ 1/	DR	Direct onsite emissions are restricted to the use of fuel in the boiler. Indirect emissions, such as due to energy consumed during construction and transportation have been considered as negligible.		OK
E.1.2. Have all relevant greenhouse gases and sources been evaluated?	/ 1/	DR I	Yes.		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
	/ 7/				
E.1.3. Do the methodologies for calculating project emissions comply with existing good practice?	/ 1/	DR	The calculations are in line with the methodology laid down as per approved methodologies for Renewable electricity generation for the grid and thus are complying with the good practices.		OK
E.1.4. Are the calculations documented in a complete and transparent manner?	/ 1/	DR	Yes.		OK
E.1.5. Have conservative assumptions been used?	/ 1/	DR	Yes.		OK
E.1.6. Are uncertainties in the project emissions estimates properly addressed?	/ 1/	DR	The project proponent has to account for emissions due to non renewable biomass. (Refer also comments under A.3.2).	CL1	OK
E.2. Leakage It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed.					
E.2.1. Are leakage calculation required for the selected project category and if yes, are the relevant leakage effects assessed?	/ 1/	DR	Since the energy generating equipment is not transferred from another activity and no existing equipment is transferred to another activity, no leakage needs to be considered.		OK
E.2.2. Are potential leakage effects properly accounted for in the calculations (if applicable)?	/ 1/	DR	Not applicable refer E.2.1		OK
E.2.3. Do the methodologies for calculating leakage comply with existing good practice (if applicable)?	/ 1/	DR	Not applicable refer E.2.1		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E.2.4. Are the calculations documented in a complete and transparent manner and (if applicable)?	/ 1/	DR	Not applicable refer E.2.1		OK
E.2.5. Have conservative assumptions been used (if applicable)?	/ 1/	DR	Not applicable refer E.2.1		OK
E.2.6. Are uncertainties in the leakage estimates properly addressed (if applicable)?	/ 1/	DR	Not applicable refer E.2.1		OK
E.3. Baseline GHG Emissions The validation of predicted baseline GHG emissions focuses on transparency and completeness of calculations.					
E.3.1. Are the baseline emissions boundaries clearly defined and do they sufficiently cover sources for baseline emissions?	/ 1/	DR	The baseline emissions are defined in accordance with Type I.D in the CDM small-scale methodology scheme.		OK
E.3.2. Are all aspects related to direct and indirect baseline emissions captured in the project design?	/ 1/	DR	All the emission sources have been captured in the project design.		OK
E.3.3. Have all relevant greenhouse gases and sources been evaluated?	/ 1/	DR	Yes.		OK
E.3.4. Do the methodologies for calculating baseline emissions comply with existing good practice?	/ 1/	DR	Yes. Selection of Southern grid for baseline is in line with ACM002.		OK
E.3.5. Are the calculations documented in a complete and transparent manner?	/ 1/	DR	As per B.2.2	CL3	OK
E.3.6. Have conservative assumptions been used?	/ 1/	DR	As per B.2.2	CL3	OK
E.3.7. Are uncertainties in the baseline emissions	PDD	DR	Yes.		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
estimates properly addressed?					
E.4. Emission Reductions Validation of baseline GHG emissions will focus on methodology transparency and completeness in emission estimations.					
E.4.1. Will the project result in fewer GHG emissions than the baseline case?	/ 1/	DR	Yes. The project replaces fossil fuel-based electricity generation.		OK
F. Environmental Impacts It is assessed whether environmental impacts of the project are sufficiently addressed.					
F.1.1. Does host country legislation require an analysis of the environmental impacts of the project activity?	/ 1/ / 7/	DR I	As per the MoEF, an EIA is not required for projects costing less than USD 22 Millions, as is the case with the proposed project. Status with respect to availability of consents to operate from the APPCB is not clear	CL5	OK
F.1.2. Does the project comply with environmental legislation in the host country?	/ 1/ / 7/	DR I	As in F.1.1	CL5	OK
F.1.3. Will the project create any adverse environmental effects?	/ 1/ / 7/	DR I	The environmental impacts, the project is likely to create, such as effects of suspended particulate matter, Nitrogen oxides and Sulphur dioxide apart from generation of fly ash.		OK
F.1.4. Have environmental impacts been identified and addressed in the PDD?	/ 1/	DR	Yes		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
G. Comments by Local Stakeholder Validation of the local stakeholder consultation process.					
G.1.1. Have relevant stakeholders been consulted?	/ 1/ / 7/	DR I	As per Table 1 No.15	CAR1	OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/ 1/ / 7/	DR I	As per Table 1 No.15	CAR1	OK
G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/ 1/ / 7/	DR I	Not specifically required for such small scale biomass projects under the Indian Legislation.		OK
G.1.4. Is a summary of the comments received provided?	/ 1/ / 7/	DR I	As per Table 1 No.15	CAR1	OK
G.1.5. Has due account been taken of any comments received?	/ 1/ / 7/	DR I	As per Table 1 No.15	CAR1	OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
<p>CAR-1</p> <p>Evidence for local stakeholders' consultation process needs to be provided.</p>	<p>Table1 No.15</p> <p>G.1.1,G.1.2, G.1.4,G.1.5</p>	<p>The plant had invited comments from all the relevant stake holders and collected the feedback and the same is documented. The proof for the same has been attached.</p>	<p>Evidence provided has been accepted</p> <p>CAR closed.</p>
<p>CAR-2</p> <p>The authority and responsibility for project management has not been clearly described.</p> <p>Procedures for training of monitoring personnel, calibration of instruments to be used, maintenance of monitoring equipment and installations, for dealing with possible monitoring data adjustments and uncertainties, internal audits, performance reviews, corrective actions needs to demonstrated.</p>	<p>D.5.1</p> <p>D.5.3</p> <p>D.5.3</p> <p>D.5.5</p> <p>D.5.6</p> <p>D.5.9</p> <p>D.5.10</p> <p>D.5.11</p> <p>D.5.12</p>	<p>The plant has formed a CDM team to monitor key parameters in the plant to estimate to carbon credits every year. The structure of the team and the persons involved in the CDM team has been submitted during validation visit. The roles and responsibilities for each of the team member are clearly defined and the same is attached.</p> <p>All the mentioned procedures and methods are in practice but they were not documented during the initial days of plant operation. Plant has streamlined all the procedures and are presently formalised and documented. The procedures for the same are attached.</p>	<p>Attached procedures have been reviewed and accepted.</p> <p>CAR closed.</p>
<p>CAR-3</p> <p>Emergencies like fire in storage area can cause unintended emission. The emergency preparedness in such situation needs to be elaborated.</p>	<p>D.5.4</p>	<p>All necessary precautionary measures are taken in terms of providing fire hydrant system and adequate fire extinguishers to handle the emergency situations. The procedure for emergency preparedness plan in the</p>	<p>The complimentary information provided has been accepted.</p> <p>CAR closed.</p>

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		plant for critical equipments is already developed and is attached.	
<p>CL1</p> <p>A clarification as how the issue is being dealt with and mechanism to ensure continual supply of permitted biomass material for the project needs further elaboration. Also demonstration that the root wood that is used in the project is renewable.</p>	<p>A.3.2 B.1.2 E.1.6</p>	<p>It is a general practice in any forest area that Forest Department cull down the old trees for reforestation regularly. And the waste generated from the cut trees (popularly known as root wood) is disposed by selling to prospective users with the help of necessary permissions and approvals. Plant has got necessary approvals and consent to procure the same from forest department whenever the same is available at forest department. This process is continuous and generates root wood on continuous basis with reforestation and afforestation activities by forest department. As the root wood is available only when the forest department sells to third party, the same can be considered as renewable biomass as the same is available only when the forest department cuts down old plants and plant new ones. The agreement with forest department is attached for reference.</p> <p>Based on the 'Socio Economic Impact Assessment of Biomass Power Plant in India' report prepared by Administrative Staff College of India, Hyderabad during July 2005, the total surplus</p>	<p>The agreement between project participant and APFDC has been evidenced. It is strongly recommended to monitor all the woody biomass which is non-renewable separately for discounting CERs.</p> <p>This is to be monitored during verification.</p> <p>CL closed.</p>

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		<p>biomass availability in the state is 22.08 lakh tones per annum. The availability of biomass material (Paddy, groundnut, cotton, sunflower) in the Adilabad district where plant located is around 0.80 lakh tones per annum. The total biomass availability in the neighboring districts where from biomass can be procured is around 2.5 lakh tones which is sufficient enough to generate around 25 MW of power as against the existing plant's capacity of 14 MW. Also, there are no other biomass power plants in the district apart from the project activity. This indicates the abundant availability of the biomass in the region. In addition to this, plant has also got the permission to use the coal up to 20% in case of emergency conditions.</p> <p>The availability of the same is ensured every year based on the assessment of biomass sources in the region, the used biomass material in the plant can be considered as renewable and available on continuous basis.</p>	
<p>CL-2</p> <p>The adequate references for the data used for demonstrating the additionality is to be provided</p> <p>To substantiate the financial barrier analysis</p>	B.2.1	<p>The IRR of the project has been estimated and the same is attached for the reference.</p> <p>Also, the sensitivity analysis of the</p>	<p>The IRR and sensitivity analysis provided demonstrates that the barrier exists.</p> <p>The complimentary information provided is accepted.</p>

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<p>a more detailed report on the IRR/NPV of the project is required to be evaluated for further clarity.</p> <p>Policy barrier identified is mainly based on the fluctuations in price of electricity. A sensitivity analysis is required to show that even a positive fluctuation in electricity price in future would make the project non-viable. It also needs a demonstration how the reduction in tariff during 2004-05 is a barrier for the starting of project which was started during the year 2001-02.</p>		<p>project with the fluctuations in the price of electricity is done and the results of the same also attached for the reference.</p> <p>From the analysis of IRR and sensitivity analysis, it is clearly demonstrated the need for the CDM revenues for the project for the sustainable operation.</p> <p>Plant has been facing risks due to steady increase in the cost of the biomass year after year and witnessed reduction in the gap between actual generation cost and revenue from APTRANSCO since long. Though the effect of the tariff on the plant operations is relatively less comparatively post tariff revision period, no biomass plant in the state expected reduction in the price from the existing. APERC has considered very less kcal/kWh value to estimate the unit cost which is very distant from the actual value. The very fact that all the Biomass Power Projects are not satisfied with APERC Tariff Order and approached the Hon'ble High Court in the absence of Electricity Tribunal for upward revision of tariff in April 2004. The Hon'ble High Court has passed an interim order for paying the 50% of differential tariff. This is an indication</p>	<p>The CL is closed</p>

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		<p>that there is no economic viability of the project with the APERC tariff. The projects are operating in anticipation of the CDM benefits.</p> <p>Construction of the project started during December 2000 and has become operational in the month of December 2002. Project Proponent (PP) has signed Power Purchase Agreement (PPA) with APTRANSCO before the start of the project under which the tariff for the power plant is at Rs. 2.25 paise per unit with escalation at 5% per annum with 1994-95 as base year subjected to the condition that the purchase price so arrived does not exceed 90% of the prevailing HT tariff of APTRANSCO. Profitability of the project is calculated based on this tariff structure during the DPR stage. With this, the tariff for the year 2003-04 should be of Rs. 3.48 per unit and Rs 3.67 for 2004-05. At the same time, PPA also mentioned that beyond the year 2003-04, the purchase price by APTRANSCO will be decided by Andhra Pradesh Electricity Regulatory Commission (APERC) and further review on completion of ten years from the date of commissioning of the project. This indicates the uncertainty in the pricing from APTRANSCO.</p>	

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		<p>Considering the risk due to changes in policy, plant had considered likely policy change on tariff also as one of the barrier and considered CDM revenue before the start of the project construction to minimize the risk due to any such policy change in addition to other barriers like increase in fuel cost. Though there was a risk due to tariff change from the year 2004-05, with an expectation that APERC would not reduce the tariff from the existing tariff, PP had completed project commissioning when the APERC has revised the tariff order (just after four months of plant operation) wide R.P. No.84 / 2003 in OP No 1075 / 2000 dated 20.03.2004 and reduced the price to Rs. 2.88. APERC has considered less kcal/kWh value to estimate the unit cost which is very distant from the actual value for biomass plants in the state. The very fact that all the Biomass Power Projects are not satisfied with APERC Tariff Order and approached the Hon'ble High Court in the absence of Electricity Tribunal for upward revision of tariff in April 2004. With the revised tariff structure, plant is facing financial sustainability problems due to increase in gap between generation cost and revenue from APTRANSCO. Most of</p>	

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		the biomass projects are operating in anticipation of the CDM benefits and initiated action towards this to claim the carbon credits. As the project already considered CDM revenue to meet such circumstances before start of the project, Project requires the same to reduce the gap between the actual generation cost and returns from the APTRANSCO.	
<p>CL-3</p> <p>In section D.3 the period for which the data has to be archived is given as 2 yrs but the guideline for SSC-PDD as given in "Guidelines for completing CDM-PDD, CDM-NNB and CDM-NNM" specifies that the period of archiving has to be up to a period of 2 yrs in excess of the end of crediting period. Monitoring of average calorific value of biomass as mentioned is not happening</p>	D.1.3	<p>The same has been incorporated in the PDD (Refer section D.2).</p> <p>As mentioned in the PDD, the average calorific value of the biomass is measured through sample testing in lab once in a year and the same will be tested quarterly/half yearly only if the source of fuel is different.</p>	<p>The revised PDD has been reviewed and accepted.</p> <p>The CL is closed.</p>
<p>CL-4</p> <p>The monitoring methodology is through metering and a separate CDM team for periodic monitoring and also periodic analysis of fuel also plans recording. This is expected to give real time results. The implementation of effectiveness has to be checked, as evidence of CDM team is to be given.</p>	D.1.4 D.5.2	Plant had already streamlined the CDM team formation with clear roles and responsibilities. It is also highlighted the need for the periodic analysis of the fuels under circumstances of procurement of biomass from various sources. The effectiveness of the laid procedures for monitoring of CDM data can be demonstrated during the verification stage.	<p>The complimentary information provided has been accepted.</p> <p>CL closed.</p>

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<p>CL-5</p> <p>Status with respect to availability of consents to operate from the APPCB is not clear.</p>	<p>A.3.4</p> <p>F.1.1</p> <p>F.1.2</p>	<p>Plant had applied for renewal of CFO with the APPCB and is waiting for the renewal certificate. The copy of the renewal application form is attached for the reference.</p>	<p>The application for renewal of consent has been witnessed. Valid consent has to be demonstrated during verification of the project.</p> <p>CL closed.</p>

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