



VALIDATION REPORT

6 MW RPPL BIOMASS BASED POWER PLANT

REPORT No. 2007-1019

REVISION No. 01

DET NORSKE VERITAS



VALIDATION REPORT

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| Client: Rithwik Power Projects Limited (RPPL) | Client ref.: Dr. Sudha Padmanabha |

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Summary:

Det Norske Veritas AS (DNV) has performed a validation of the “6 MW RPPL biomass based power plant” 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. This validation report summarizes the findings of the validation.

The validation consisted of the following three phases: i) a desk review of the project design documents, 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 project design document of 21 May 2007, 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 10, dated 23 December 2006. Hence, DNV requests the registration of the “6 MW RPPL biomass based power plant” project as CDM project activity.

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***Abbreviations***

| | |
|-------------------|---|
| CAR | Corrective Action Request |
| APTRANSCO | Andhra Pradesh Transmission Corporation |
| APPCB | Andhra Pradesh Pollution Control Board |
| APEREC | Andhra Pradesh Electricity Regulatory Commission |
| SR | Southern Regional grid |
| ETDC | Electronic Testing and Development Center. |
| ESP | Electro Static Precipitator |
| CDM | Clean Development Mechanism |
| 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 |
| GHG | Greenhouse gas(es) |
| GWP | Global Warming Potential |
| IPCC | Intergovernmental Panel on Climate Change |
| MP | Monitoring Plan |
| MNES | Ministry of Non-conventional Energy Sources |
| N ₂ O | Nitrous oxide |
| NGO | Non-governmental Organisation |
| ODA | Official Development Assistance |
| PDD | Project Design Document |
| UNFCCC | United Nations Framework Convention on Climate Change |
| VEPL | Velcan Energy Private Limited |

1 INTRODUCTION

Rithwik Power Projects Limited has commissioned DNV Certification AS (DNV) to perform a validation of the “6 MW RPPL biomass based power plant” 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 consists of the following personnel:

| | | |
|--------------------|--------------------------|--------------------------|
| Ms. Anjana Sharma | DNV Certification India | Team leader, GHG auditor |
| Mr. KV Raman | DNV Certification India | CDM validator |
| Mr Michael Lehmann | DNV Certification Norway | Sector Expert |
| Mr. C. Kumaraswamy | DNV Certification India | Technical verifier |

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 and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology AMS-I.D, version 10. The validation team has, based on the recommendations in the Validation and Verification Manual /10/ 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 biomass based power generation plant. This plant construction started in April 2001, was originally commissioned in 2002 but due to operational problems in the plant, financial inability of the owners to carry out the modification work and rising prices of biomass led to its closure in May 2006. The same plant was taken over by Velcan Energy Private Limited (VEPL) on 30 October 2006 with the aim of reviving it with the support of CER credits.

The installed capacity of the plant was 6 MW which will remain the same under the current ownership of VEPL also. The electricity generated by the project, which is expected to be 34.059 GWh per year, will be supplied to the southern regional grid through APTRANSCO. The



southern regional grid is dominated by power supplied using fossil fuels (coal, diesel, gas etc). Hence, the generation by the proposed project activity is a non-GHG source and it is expected that the proportion of fossil fuel based generation in the grid will be reduced by the project activity leading to lower carbon intensity in the grid.

Given that the project developer is able to make investments in the plant for improving its performance, the project is expected to reduce the average annual emissions by 23 520 tonnes of CO₂-equivalents (tCO₂e) through the selected seven year renewable crediting period.

2 .METHODOLOGY

The validation consists of the following three phases:

- I a desk review of the project design documents
- 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 /10/. 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 “6 MW RPPL biomass based power plant” 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) are 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.



| 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 , version 01, dated 27 November 2006, and revised version 02, dated 21 May 2007, /1/ submitted by Rithwik Power Projects Limited and additional background documents related to the project design and baseline were reviewed as a part of the validation.

2.2 Follow-up Interviews

On 23 January 2007, DNV performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of Rithwik Power Projects Limited, biomass suppliers and local villagers were interviewed. The main topics of the interviews are summarised in Table 1.

Table 1 Interview topics

| Interviewed organisation | Interview topics |
|---------------------------------|--|
| Rithwik Power Projects Limited. | <ul style="list-style-type: none">➤ Operational problems in the plant➤ Additionality➤ Baseline determination and applicability of approved baseline methodology AMS ID.➤ Monitoring Plan➤ Stakeholder consultation➤ Biomass availability and prices➤ EIA requirement➤ Host country Approval➤ Procedures for training, calibration of equipments etc. |

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 corrective action requests and requests for clarification raised by DNV, presented to the project participants in DNV's draft validation report of 7 March 2007 (rev. 00) were resolved during communications between the M/s Rithwik Power Projects Limited and DNV. To guarantee the transparency of the validation process, the concerns raised and responses given are documented in the validation protocol in Appendix A.

Since modifications to the Project design were necessary to resolve DNV's concerns, the client decided to revise the PDD and resubmitted the PDD on 21 May 2007. After reviewing the revised PDD, DNV issued this final validation report and opinion.

2.4 Internal Quality Control

The draft validation report including the initial validation findings underwent a technical review before being submitted to the project participants. The final validation report underwent another technical review before requesting registration of the project activity. The technical review was

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performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

3 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. 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.

3.1 Participation Requirements

The project has been proposed as a unilateral project and no Annex I party is involved. India is the host country. Rithwik Power Projects Limited (RPPL) is the sole project participant from the host country. India has ratified the Kyoto Protocol and has established the DNA, under the Ministry of Environment and Forests, Government of India. DNA of India has approved the project as a CDM project in its letter dated 12 March 2007 /2/ and has also provided authorisation to Rithwik Power Projects Limited.

The revival of project activity is expected to contribute to sustainable development through the reductions of GHG emissions into the atmosphere, generation of employment and betterment of the socio-economic conditions of the local populace. DNA of India has also confirmed that the project assists in sustainable development /2/

3.2 Project Design

The project activity is a 6 MW biomass based power generation plant. It consists of 7.5 MW (max capacity, 6 MW – normal rate) turbo generator, 35 TPH travelling grate boiler, and pneumatic feeders. The project is using rice husk, bagasse, cotton stalk, red gram stalk, groundnut shell, wood waste and coal (up to 5% of total fuel consumption) as fuel. MNES permits the usage of coal upto 25%. It has also been demonstrated that surplus biomass is available in the surrounding region. As per the survey done by Indian Institute of Science (IISc), the surplus crop residue available in the Khammam district is approximately 338 ktons per year which is 20% higher than the total requirement. Besides crop residues, surplus woody waste (fuel wood) is also available in the Khammam district. Andhra Pradesh forest department has confirmed that the fuel wood being used by the project activity is renewable /5/.

The power generated is evacuated through APTRANSCO substation located at Penuballi Mondal in Khammam district. The installed capacity of the project is 6 MW which will export about 34.059 GWh every year generating an estimated amount of emission reductions of 23 520 tons of CO₂e per year.

The starting date of the project activity is 30 October 2006 (restart date of the power plant) and the operational lifetime of the project activity is expected to be 30 years. A renewable crediting period of 7 years has been selected with the starting date from 01/09/2007.

3.3 Baseline Determination

Approved baseline methodology, AMS ID, version 10, dated 23 December 2006 – “Renewable electricity generation for a grid” has been applied. The application of methodology is justified as the total installed capacity of the project is 6 MW which is well within the qualifying limit of 15 MW for type I small scale projects.

The old biomass plant, which was commissioned on 22 November 2002, faced operational problems since beginning (as also indicated in section 3.4 of this report) and eventually was shut down in 2006. Subsequently, after about four months, Velcan Energy took over the plant with the sole aim of reviving the biomass based power plant. Hence, in the light of the fact the plant was shut down and the ownership eventually changed hands, the project activity is deemed to be a new biomass grid connected power plant and thus the application of the selected methodology is deemed justified.

In the absence of project activity, the same amount of power would have been generated by power plants connected to the southern regional grid. Currently, southern regional grid is energy deficit and fossil fuel power dominated. The statistics of Central Electricity authority (CEA) show that there is a deficiency of approx. 8% in the state grid*. In addition to this, the southern regional grid is dominated by power from fossil fuel based power plants*. Most of the capacity additions planned and implemented in the southern region during the 10th plan of the Planning Commission of India were fossil fuel based. Approximately 7376 MW was planned to be added to the existing capacity of the southern regional grid during the period from 2002-2007 to meet the energy demand. Out of this, the share of thermal power is approx 80% of total capacity additions planned. Under such circumstances, the selection of southern regional grid as baseline scenario is deemed reasonable.

The revival of 6 MW RPPL biomass based power plant will help in reducing the emissions resulting from the burning of fossil fuels in the baseline scenario for power generation. Emission reduction will be calculated as the net electricity available for sale multiplied by the grid emission factor of the selected grid. As the project activity is feeding the generated power to the APTRANSCO, which is a part of the southern regional grid; the baseline for this project activity is the function of the generation mix of southern regional grid. The selection of the southern regional grid as the grid system boundary for the project activity is in line with the recent EB guidance for large countries such as India.

The applicable baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kgCO₂e/kWh). The methodology permits calculation of emission coefficient either as a combined margin (CM), consisting of the combination of Operating Margin (OM) and Build Margin (BM) according to the procedures prescribed in the approved methodology ACM0002 or as the weighted average emissions (in kgCO₂eq./kWh) of the current generation mix. The Central Electricity Authority (CEA) has, in Dec 2006, published “Baseline Carbon dioxide Emission Database”, Version 1.1, and is available at <http://www.cea.nic.in/planning/c%20and%20e/Govertment%20of%20India%20website.htm>.

The weighted average emission factors as well as the OM, BM and CM data for all the five regional grids of the country have been calculated in accordance with the methodology ACM

* Power Scenario-Andhra Pradesh:

<http://www.cea.nic.in/planning/POWER%20SCENARIO%20AT%20A%20GLANCE/report.pdf>

0002, Version 06. CEA has the mandate for publishing such data on an annual basis, which the project promoters desire to apply for arriving at emission reductions achieved by them on an *ex-ante* basis. Accordingly, the value of combined margin (in kgCO₂e/kWh, with imports included) for the southern regional grid provided as 860 kgCO₂e/kWh for 2004-2005 has been used to estimate the emission reductions.

3.4 Additionality

The 6 MW RPPL biomass power plant was taken over by Velcan Energy Private Limited on 30 October 2006 with an objective of reviving an environmental friendly power plant with the support of CER income. It has been demonstrated that the benefits of CDM were considered for revival of the plant/10/. It has also been demonstrated that no other incentives are available from state and central government for the revival of such units.

The project is not a business-as-usual scenario because of the following reasons:

- Technological problems: The old biomass plant, which was commissioned on 22 November 2002, faced operational problems since beginning. DNV has been able to verify this from the plant log sheets, a technical study of the turbine and related correspondence with the technology supplier and also the technical study done by the third party M/s Shriram EPC Limited /4/. These operational problems led to higher fuel consumption and hence higher cost of power generation. It has been demonstrated that the operational problem in the plant, unavailability of funds to carry out the modification work and also the rising biomass prices in the region, made it difficult for the previous owners to continue the operation of the plant.
- Velcan Energy Private Limited took over the plant on 30 October 2006 relying on CDM income for making the necessary investments in the plant to revive its performance. Besides the project cost, additional investment is required at the following areas:
 - a) Standardization in the turbine: To bring down the specific steam consumption in the turbine and hence fuel consumption. Approx cost is INR 30 million.
 - b) Fuel storage area: To provide shed for fuel storage area to avoid moistening of fuel during rainy season. Approx cost is INR 10 million.
 - c) Fuel handling area- To provide chain conveyor along with the belt conveyor. Approx cost is INR 6 million
 - d) ESP upgradation: Approx cost is INR 8 million.

Currently, the plant has been started with only some minor modification but there is no improvement in the performance and Velcan Energy Private Limited is relying on CDM income for making these major investments. It has been demonstrated that the project is not financially attractive without CDM revenue. The project proponent has worked out the project IRR, with and without CDM revenue inclusive of additional investment and normalization of the plant. The project IRR is 10.93% and equity IRR is 11.03% without CDM revenue which improves to 17% IRR on equity with CDM revenue. The benchmark considered for the equity IRR is 16% as declared by APERC for biomass projects. A sensitivity analysis with 5 % fluctuation in biomass prices, tariff and CER prices also reveal that the project is not financially viable without CDM revenue. The results of sensitivity analysis are as follows:



| Scenarios | Without CDM Revenue | | With CDM Revenue | |
|---|---------------------|-----|------------------|-----|
| Equity Benckmark IRR (ref: APERC Order) | 16% | | | |
| RPPL Project Scenario Equity IRR ¹ | 11% | | 17% | |
| ± 5% Biomass Price | 10% | 12% | 16% | 18% |
| ± 5% Electricity Tariff | 9% | 13% | 14% | 19% |
| ± 5% CDM Price | - | - | 17% | 18% |

Policy related barriers:

It has also been argued that in addition to the operational problems in the plant and rising biomass prices, the tariff revision by the state government further made the activity unattractive. As per the original PPA signed by the previous owners /3/, the tariff was fixed at INR 2.25 per unit with 5% escalation on 1994-95 basis. The state government of Andhra Pradesh revised the tariff in year 2003 wherein new tariff rates were fixed at INR 2.78 per unit as against INR 3.48 per unit (as per MNES rules). However, this revised tariff was not accepted by the biomass energy producers and BEDA (Biomass Energy Developers Association) filed a case against this order. As per the interim order of High court, the 50% of the differential amount between the old and the revised tariff is to be paid to the biomass based power producers. But the project is still under risk due to the uncertainties linked with the final order from Supreme Court of India, which may result in the cash outflow in case the order turns against the project proponents.

The registration of the project as a CDM activity will present additional revenue for the project and thereby significantly alleviate the financial hurdles to the project.

In conclusion, it has been verified that in current situation, the revival of the power plant is not financially attractive and also faces other barriers. Hence, the emissions reductions occurring from the project are deemed additional to those that would occur in the absence of the project activity.

3.5 Monitoring Plan

The approved small scale monitoring methodology AMS-ID, “Renewable electricity generation for a grid”, has been adopted for the proposed project activity. The choice of methodology is justified as the project activity is the generation of electricity using surplus biomass potential and supplying the same to the APTRANSCO which is connected to southern regional (SR) grid.

The monitoring involves metering of the gross electricity generated, auxiliary electricity consumption, power import and export to the APTRANSCO grid. The project developer has made the following provisions for monitoring of these parameters:

- Gross electricity generation: Generation meter installed at the output of the generator. Generation is recorded on a daily basis.
- Electricity supplied by the project activity to APTRANSCO: Monitored through two meters i.e. main energy meter and check meter installed jointly by RPPL and APTRANSCO, at a 132 KV APTRANSCO substation at Penuballi. The reading is cross-checked through the

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sales receipts. The calibration of meters is done once in a year at external laboratory, Electronic Testing and Development Center (ETDC), authorised by APTRANSCO.

- Electricity supplied by APTRANSCO to the project activity: Monitored through the same energy meter installed jointly by APTRANSCO and RPPL at their substation.
- Auxiliary consumption by the project activity: The difference between the electricity generated and electricity supplied to the grid will be taken as auxiliary consumption.
- Excess biomass availability to be estimated yearly

The records of net energy fed to the grid system by the project activity duly signed by representatives of both APTRANSCO and project developer, will be kept for the entire crediting period plus two years. Supporting documents such as receipts of payments released by APTRANSCO will also be preserved for cross checking.

For the calculation of emission reductions, the grid emission factor for the southern regional grid has been fixed *ex ante* based on the “CO₂ Baseline Database” published by the CEA^{*}

The authority and responsibility for project management, monitoring, measurement, review and reporting has been clearly established. Similarly, the procedures for calibration and maintenance, performance reviews, internal auditing, corrective actions etc. have been defined in the monitoring plan.

3.6 Calculation of GHG Emissions

The project activity will displace a part of fossil fuel based electricity in the southern regional grid of India and will help in reduction of GHG emissions from the burning of fossil fuels in the plants linked to the regional grid. The emission reductions due to the project activity are calculated to be equal to the difference of baseline emissions, project emissions and leakages and have been estimated to be 23 520 tCO₂e per year, based on a baseline emission factor of 860 tCO₂e/GWh as addressed in section 3.3 of this report. The grid emission factor has been fixed *ex ante* and will not be changed during the crediting period. The baseline emission factor of 860 kgCO₂e/kWh has been derived from the “CO₂ Baseline Database” published by the CEA[†]. This is based on the OM emission factor estimated based on the vintage data for the years 2003, 2004 and 2005, and verified to be 1.0 kg CO₂e / kWh. Determination of the build margin emission factor at 0.72 kg CO₂e / kWh is based on the sample group consisting of the power plant capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have most recently been built.

3.7 Environmental Impacts

The project is a renewable biomass based power plant. As per the requirement of Ministry of Environment and Forests, Government of India, an EIA is not required for biomass power plants. Consent to establish and operate under the provisions of the Water Act 1974 and Air Act 1981 has been issued by the Andhra Pradesh Pollution Control Board for the project activity/7/.

^{*} CO₂ Baseline Database, <http://www.cea.nic.in/planning/c%20and%20e/Govtment%20of%20India%20website.htm>

3.8 Comments by Local Stakeholders

The project developer has identified the following stakeholders and consulted them for their comments /approvals:

- Local villages: The project developer has consulted the local population through the representatives elected by the local villages. The minutes of meeting dated 15th November 2006, with the representatives has been verified/5/. No negative comments were received. The revival of project activity is a boon to the local villages as it is providing employment to the local villagers.
- Local Biomass supplier: Meeting with the local biomass supplier was conducted on 23 January 2007. No negative comment was received/5/.
- APTRANSCO: No negative comment has been received from APTRANSCO. It has signed Power purchase agreement with the RPPL which is valid for a period of 20 years/3/

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD, version 01 dated 27 November 2006 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 13 December 2007 to 11 January 2007.

No comment was received.

5 VALIDATION OPINION

Det Norske Veritas Certification AS (DNV) has performed a validation of the "6 MW RPPL biomass based power plant" in India. The validation was performed 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.

The review of the project design documentation and the subsequent follow-up interviews have provided DNV with sufficient evidence to determine the fulfilment of stated criteria.

The host country is India and no Annex I country is involved. India fulfils the participation criteria and has approved the project and authorized the project participants. The DNA from India confirmed that the project assists in achieving sustainable development.

Having an installed capacity of less than 15 MW, the project is eligible as type I small-scale CDM project activity.

The project correctly applies the simplified baseline and monitoring methodology AMS-I.D, version 10, dated 23 December 2006.

By generating renewable energy which will displace fossil fuel based grid electricity, the project results in reductions of CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline



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scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The total emission reductions from the project are estimated to be on the average 23 520 tCO₂e per year over the selected 7 year crediting period. The emission reduction forecast has been checked and is deemed likely that the state amount is achieved given that the underlying assumptions do not change.

Adequate training and monitoring procedures have been implemented.

In summary, it is DNV's opinion that the project, as described in the project design document of 21 May 2007, 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. Hence, DNV requests the registration of the "6 MW RPPL biomass based power plant" project as a CDM project activity.

REFERENCES

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

- /1/ Project Design Document, version 01, dated 27 November 2006 and version 02 dated 21 May 2007
- /2/ DNA of India, Letter of Approval, Dated 12 March 2007
- /3/ Power Purchase Agreement between APTRANSCO and Rithwik Power Projects Limited, dated 19 March 2002, validity – 20 years.
- /4/ Technical study of the plant by third party, M/s Sriram EPC Limited dated, SEPC/RPPL/TR/9633, Dt. 15 May, 2004
- /5/ Confirmation from Forest Department: 6.5.01/MFW/RPPL/2006-07/Vol II/2237, Dt 27 November 2006.
- /6/ Minutes of meeting with local villagers – Dated 15 November 2006 and local biomass suppliers, dated 23 January 2007.
- /7/ Consent to operate issued by Andhra Pradesh State Pollution Control Board., APPCB/VJA/KTM/168/HO/2002/A/181/1778 Dt 15/11/2002, and subsequent payment receipts for renewal of the consent.
- /8/ Minutes of internal meeting of M/s Velvan Energy Private Limited, regarding CDM benefits for the project dated 03 October 2006.
- /9/ Financial Analysis sheet.

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

- /10/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>
- /11/ Appendix B of the simplified modalities and procedures for small-scale CDM project activities: Approved Baseline methodology AMS ID – Renewable electricity generation for a grid, version 10, dated 23 December 2006.

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

- /12/ Dr Sudha Padmanabha: Vice President - M/s Rithwik Power Projects Limited.
- /13/ Mr. Jean Baptiste Curien : M/s Velcan Energy Private Limited
- /14/ Mr. G. Govardhan : General Manager : M/s Rithwik Power Projects Limited
- /15/ Mr. J. Dharma Rao : General Manager (Marketing) – M/s Rithwik Power Projects Limited.





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 | OK | Table 2, Section E.4.1 The project is being proposed as unilateral project. |
| 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 | CAR-1 | Table 2, Section A.3 DNA of India has confirmed the project's contribution to sustainable development. Letter dated 12 March 2007. |
| 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 | CAR-1 | Letter of Approval from DNA of India has been received. |
| 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 | CL-1 | Table 2, Section B.2.1 |
| 7. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not | Decision 17/CP.7, CDM Modalities and Procedures Appendix B, | OK | No public funding from Annex I countries is involved. |

| Requirement | Reference | Conclusion | Cross Reference/ Comment |
|--|---|------------|---|
| result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties. | § 2 | | |
| 8. Parties participating in the CDM shall designate a national authority for the CDM | CDM Modalities and Procedures § 29 | OK | Ministry of environment and forests, Government of India, is the designated national authority for all CDM activities in India. |
| 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 the Kyoto Protocol on 22 nd August 2002. |
| 10. The participating Annex I Party's assigned amount shall have been calculated and recorded | CDM Modalities and Procedures §31b | OK | 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 | OK | 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 confirm 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 | OK | Table 2, Section G |

| 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 | CAR-6 | 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 | The PDD was published on DNV Certification's Climate Change website. Parties, stakeholders and NGOs are through the UNFCCC CDM website invited to provide comments on the validation requirement during a period of 30 days from 13 December 2006 to 11 January 2007. No comment was received. |

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 | Yes, the project activity is a renewable biomass based power generation plant with maximum output capacity of 6 MW which is less than the limit of 15 MW defined for small scale CDM project activity. | | OK |
| A.1.2. The small scale project activity is not a debundled component of a larger project activity? | /1/ | DR | Yes, the project activity is not a debundled component of a larger project activity. | | OK |
| A.1.3. Does proposed project activity confirm to one of the project categories defined for small scale CDM project activities? | /1/ | DR | The project activity is renewable biomass based power generation facility connected to the southern regional grid and hence falls under Type I category D defined for small scale CDM project activities. | | OK |
| 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/ | DR | The project activity is located at Tekullapalli village about 3 Kms from the Penuballi Mondal road junction in the Khammam district of Andhra Pradesh in India. | | OK |

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

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| Checklist Question | Ref. | MoV* | Comments | Draft Concl. | Final Concl. |
|---|------|------|--|--------------|--------------|
| A.2.2. Are the project's system (components and facilities used to mitigate GHG's) boundaries clearly defined? | /1/ | DR | The project system boundary consists of fuel (biomass) storage and handling area, travelling grate type boiler using different type of biomass and also fossil fuel i.e. coal, pneumatic feeders, a steam turbine with associated auxiliaries and utilities and the power evacuation system. | | OK |
| A.2.3. Does the project design engineering reflect current good practices? | /1/ | DR | Yes | | OK |
| A.2.4. Will the project result in technology transfer to the host country? | /1/ | DR | No. | | OK |
| A.2.5. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period? Does the project make provisions for meeting training and maintenance needs? | /1/ | DR | Initial training and maintenance needs are not specifically mentioned in the PDD, but M/s Velcan Energy Limited has taken over the old plant and the employees of the plant were given on job training during the plant commissioning in 2002 as per the contract with the technology supplier. | | OK |
| 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/ | DR | Yes, the project activity is likely to create direct and indirect employment opportunities in the region. Approximately 120 people are required for normal operation of the plant and others for transportation and handling of biomass from fields and mills to the project site, transportation of fly ash from project site to brick manufacturers. | | OK |

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

| Checklist Question | Ref. | MoV* | Comments | Draft Concl. | Final Concl. |
|--|------|------|--|---------------------|--------------|
| A.3.2. Will the project create any adverse environmental or social effects? | /1/ | DR | The project activity is a renewable biomass based power generation facility and is not likely to create any adverse environmental or social effects. | | OK |
| A.3.3. Is the project in line with sustainable development policies of the host country? | /1/ | DR | Confirmation from the DNA of host country is awaited. | CAR 4 | OK |
| A.3.4. Is the project in line with relevant legislation and plans in the host country? | /1/ | DR/I | <p>Yes, the project is in line with the host country laws and regulations. Following agreements/clearances and consents have been verified:</p> <ul style="list-style-type: none"> - Share Purchase agreement between M/s Rithwik Power Private Limited and M/s Velcan Renewable Energy Private Limited. - Power purchase agreement signed between APTRANSCO and M/s Rirhwik Power Private Limited (Previous owners of the plant), Ref No. 10578 Dt 19/03/2002. The validity of Power Purchase agreement is 20 years. - Consent of establishment from NEDCAP, Andhra Pradesh issued to previous owner M/s Rithwik Power Private Limited, Ref No. NEDCAP/PD/8061/99-2000/2708, Dt.- 22/11/1999. - Consent for operation under Air and Water (Prevention and Control of Pollution) Act, 1981, Ref No. APPCB/VJA/KTM/168/HO/2002/A/181/1778 Dt 15/11/2002,, issued to the previous owner M/s Rithwik Power Private Limited. The consents issued were valid till 31st October, 2003. Previous management has deposited the fees to APPCB for the period 2003-2005 and 2005- | | OK |

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

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| Checklist Question | Ref. | MoV* | Comments | Draft Concl. | Final Concl. |
|--|------|------|---|--------------|--------------|
| | | | <p>2007, for renewal of consents.</p> <ul style="list-style-type: none"> - APPCB has permitted the usage of rice husk, bagasse, cotton stalk, red gram stalk, GN shell, coal. Under special conditions, it has also given approval to use the wood waste in addition to biomass (Ref. No. APPCB/VJA/KTM/168/HO/2002/A/181/1778 Dt 15/11/2002) - The confirmation from Andhra Pradesh Forest development Corporation Limited that the miscellaneous firewood used by M/s Rithwik Power Project Limited is renewable firewood. (Ref: 6.5.01/MFW/RPPL/2006-07/Vol II/2237 Dt 27/11/2006) - Boiler Inspection Certificate, Dt 26/09/2006 issued by Deputy Chief Inspector of Boilers, Hyderabad. The validity of the certificate is one year. - Boiler operator certificates. | | |
| 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 | /1/ | DR | The project activity has used approved simplified | CAR | OK |

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

| Checklist Question | Ref. | MoV* | Comments | Draft Concl. | Final Concl. |
|--|------|------|---|----------------|--------------|
| line with the baseline methodologies provided for the relevant project category? | | | baseline methodology AMS ID, Version 9, dt 28 th July 2006. The methodology version to be changed to version 10, dt 23 rd December, 2006, in the revised PDD. | <u>2</u> | |
| B.1.2. Is the baseline methodology applicable to the project being considered? | /1/ | DR | Yes, the project activity satisfies the applicability conditions for AMSID. The old biomass plant which stopped production in May 2006 was taken over by M/s Velcan Energy Private limited in October, 2006 relying on CER credits for making huge investments in the plant for its revival. After revival of the plant, the generated electricity will be supplied to the energy deficit grid which would replace the electricity generated by fossil fuel fired power plants. | | 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 to the existence of one or more of the following barriers: investment barriers, technology barriers, barriers due to prevailing practice or other barriers? | /1/ | DR/I | <p>Additionality of the project activity has been discussed based on the following barriers:</p> <ul style="list-style-type: none"> - Investment barrier: It is stated that the running of the old biomass plant became financially unattractive because of the following reasons: <ul style="list-style-type: none"> a) Technical problems in the plant leading to low efficiency of the plant. As a result, the cost of generation increased. The actual steam flow to the turbine was demonstrated to be between 32 to 35 T/hr against the designed flow rate of app. | CL1 | OK |

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

| Checklist Question | Ref. | MoV* | Comments | Draft Concl. | Final Concl. |
|--------------------|------|------|--|--------------|--------------|
| | | | <p>31T/hr. This resulted in higher fuel consumption. This has been verified from the plant log sheets and technical study of the turbine and related correspondence with the technology supplier i.e. M/s Alstom Power Private Limited. Technical study of the turbine, done by the third party M/s Shriram EPC limited has been verified. (Ref No. SEPC/RPPL/TR/9633, Dt. 15 May, 2004).</p> <p>b) Increase in the biomass prices: The study of biomass prices over the last three years may be submitted for verification.</p> <p>The combined effect of the two factors together with the unavailability of the funds to carry out the normalization work on turbine and other relevant areas including fuel storage and handling made it difficult for the previous owner i.e. M/s Rithwik Power project Limited to continue running the plant.</p> <p>It is also stated that the Velcan Renewable Energy Private Limited decided to take over the financially unattractive but environment friendly biomass based power plant relying on CER credits for the revival of the closed plant. The project developer still needs to demonstrate that how the CDM revenue will make the project activity financially attractive.</p> <p>The plant has been taken over on 30th October 2006.</p> <p>It is stated that the M/s Velcan Renewable Energy</p> | | |

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

| Checklist Question | Ref. | MoV* | Comments | Draft Concl. | Final Concl. |
|--------------------|------|------|---|--------------|--------------|
| | | | <p>Private Limited is relying on CER revenue for making the following major modifications in the plant:</p> <ul style="list-style-type: none"> - Normalization in the turbine: To bring down the specific steam consumption in the turbine and hence fuel consumption. Approx cost is INR 30 million only. It has been verified from the quotation of one turbine supplier.. - Fuel Storage area: To provide shed for fuel storage area to avoid moistening of fuel during rainy season. Approx cost is INR 10 million. Verified from the quotation from M/s Padamshri Builders. - Fuel handling area- To provide chain conveyor along with the belt conveyor. Approx cost is INR 6 million. - ESP Upgradation: Approx cost is INR 8 million. Verified from the quotation from M/s Bengal Tools Limited. - Policy related barrier: It is stated that previous owners signed the power purchase agreement (PPA) with APTRANSCO in 2002 with fixed tariff of INR 2.25 per unit with 5% escalation on 1994-95 as base year (Ref. No. 10578, dt 19/03/2002). The same has been verified during the site visit. In 2003, Andhra Pradesh Electricity regulatory Commission decided to review the PPA signed between APTRANSCO and previous owners. The copy of this decision and the new PPA may be submitted to DNV for verification. As per this new PPA, power tariff was fixed at INR 2.78 against | | |

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

| Checklist Question | Ref. | MoV* | Comments | Draft Concl. | Final Concl. |
|--------------------|------|------|--|--------------|--------------|
| | | | <p>INR 3.48 per unit as per MNES rules. It is stated that the assumptions used for this rate calculations are not practical for the biomass based power plants due to which the Association of Biomass based power producers filed a petition (No. 12921) against this revision in 2004. The same has been verified by the validation team. An interim order dt 20/08/2004 was issued by High Court directing APTRANSCO to pay additional 50% of the differential amount between the old and the revised tariff. Final order is still awaited. The interim order from the high court has been verified. It is stated that the uncertainties due to Supreme court of India decision may result in cash outflow for the last three years which may impact the sustainability of the project activity. Therefore, the project activity is relying on CER credits for its revival and financial sustainability.</p> <p>The biomass power plant was financially attractive during the first two years of its operation but suddenly the cost of production started increasing in 2004-05 and finally rose up by approximately 40% of the tariff fixed by APTRANSCO. It has been verified during the desk meeting with project developer i.e. M/s Velcan Renewable Power Limited that the main reason behind the increase in cost of generation was the deteriorating performance of turbine resulting in higher fuel consumption and increasing biomass prices since 2003-04. The same has been verified from the process logsheets, technical study of the plant done by third party M/s Shriram EPC limited and the correspondence between previous owner and</p> | | |

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

| Checklist Question | Ref. | MoV* | Comments | Draft Concl. | Final Concl. |
|---|------|------|---|---------------------|--------------|
| | | | the original supplier of the turbine i.e. M/s Alstom Power private limited. - Financial Barrier: It is stated that the rise in the biomass prices over the last few years is affecting the financial viability of biomass based power plants in the state of Andhra Pradesh. | | |
| B.2.2. Is the application of the baseline methodology and the discussion and determination of the chosen baseline transparent and conservative? | /1/ | DR | Yes, the application of baseline methodology and discussion and determination of chosen baseline is transparent and conservative. | | OK |
| B.2.3. Are relevant national and/or sectoral policies and circumstances taken into account? | /1/ | DR | Yes | | OK |
| 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/ | DR | Since the project activity was taken over by Velcan Renewable Energy Private Limited in October 2006, the starting date of the project activity to be changed in the PDD. | CAR 3 | OK |
| C.1.2. Is the assumed crediting time clearly defined (renewable crediting period of seven years with two possible renewals or | /1/ | DR | Renewable crediting period of seven years has been selected. The crediting period will start after the registration of the project activity. | | OK |

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

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| Checklist Question | Ref. | MoV* | Comments | Draft Concl. | Final Concl. |
|--|------|------|---|--------------|--------------|
| fixed crediting period of 10 years with no renewal)? | | | | | |
| 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 selected monitoring methodology is in line with Type I.D “Grid connected renewable electricity generation” for small-scale CDM project activities” | | OK |
| D.1.2. Is the monitoring methodology applicable to the project being considered? | /1/ | DR | Yes, the monitoring methodology is applicable to the project activity. | | OK |
| D.1.3. Is the application of the monitoring methodology transparent? | /1/ | DR | Yes, the application of methodology is transparent. Monitoring plan covers the monitoring of all relevant parameters: <ul style="list-style-type: none"> - Gross electricity generation - Auxiliary power consumption - Power exported to and imported from the grid. - Type of biomass and fossil fuel (coal) consumption. - Characteristics of fuel i.e. calorific value etc. | | OK |
| D.1.4. Will the monitoring methodology give opportunity for real measurements of | /1/ | DR | Yes, the monitoring methodology will result in real measurements of achieved emission reductions. | | OK |

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

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| Checklist Question | Ref. | MoV* | Comments | Draft Concl. | Final Concl. |
|---|------|------|---|--------------|--------------|
| achieved emission reductions? | | | | | |
| 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/ | | <input type="checkbox"/> Project emissions at the project site will consist of: 1) Emissions from the on-site consumption of fossil fuel i.e. coal: Following relevant parameters will be monitored for calculating project emissions: <ul style="list-style-type: none"> - Quantity of coal consumption: Accurate consumption will be calculated on the basis of quantity of fuel delivered at the site and the stock balance. Stock balance will be monitored on monthly basis. This consumption will be cross checked with the on-line weightier on the belt. - Net calorific value of coal will be taken from the local supplier. It will be measured for each batch of coal through sample testing in certified laboratory. The data collected will be kept for the whole of crediting period plus two years. | | OK |
| D.2.2. Are the choices of project GHG indicators reasonable? | /1/ | DR | Yes, the choice is reasonable. | | OK |
| D.2.3. Will it be possible to monitor / measure the specified project GHG indicators? | /1/ | DR | Yes, it is possible to monitor and measure these indicators. | | OK |

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

| Checklist Question | Ref. | MoV* | Comments | Draft Concl. | Final Concl. |
|---|------|------|---|--------------|--------------|
| 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? | /1/ | DR | The project developer has considered the emissions resulting from the transportation of biomass from biomass collection centres and also the transportation of fly ash to brick manufacturers as leakage. | | OK |
| D.3.2. Are the choices of leakage indicators reasonable? | /1/ | DR | Yes | | OK |
| D.3.3. Will it be possible to monitor / measure the specified leakage indicators? | /1/ | DR | Yes | | OK |
| D.3.4. Will the indicators give opportunity for real measurements of leakage effects? | /1/ | DR | Yes | | 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/ | | <input type="checkbox"/> Yes, monitoring plan includes the monitoring of following parameters required for calculating baseline emissions: - <u>Net electricity generation from the project activity:</u> Gross electricity generation will be monitored by the use of generator meter installed at the output of generator. Tri-vector | | OK |

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

| Checklist Question | Ref. | MoV* | Comments | Draft Concl. | Final Concl. |
|--|------|------|---|--------------|--------------|
| | | | <p>meter installed in the APTRANSCO sub-station will be used to measure the electricity exported to the grid. This will be verified by the receipt of sales. Difference between gross generation and export will be taken as auxiliary consumption. Import of electricity from grid will be taken from the meter installed in APTRANSCO sub station. APTRANSCO meters are calibrated yearly.</p> <p>- Baseline emission factor for the grid: Baseline emission factor has been fixed <i>ex-ante</i> based on previous three years data and will not be changed during the crediting period. The emission factor has been taken from the official website of Central Electricity Authority (CEA)</p> <p>The data collected will be kept for whole of the crediting period plus two years.</p> | | |
| D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable? | /1/ | DR | Yes, the choice of baseline indicators is reasonable. | | OK |
| D.4.3. Will it be possible to monitor / measure the specified baseline indicators? | /1/ | DR | Yes, it is possible to measure/monitor the net electricity generation from the project activity and the baseline emission factor. | | OK |
| D.4.4. Will the indicators give opportunity for real measurements of baseline emissions? | /1/ | DR | Yes, it is possible to get realistic baseline emissions by using these baseline indicators. | | 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? | | DR/I | <p>The authority and responsibility of the project management has been fixed with the GHG monitoring team which will established after the registration of the project activity. The main responsibilities of the team will be :</p> <ul style="list-style-type: none"> - Collection of all relevant data for calculation of project emissions, leakages and baseline emissions. - Preparation of monthly and annual report for emission reduction monitoring. - Calibration and maintenance of various monitoring equipments. - Archiving of data during the required period i.e crediting plus two years. - Collection of samples of the materials to be analysed. - Preparation of monitoring report for CER issuance etc. <p>It has been verified during the site visit that the GHG monitoring team has been established. The roles and responsibilities have been included in the revised monitoring plan. The revised monitoring plan may be included in the revised PDD. The baseline methodology version number may be changed to AMS ID, version 10 in the</p> | CAR 4 | OK |

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

| Checklist Question | Ref. | MoV* | Comments | Draft Concl. | Final Concl. |
|---|------|------|--|------------------|--------------|
| | | | revised monitoring plan. | | |
| D.5.2. Is the authority and responsibility for registration monitoring measurement and reporting clearly described? | | DR | See section D.5.1. | CAR 4 | |
| D.5.3. Are procedures identified for training of monitoring personnel? | | DR/I | Monitoring plan does not mention anything regarding training of monitoring personnel. Procedures for training of monitoring personnel to be included in the revised monitoring plan. | CAR 5 | OK |
| D.5.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions? | | DR/I | Procedures for emergency preparedness may be formulated. | CAR 5 | OK |
| D.5.5. Are procedures identified for calibration of monitoring equipment? | | DR/I | Procedures for calibration of monitoring equipment may be formulated. | CAR 5 | OK |
| D.5.6. Are procedures identified for maintenance of monitoring equipment and installations? | | DR/I | Procedures for maintenance of monitoring equipment and installations may be formulated. | CAR 5 | OK |
| D.5.7. Are procedures identified for monitoring, measurements and reporting? | | DR/I | Procedures for monitoring, measurement and reporting may be formulated. | CAR 5 | OK |
| D.5.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation) | | DR | Procedures for day-to-day handling may be formulated. | CAR 5 | OK |
| D.5.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties? | | DR | Procedures for dealing with monitoring data adjustments may be formulated. | CAR 5 | OK |
| D.5.10. Are procedures identified for internal audits of GHG project compliance with operational requirements as applicable? | | DR | Procedures for internal audits of GHG project compliance with operational requirements may be formulated. | CAR 5 | OK |
| D.5.11. Are procedures identified for project | | DR | Procedures for project performance reviews may | CAR | OK |

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

| Checklist Question | Ref. | MoV* | Comments | Draft Concl. | Final Concl. |
|--|------|------|---|--------------|--------------|
| performance reviews? | | | be formulated. | 5 | |
| D.5.12. Are procedures identified for corrective actions? | | DR | Procedures for corrective actions may be formulated. | CAR 5 | 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 ex-ante estimated 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? | | DR | The emissions resulting from the burning of fossil fuel i.e. coal have been considered as project emissions. The project developer has proposed to use coal up to a limit of 5% of the total annual fuel mix during rainy seasons. The permissible limit of fossil fuel consumption fixed by MNES is 25%. | | OK |
| E.1.2. Have all relevant greenhouse gases and sources been evaluated? | | DR | Yes, CO ₂ gas emission will be considered. | | OK |
| E.1.3. Do the methodologies for calculating project emissions comply with existing good practice? | | DR | Yes. | | |
| E.1.4. Are the calculations documented in a complete and transparent manner? | | DR | Yes, the calculation is documented in a complete and transparent manner. The estimated project emissions resulting from the burning of fossil fuel have been calculated as the product of quantity of | | OK |

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

| Checklist Question | Ref. | MoV* | Comments | Draft Concl. | Final Concl. |
|--|------|------|--|--------------|--------------|
| | | | coal consumed in a year, net calorific of coal used (provided by local suppliers and also tested in the local laboratory), CO ₂ emission factor per unit of energy of coal (taken from India's Initial communication to UNFCCC) and oxidation factor of the coal (taken from the latest IPCC guidelines-2006).The project emissions will be updated <i>ex post</i> based on the quantity of coal usage and calorific value of fuel. | | |
| E.1.5. Have conservative assumptions been used? | | DR | Yes. | | OK |
| E.1.6. Are uncertainties in the project emissions estimates properly addressed? | | DR | Yes. | | 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 and estimated ex-ante. | | | | | |
| E.2.1. Are leakage calculation required for the selected project category and if yes, are the relevant leakage effects assessed? | | DR | Yes | | OK |
| E.2.2. Are potential leakage effects properly accounted for in the calculations (if applicable)? | | DR | Yes. | | OK |
| E.2.3. Do the methodologies for calculating leakage comply with existing good practice (if applicable)? | | 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. |
|--|------|------|---|--------------|--------------|
| E.2.4. Are the calculations documented in a complete and transparent manner and (if applicable)? | | DR | <p>The estimation has been done on the basis of following assumptions:</p> <ul style="list-style-type: none"> - Distance from the field to the power plant is 50 KM. - Distance from the power plant to the brick manufacturer is 75 Km. - Production of fly ash: 20% of raw material. - Average fuel consumption of a truck is 30 litres/km. <p>The calculations will be updated afterwards, in case there is any change in the situation.</p> | | OK |
| E.2.5. Have conservative assumptions been used (if applicable)? | | DR | Yes. | | OK |
| E.2.6. Are uncertainties in the leakage estimates properly addressed (if applicable)? | | DR | Yes | | OK |
| E.3. Baseline GHG Emissions The validation of ex-ante estimated baseline GHG emissions focuses on transparency and completeness of calculations. | | | | | |
| E.3.1. Are the baseline emission boundaries clearly defined and do they sufficiently cover sources for baseline emissions? | | DR | Yes, the baseline emission boundaries include the southern regional grid. The source of baseline emissions is the CO ₂ emissions from the fossil fuel fired power plants connected to the southern regional grid. | | OK |
| E.3.2. Are all aspects related to direct and indirect baseline emissions captured in the project design? | /1/ | DR | Yes. | | OK |

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

| Checklist Question | Ref. | MoV* | Comments | Draft Concl. | Final Concl. |
|--|------|------|--|--------------|--------------|
| E.3.3. Have all relevant greenhouse gases and sources been evaluated? | /1/ | DR | Yes, CO ₂ gas emissions from these sources have been considered. | | OK |
| E.3.4. Do the methodologies for calculating baseline emissions comply with existing good practice? | /1/ | DR | Yes. | | OK |
| E.3.5. Are the calculations documented in a complete and transparent manner? | /1/ | DR | <p>Yes, the calculations have been documented in a complete and transparent manner. The baseline emissions will be calculated as the product of net electricity supplied by the project activity to the grid and the carbon emission factor of the grid. The net electricity supplied to the grid will be taken from the meter reading of meter installed and calibrated by APTRANSCO. The despatch will also be cross checked through the receipts of sales.</p> <p>The grid emission factor has been taken as an average of the Operating margin and Built margin. It has been fixed <i>ex ante</i> and will not be changed during the crediting period. The value for grid emission factor i.e. 860 t CO₂ e/ GWh has been taken from the official website of Central Electricity Authority (CEA).</p> | | OK |
| E.3.6. Have conservative assumptions been used? | /1/ | DR | Yes, wherever possible, conservative assumptions have been used. | | OK |
| E.3.7. Are uncertainties in the baseline emissions estimates properly addressed? | /1/ | DR | Yes | | OK |
| E.4. Emission Reductions Validation of ex-ante estimated emission reductions. | | | | | |
| E.4.1. Will the project result in fewer GHG | /1/ | DR | The project activity is likely to reduce 23 520 t CO ₂ | | OK |

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

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| Checklist Question | Ref. | MoV* | Comments | Draft Concl. | Final Concl. |
|--|------|------|---|---------------------|--------------|
| emissions than the baseline case? | | | e per year. | | |
| 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/ | DR/I | <p>The EIA requirement for the project to be checked in accordance with the new EIA notification, 2006 issued by Ministry of Environment and forests. The following measures taken by the project developer for environment protection have been verified during the site visit:</p> <ul style="list-style-type: none"> - Electrostatic precipitator is provided to reduce the SPM emissions from boiler to 115 mg/nm³ according state pollution control board. Current level of emissions will be checked during the site visit. - Solid wastes i.e. ash is disposed on daily basis. Fly ash is stored in silo. - Boiler blow down due to its higher pH is neutralised before mixing with other effluent streams. The treated boiler blow down and cooling bleed off effluents will be utilised for fly ash quenching and for green belt development in the plant premises. - Neutralisation of acidic and alkaline effluent streams from the DM plant. - Treatment of sanitary waste water in septic tanks. - Maintaining green belt around the plant area. - Providing the air, water and noise monitoring | CAR 6 | OK |

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

| Checklist Question | Ref. | MoV* | Comments | Draft Concl. | Final Concl. |
|---|------|------|--|-----------------|--------------|
| | | | data on the black boards near the entrance of the factory. | | |
| F.1.2. Does the project comply with environmental legislation in the host country? | /1/ | DR | Yes. | | OK |
| F.1.3. Will the project create any adverse environmental effects? | /1/ | DR | NO | | OK |
| F.1.4. Have environmental impacts been identified and addressed in the PDD? | /1/ | DR | Yes, the environmental impacts of the project activity have been addressed in the PDD. The environment management plan prepared by the project developer may be submitted to the validation team for verification. | CL-2 | OK |
| G. Comments by Local Stakeholder | | | | | |
| Validation of the local stakeholder consultation process. | | | | | |
| G.1.1. Have relevant stakeholders been consulted? | /1/ | DR | The project developer has consulted the local population through the representatives elected by the local villages. The minutes of meeting dt. 15 th November 2006, with the representatives has been verified. Meeting with the local biomass supplier was conducted on 23 rd January 2007. No negative comment was received. | | OK |
| G.1.2. Have appropriate media been used to invite comments by local stakeholders? | | DR | PDD does not mention about the media used for stakeholders consultation process. | | 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/ | DR | There is no specific requirement in India for conducting the stakeholders consultation process. | | OK |

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

| Checklist Question | Ref. | MoV* | Comments | Draft Concl. | Final Concl. |
|---|------|------|---|-----------------|-----------------|
| G.1.4. Is a summary of the comments received provided? | /1/ | DR | No negative comments were received for the project activity. Validation team has verified the same. | | OK |
| G.1.5. Has due account been taken of any comments received? | /1/ | DR | Same as G.1.4. | | 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 |
|--|------------------------|--|---|
| CAR 1: Approval of the project activity by the DNA of India to be provided. | Table 1 | Kindly find enclosed the host country approval provided by the Ministry of Environment and Forests, India | Host country approval dated 12 March 2007 has been verified. CAR 1 is closed |
| CAR 2 : Baseline methodology AMS ID version to be changed to latest version 10, Dt 23rd December, 2006. | B.1.1. | The change has been made in the revised PDD | PDD has been revised. CAR 2 is closed. |
| CAR 3: The starting date of the project activity to be changed in the PDD. | C.1.1. | The change has been made in the revised PDD | PDD has been revised. CAR 3 is closed. |
| CAR 4 : Revised monitoring plan to be included in the revised PDD. The baseline methodology version no to be changed to version 10 in revised monitoring plan. | D.5.1 | The revised monitoring plan has been included in the revised PDD and the baseline methodology has been changed to Version 10. | The monitoring has been included in the revised PDD. CAR 4 is closed. |
| CAR 5: Procedures related to the following may be formulated : <ul style="list-style-type: none"> - For training of the monitoring personnel. - Calibration of the monitoring equipment. - Emergency preparedness. - Maintenance of monitoring equipment and installations. - For monitoring, measurements and reporting. - Day-to-day record handling. - Dealing with possible monitoring data | D.5.3. | <p>The procedures related to all the issues have been incorporated in the revised monitoring report and the Project Management Planning.</p> <p>The revised monitoring report has been included in the revised PDD.</p> <p>The Project Management Planning has been submitted incorporating all the procedures mentioned in CAR 5.</p> | <p>Revised monitoring plan and project management planning has been reviewed and is acceptable.</p> <p>CAR 5 is closed.</p> |

| Draft report corrective action requests and requests for clarification | Ref. to Table 2 | Summary of project participants' response | Final conclusion |
|--|-----------------|---|---------------------------------------|
| <p>adjustments.</p> <ul style="list-style-type: none"> - Internal audits of GHG project compliance. - For project performance review. - For corrective actions. | | | |
| <p>CAR 6 : EIA requirement to be checked as per the latest EIA notification 2006.</p> | <p>F.1.1</p> | <p>According to the Notification of MoEF, 2006, schedule (Page 10), project activity 1 that includes "Mining, extraction of natural resources and power generation (for a specified production capacity)", biomass power plants do not come under the purview for environmental clearance.</p> | <p>Accepted. Car 6 is closed.</p> |
| <p>CL1 : - The study of biomass prices over the last three years may be provided.</p> <p>- To demonstrate how the CDM revenue makes the project activity financially attractive.</p> | <p>B.2.1</p> | <p>- Find enclosed evidences on the biomass increase over the years. All the biomass plants in Andhra Pradesh are facing the same issue, due to which collectively, the Biomass Energy Developers Association (BEDA) have appealed to the court.</p> <p>Biomass power promoters in AP pull the plug http://www.hinduonnet.com/thehindu/thscrip/print.pl?file=2004032601641700.htm&date=2004/03/26/&prd=bl&</p> <p>Government policy on power purchase flayed http://www.hinduonnet.com/thehindu/thscrip/print.pl?file=2004032602520500.h</p> | <p>Accepted. CL1 is closed.</p> |

| Draft report corrective action requests and requests for clarification | Ref. to Table 2 | Summary of project participants' response | Final conclusion |
|--|-----------------|--|------------------|
| | | <p>tm&date=2004/03/26/&prd=th&http://www.electricityforum.com/news/mar04/biomass.html</p> <p>Biomass group considers petition over power tariff</p> <p>http://www.electricityforum.com/news/mar04/biomass.html</p> <ul style="list-style-type: none"> - To demonstrate the CDM revenue requirement, kindly find enclosed the financial analysis (IRR calculations) for the project with and without CER revenue. - The analysis is done for the current scenario i.e. Biomass Price of Rs. 1000/t; Electricity Tariff of 3.16/unit and CER Price of 10€/CER (Also according to APERC Order). - The sensitivity analysis at $\pm 5\%$ of biomass prices, electricity tariff and CER Price is shown in Annex 1 below. - As seen, CDM revenue is required to achieve the bench mark equity IRR of 16% (as given by APERC). - We have also included the audited financial statements of the past 2 years showing that RPPL has been losing money and that CERs is the only way to make it profitable. - A copy of the decision by APEC has been enclosed (R.P.No.84/2003 in O.P.No.1075 / 2000 dated 20th March | |

| Draft report corrective action requests and requests for clarification | Ref. to Table 2 | Summary of project participants' response | Final conclusion |
|--|-----------------|---|-----------------------------|
| | | 2004 – page 32 to 43) based on which the electricity tariff was revised. A revised PPA was not signed with any of the biomass plant owners. It was implemented based on the order. The invoice with the revised tariff was submitted to DNV during site visit | |
| CL2 : Environment management plan may be submitted to DNV for verification. | F.1.4. | The Environment Management Plan is enclosed. | Accepted. CL2 is closed. |

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APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Michael Lehmann

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

| | | | |
|--|----------------------------|----------------------|-----|
| GHG Auditor: | Yes | | |
| CDM Validator: | Yes | JI Validator: | -- |
| CDM Verifier: | Yes | JI Verifier: | -- |
| Industry Sector Expert for Sectoral Scope(s): | Sectoral scope 1, 2, 3 & 9 | | |
| Technical Reviewer for (group of) methodologies: | | | |
| ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G | Yes | AM0027 | Yes |
| ACM002, AMS-I.A-D, AM0019, AM0026, AM0029, AM0045 | Yes | AM0028, AM0034 | Yes |
| ACM003, ACM0005, AM0033, AM0040 | Yes | AM0030 | Yes |
| ACM0004 | Yes | AM0031 | Yes |
| ACM0006, AM0007, AM0015, AM0036, AM0042 | Yes | AM0032 | Yes |
| ACM0007 | Yes | AM0035 | Yes |
| ACM0008 | Yes | AM0038 | Yes |
| ACM0009, AM0008, AMS-III.B | Yes | AM0041 | Yes |
| AM0006, AM0016, AMS-III.D, ACM0010 | Yes | AM0034 | Yes |
| AM0009, AM0037 | Yes | AM0043 | |
| AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I | Yes | AM0046 | |
| AM0014 | Yes | AM0047 | |
| AM0017 | Yes | AMS-II.A-F, AM0044 | Yes |
| AM0018 | Yes | AMS-III.A | Yes |
| AM0020 | Yes | AMS-III.E, AMS-III.F | Yes |
| AM0021 | Yes | | |
| AM0023 | Yes | | |
| AM0024 | Yes | | |

Høvik, 5 February 2007

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Anjana Sharma

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1

| | | | |
|---|-----|-----------------------------|----|
| <i>GHG Auditor:</i> | Yes | | |
| <i>CDM Validator:</i> | -- | <i>JI Validator:</i> | -- |
| <i>CDM Verifier:</i> | -- | <i>JI Verifier:</i> | -- |
| <i>Industry Sector Expert for Sectoral Scope(s):</i> | -- | | |

Høvik, 5 February 2007

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Kumaraswamy Chandrashekara

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

| | | | |
|--|----------------------|----------------------|-----|
| GHG Auditor: | Yes | | |
| CDM Validator: | Yes | JI Validator: | -- |
| CDM Verifier: | Yes | JI Verifier: | -- |
| Industry Sector Expert for Sectoral Scope(s): | Sectoral scope 4 & 5 | | |
| Technical Reviewer for (group of) methodologies: | | | |
| ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G | Yes | AM0027 | Yes |
| ACM002, AMS-I.A-D, AM0019, AM0026, AM0029, AM0045 | Yes | AM0028, AM0034 | Yes |
| ACM003, ACM0005, AM0033, AM0040 | Yes | AM0030 | Yes |
| ACM0004 | Yes | AM0031 | Yes |
| ACM0006, AM0007, AM0015, AM0036, AM0042 | Yes | AM0032 | Yes |
| ACM0007 | Yes | AM0035 | Yes |
| ACM0008 | Yes | AM0038 | Yes |
| ACM0009, AM0008, AMS-III.B | Yes | AM0041 | Yes |
| AM0006, AM0016, AMS-III.D, ACM0010 | Yes | AM0034 | Yes |
| AM0009, AM0037 | Yes | AM0043 | |
| AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I | Yes | AM0046 | |
| AM0014 | Yes | AM0047 | |
| AM0017 | Yes | AMS-II.A-F, AM0044 | Yes |
| AM0018 | Yes | AMS-III.A | Yes |
| AM0020 | Yes | AMS-III.E, AMS-III.F | Yes |
| AM0021 | Yes | | |
| AM0023 | Yes | | |
| AM0024 | Yes | | |

Høvik, 5 February 2007

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Raman Venkata Kakaraparthi

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1

| | | | |
|---|------------------|----------------------|----|
| GHG Auditor: | Yes | | |
| CDM Validator: | Yes | JI Validator: | -- |
| CDM Verifier: | -- | JI Verifier: | -- |
| Industry Sector Expert for Sectoral Scope(s): | Sectoral scope 5 | | |
| Technical Reviewer for (group of) methodologies: | | | |
| ACM002, AMS-IA-D, AM0019, AM0026, AM0029, AM0045 | Yes | | |

Høvik, 22 December 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director