Industrie Service

Choose certainty.
Add value.

Validation Report

Reliance Industries Limited

Validation of the project “Demand side energy efficiency projects at RIL-PG” in India

Report No. 870346, Revision 02

02 April 2007

TÜV SÜD Industrie Service GmbH
Carbon Management Service
Westendstr. 199 - 80686 Munich - GERMANY

Industrie Service

Report No.	Date of first issue	Revision No.	Date of this revision	Certificate No.
870346	05 February 2007	02	02 April 2007	-

Subject:	Validation of a small scale CDM Project
Executing Operational Unit:	TÜV SÜD Industrie Service GmbH Carbon Management Service Westendstr. 199 - 80686 Munich Federal Republic of Germany
Client:	Reliance Industries Limited Thane-Belapur Road, Koparkhairane BCA-28, 2nd floor, PHQ, Dhirubhai Ambani Knowledge City (DAKC) Maharashtra – 400709 Navi Mumbai, India
Contract approved by:	Werner Betzenbichler
Report Title:	Validation of the project "Demand side energy efficiency projects at RIL-PG" in India
Number of pages	19 (excluding cover page and annexes)

Summary:

The Certification Body "Climate and Energy" has been ordered by Reliance Industries Limited to perform a validation of the above mentioned project. The project is a unilateral CDM project. Project participant is Reliance Industries Limited, India.

Using a risk based approach, the validation of this project has been performed by document reviews and on-site inspection, audits at the locations of the project and interviews at the offices of the project developer and the project owner.

As the result of this procedure, it can be confirmed that the submitted project documentation is in line with all requirements set by the Kyoto Protocol, the Marrakech Accords and relevant guidance by the CDM Executive Board.

Additionally the assessment team reviewed the estimation of the projected emission reductions. We can confirm that the indicated amount of emission reduction of 122 160 tonnes CO2e over a crediting period of ten years, resulting in a calculated annual average of 12 216 tonnes CO2e, represents a reasonable estimation using the assumptions given by the project documents.

Work carried out by:	• Dr. Ayse Frey (Project manager, GHG auditor) • Bratin Roy (GHG auditor, Lead Auditor Quality and Environmental Management Systems (ISO 9001 and 14001), Local expert) • Dr. Alexandra Babeck (GHG auditor)	Internal Quality Control by: Werner Betzenbichler

Abbreviations

BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CER	Certified Emission Reduction
COP	Conference of the Parties
CR	Clarification Request
CTS	Central Technical Service
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
EIA / EA	Environmental Impact Assessment / Environmental Assessment
ER	Emission Reduction
GHG	Greenhouse gas(es)
KP	Kyoto Protocol
MP	Monitoring Plan
ODA	Official Development Assistance
PG	Patalganga division of Reliance Industries Limited
PDD	Project Design Document
RIL	Reliance Industries Limited
TÜV SÜD	TÜV SÜD Industrie Service GmbH
UNFCCC	United Nations Framework Convention on Climate Change
UPPCB	Uttar Pradesh Pollution Control Board
VVM	Validation and Verification Manual

Table of Contents Page

1 INTRODUCTION

1.1 Objective

Reliance Industries Limited (RIL) has commissioned TÜV SÜD Industrie Service GmbH (TÜV SÜD) to validate the project "Demand side energy efficiency projects at RIL-PG" in India. The validation serves as a design verification and is a requirement of all CDM projects. The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, the monitoring plan (MP), and the project's compliance with relevant UNFCCC and host country criteria are validated in order to confirm that the project design as documented is sound and reasonable and meets the stated requirements and 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).

UNFCCC criteria refer to the Kyoto Protocol criteria and the CDM rules and modalities as agreed in the Bonn Agreement and the Marrakech Accords.

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. TÜV SÜD has, based on the recommendations in the Validation and Verification Manual employed a risk-based approach in the validation, 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 client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

The audit team has been provided with a draft PDD in July 2006. Based on this documentation, a document review and a fact finding mission in form of an on-site audit has taken place. The revised final PDD version, in response to the CRs indicated in the audit process, was submitted in January 2007. This PDD and the results from the on-site audit serve as the basis for the assessment presented herewith.

Studying the existing documentation belonging to this project, it was obvious that the competence and capability of the validation team has to cover at least the following aspects:

- Knowledge of Kyoto Protocol and the Marrakech Accords
- Environmental and Social Impact Assessment
- Skills in environmental auditing (ISO 14000, EMAS)
- Quality assurance
- Technical aspects of compressed air supply systems
- Technical aspects of biogas generation and utilisation
- Monitoring concepts
- Political, economical and technical framework conditions in host country

According to these requirements, TÜV SÜD has composed a project team in accordance with the appointment rules of the TÜV certification body "climate and energy":

Dr. Ayse Frey is an auditor and project manager for CDM/JI projects as well as an energy/waste expert at TÜV SÜD Industrie Service GmbH. In her position she is responsible for the implementation of validation, verification and certifications processes for greenhouse gas mitigation projects in the context of the Kyoto Protocol. After her studies in civil and environmental engineering, she completed a PhD in the field of water and waste policy. She has extensive experience with the CDM and JI flexible mechanisms as well as with management systems.

Bratin Roy is an auditor for CDM/JI projects and also a lead auditor for quality and environmental management systems (according to ISO 9001 and ISO 14001). He holds a Masters Degree in Environmental Science. Prior to joining TÜV SÜD, Mr. Roy has worked for several years as a consultant in the field of energy industries, renewable and non-renewable sources, and energy distribution equipment, especially biomass and solar energy. He has received extensive training in the CDM and JI validation and verification processes and has already participated in several CDM/JI project assessments.

Dr. Alexandra Babeck is an auditor for CDM projects and environmental management systems as well as a technical expert on energy systems and environmental technologies. Before joining the TÜV SÜD Industrie Service GmbH as co-operation partner she worked as an expert for energy efficiency, renewable energy, environmental technologies and emission trading. She participated already in several CDM project assessments.

The audit team covers the above mentioned requirements as follows:

- Knowledge of Kyoto Protocol and the Marrakech Accords (ALL)
- Environmental and Social Impact Assessment (ALL)
- Skills in environmental auditing (ALL)
- Quality assurance (ALL)
- Technical aspects of compressed air supply systems (ROY/BABECK)
- Technical aspects of biogas generation and utilisation (ALL)
- Monitoring concepts (ALL)
- Political, economical and technical framework conditions in host country (ROY)

In order to have an internal quality control of the project, a team of the following persons has been composed by the certification body "climate and energy":

- Werner Betzenbichler (head of the certification body "climate and energy")

1.3 GHG Project Description

The project activity takes place at the production plant of Patalganga (PG) division of RIL, a manufaturer of petrochemicals and fiber intermediates and involves two different energy efficiency measures:

1) Energy efficiency improvement of the compressed air generation system by the installation of a variable speed screw compressor: The optimised system, matching the variable LP air demand results in a reduced power consumption.
2) Utilisation of biogas from effluent treatment plant, which was being flared in pre-project scenario, in a process heater, thus reducing fossil fuel consumption of the process heater.

The plant is located at B-4, MIDC Industrial area, Patalganga (18°50'10'' North, 73°05'40' East), Raigarh district, Maharashtra, India. The project is a unilateral CDM project. Project participant is Reliance Industries Limited, India.

The project starting dates are August 9, 2003 (measure 2: biogas in process heater) and January 28, 2004 (measure 1: variable speed screw compressor). The fixed crediting period of 10 years starts on April 01, 2007.

2 METHODOLOGY

The project assessment aims at being a risk based approach and is based on the methodology developed in the Validation and Verification Manual (for further information see www.vvmanual.info), an initiative of all Applicant Entities, which aims to harmonize the approach and quality of all such assessments.

In order to ensure transparency, a validation protocol was customised for the project, according to the Validation and Verification Manual. The protocol shows, in a 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 is enclosed in Annex 1 to this report.

Validation Protocol Table 1: Mandatory Requirements			
Requirement	***Reference***	***Conclusion***	***Cross reference***
The requirements the project must meet.	*Gives reference to the legislation or agreement where the requirement is found.*	*This is either acceptable based on evidence provided (**OK**), or a **Corrective Action Request (CAR)** of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the Validation report.*	*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.*

Validation Protocol Table 2: Requirement checklist				
Checklist Question	***Reference***	***Means of verification (MoV)***	***Comment***	***Draft and/or Final Conclusion***
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.	*Gives reference to documents where the answer to the checklist question or item is found.*	*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.*	*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.*	*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). **Clarification** is used when the validation team has identified a need for further clarification.*

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

Figure 1 Validation Protocol Tables

2.1 Review of Documents

The project design document submitted by the client and additional background documents related to the project design and baseline were reviewed. A complete list of all documents reviewed is attached as Annex 2 to this report. The project design document underwent several revisions addressing corrective action and clarification requests issued by TÜV SÜD.

2.2 Follow-up Interviews

On October 13 and 14, 2006, TÜV SÜD performed interviews with project 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	Interview topics
Reliance Industries Limited	➢ Project design ➢ Technical equipment ➢ Sustainable development issues ➢ Baseline determination ➢ Additionality ➢ Crediting period ➢ Monitoring plan ➢ Management system ➢ Environmental impacts ➢ Stakeholder process ➢ Approval by the Parties involved

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve the requests for corrective actions and clarification and any other outstanding issues which needed to be clarified for TÜV SÜD`s positive conclusion on the project design. The Clarification Requests raised by TÜV SÜD were resolved during communications between the client and TÜV SÜD. To guarantee the transparency of the validation process, the concerns raised and responses given are summarised in chapter 3 below and documented in more detail in the validation protocol in Annex 1.

3 VALIDATION FINDINGS

In the following sections the findings of the validation are stated. The validation findings for each validation subject are presented as follows:

1) The findings from the desk review of the project design documents and the findings from interviews during the follow up visit are summarised. A more detailed record of these findings can be found in the Validation Protocol in annex 1.
2) Where TÜV SÜD had identified issues that needed clarification or that represented a risk to the fulfilment of the project objectives, a Clarification or Corrective Action Request, respectively, have been issued. The Clarification and Corrective Action Requests are stated, where applicable, in the following sections and are further documented in the Validation Protocol in Annex 1. The validation of the project resulted in fourteen Clarification Requests.
3) Where Clarification Requests have been issued, the exchanges between the client and TÜV SÜD to resolve these Clarification Requests is summarised.
4) The conclusions for validation subject are presented.

The validation findings relate to the project design as documented and described in the final project design documentation.

3.1 Project Design

3.1.1 Discussion

The project participant is Reliance Industries Limited, India. No project participant from an Annex I Party is involved in the project. The participating Party, India as the host Party meets all relevant participation requirements. A letter of approval from the Ministry of Environment and Forests issued on January 22, 2007 has been submitted.

The objective of the project is to increase energy efficiency at the manufacturing plant by the implementation of two independent measures, optimising the low pressure compressed air system and utilising of biogas in a process heater.

Measure 1 involves the installation of a new screw compressor with variable frequency drives (design capacity 5.000-9000 Nm^3/h) running in parallel to existing centrifugal compressors (centrifugal compressors each capacity 10.000 Nm^3/h, 1050 kW). The optimised system meets the variable LP demand more efficiently and results in a reduced specific power consumption and associated GHG emissions.

Within Measure 2 biogas - generated in the effluent treatment plant and flared in pre-project scenario – is used as fuel in a process heater, thus replacing fossil fuel and reducing related GHG emissions.

The project itself does qualify as a Small Scale Project as it fulfils the requirements defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM by being a project in the category Type-II – Energy Efficiency Improvement Projects - and sub category D – Energy Efficiency and Fuel switching measures for Industrial Facilities.

The aggregate energy savings do not exceed 45 GWh_{th} per year. Measure 1 is expected to reduce 6.6 GWh_e/year (equivalent to 20.8 GWh_{th}/year) and measure 2 saving projections amount to 21.3 GWh_{th}/year.

The project activity is not a debundled component of a larger project activity according to the rules for "determining the occurrence of debundling" as they are outlined in Appendix C of the Simplified Modalities and Procedures for Small-Scale CDM project activities. There is no other small scale project activity already registered or in the process of applying for registration - done by the same project participant within 1 km of project boundary of this project.

The activity is located at the premises of Patalganga division of Reliance Industries Limited, MIDC Industrial area, Patalganga, Raigarh district, Maharashtra, India. The revised PDD does clearly define the project's spatial boundaries. Measure 1 involves all LP air compressors and measure 2 involves the biogas recovery unit as well as all process heater plants. All components and facilities used to mitigate GHGs or which may form a potential source of GHGs are covered. Information regarding the capacity of the installations is described in the PDD as well as supported by corresponding documentation.

The project design engineering is reflecting current good practices. The project is professionally managed and the applied technologies represents state-of-the-art technique. The project equipments can be expected to run for the whole project period and it is not expected that it will be replaced by more efficient technologies. The project makes provisions for meeting training and maintenance needs. Initial training was required for the operation of the optimised low pressure supply system and same has been provided.

The project is in line with sustainable development policies of the country. The Government of India is encouraging energy conservation in industry. In the Letter of Approval the Government of India moreover confirms that the project contributes to sustainable development in the country.

As the project activity is an energy efficiency project, implemented inside the premises of PG-RIL there is no need for the company to acquire any special or separate permission or licenses.

The funding for the project does not lead to a diversion of official development assistance, as according to the information obtained by the audit team, ODA does not contribute to the financing of the project.

A starting date has been defined in the PDD separately for measure 1 and measure 2, when measures internally were approved. This are August 9, 2003 (measure 2: biogas in process heater) and January 28, 2004 (measure 1: variable speed screw compressor). Respective evidences have been provided. The expected life time of the activity of 20 years is considered to be plausible. The fixed crediting period of 10 years starts on April 01, 2007.

3.1.2 Findings

Clarification Request No. 1:

Please provide a detailed and clear schematic diagram of equipment involved in the measure 1.

Response:

A scheme is provided in A 4.2 of the revised PDD. In addition the scheme for Measure II has been revised to include the blower, a small drive before the compressor.

Clarification Request No. 9:

Considering the given information on site the project boundary has to be rechecked in the PDD.

For the measure II, it should include the biogas recovery unit as well as all the heaters in the PX plant in the project boundary. Please revise the project boundary diagram in the PDD accordingly.

Response:

The project boundary is revised so as to include biogas recovery unit and all process heaters in PX plant. The biogas is utilised in a single heater in PX plant, however all heaters in the PX plant are considered within project boundary because the fuel gas displaced from the said heater may be utilised in any other heaters. The excess gas used in other heater will reduce fuel oil consumption in those heaters.

Clarification Request No. 10

Which one is the project starting date –approval or commissioning date? In addition please justify why CDM registration process has not been initiated until 2006, although decision of investment was taken in August 2003 (measure II) and January 2004 (measure I) and CDM is claimed to be important for project implementation.

Response:

Date of approval of project may be considered as start date because that is one of the major activity in the project.

Though RIL was aware of CDM concept and assistance for the project it may get through the same, there was not much of clarity on the procedures and documentation required for application. The actual CDM potentiality of these projects was being discussed with experts in this area. RIL could gain some clarity on the subject after a workshop conducted by CDM-India for RIL engineers (Oct'04) and real activity on application to UNFCCC started. Due to the deadline of 31.12.05 for retroactive projects, we experienced that DOEs were short of manpower to accept our projects. RIL had several projects to be developed. We have developed four new methodologies. We have completed documentation for bigger, major projects on priority followed by small scale projects.

3.1.3 Conclusion

The project complies with the requirements. Schemes have been included in the PDD that clearly present the single equipments involved in the respective measures. Information regarding the capacity of the installations is presented and has been supported by corresponding documentation. The project boundaries covers all components and facilities affected by the project activity. Starting dates of the individual project measures have been clearly defined and although actvities started in 2003 and 2004 already the late start of CDM registration process has been convincingly justified.

3.2 Baseline and Additionality

3.2.1 Discussion

The selected baseline methodologies are in line with the baseline methodology provided for the relevant project category. Version number and date of the version applied needed to be included. The PDD responds convincingly to the applicability criteria of the project category. The project comprises two energy efficiency measures – optimised compressed air generation system as well as using biogas for process heating that had been flared before. The aggregate energy savings do not exceed 45 GWh_{th} per year in fuel input. An aggregate saving of approx. 42.1 GWh_{th} in fuel input is predicted.

The application of the baseline methodologies is transparent and considered to be appropriate.

The emission baseline for measure 1 consists of the specific power consumption prior to the installation of the new compressor. As power is generated on-site transmission and distribution losses are negligible and has not been considered. This approach is appropriate and conservative. Time period for calculation of specific power consumption in baseline case needed to be clarified.

For measure 2 the energy baseline consists of the fuel oil consumption in process heater that is replaced by biogas.

The baseline scenarios do sufficiently take into account relevant national and/or sectoral policies. The Government of India is encouraging energy conservation in industry, but there is no regulation or act in India, which demands taking such actions mandatorily.

The PDD describes that the project is not a likely baseline scenario according to technological and prevailing practice barriers faced by the project. However, supporting documentation giving evidence for the same was requested.

For measure 1 the analysis describes barriers of increased monitoring requirements of the optimised system and the risk due to lack of experience in operation of the latest technology which needs sophistication of operational practices and trained manpower. For measure 2 technological barriers related to the composition of the biogas and the fluctuation of biogas quantity with possible negative effects on the process heater performance have been described.

CDM incentive is deemed to be important for taking the risks related to changing well established processes crucial for production. Evidence has been provided that the company was well aware on probable CDM benefits for such kind of activities at the time of project approval.

In the revised PDD references have been made to all data sources used.

3.2.2 Findings

Clarification Request No. 2

Please include information on the version number and date of the methodology applied.

Response:

Included in revised PDD.

Clarification Request No. 3

The combined energy savings of the entire project activity is below 15 GWhe or 45 GWhth. Please submit the supporting calculation in excel form.

Response:

The excel sheet for calculation of combined energy saving is attached herewith. The period for calculations is 22.09.05 – 21.09.06 to cover one complete year.

Clarification Request No. 4:

The time period which has been considered for calculation of energy baseline in section B2 in the PDD needs to be clarified in the PDD (for example, average LP air generation, average power consumption).

Response:

The time period is considered to be September 2003 - August 04 i.e. one year before the implementation of project activity. The same is written in the revised PDD.

Clarification Request No. 5:

The table in section B2 for the measure II considers the methane content of the biogas as 68%. But the same can not be verified as true figure during the site audit. Please clarify and use the actual calculated average value in the PDD.

Response:

Actual methane content of 70.96 % is considered in revised PDD.

Clarification Request No. 6

Exact sources of data for power consumption of the biogas compressor must be included in the PDD. Retraceable data source for NCV methane should also be included in the PDD**.**

Response:

Power consumption of biogas was calculated through proportional allocation of design motor power as per biogas flow. The same is now changed and power will be monitored monthly by portable powermeter, which will be calibrated regularly.

The power consumption of the compressor and blower is actually negligible (2-3%) as compared to reduction in energy consumption. The motor ratings of these two drives are 30 and 7 kW respectively. Even if full load power of these drives is considered, it is 0.888 MWh/day which is equivalent to emission of 0.76 t CO_2/day. Hence measurement of power consumption of these two drives on monthly basis will serve the purpose. Otherwise, maximum drive power could be taken as conservative approach, however, the methodology demands measurement of energy consumption of project, so it is included in monitoring.

Source of NCV is a report from Department of Energy, US. The same is mentioned in section D.3 of revised PDD.

Clarification Request No. 7

Barriers described in the PDD needs to be supported with authentic and retraceable documentary evidence.

Response:

Only technological barriers are now explained in the PDD after removing other minor barriers. Evidences have been submitted.

Measure 1: The technology used in this VSD screw compressor was very recent when the project was implemented. From the documents available from M/s Atlas Copco, the machines were developed in Year 2002 and are modified in steps to obtain maximum efficiency. It is

normal practice to visit similar installations before purchasing anything new. When supplier was asked to arrange such visit, we were not offered any installation of such machine in India. It was told that there was no other installation in India.

Measure 2: The heater where biogas is used plays a crucial role in PX Xyfrac section. Any failure in this heater results directly into production loss. No other heater can serve the purpose of this heater. Each one of the heaters is used to maintain the temperature of different process streams in various units of PX plant. The temperature of these streams play critical role in operation of each unit.

Risk of production loss in PX plant due to fluctuation in biogas quantity and composition is a very important and significant barrier for a manufacturer for whom production is more important than energy consumption.

Clarification Request No. 8:

For the measure I it should be clearly evidenced that there would have been no technical limitations (capacity, lifetime of compressors) in the continuation of pre-project setup.

Response:

Specification sheets for all the LP air compressors have been submitted. It could be seen that the total installed capacity of the compressors (73.704 Nm3/hr) is much higher than LP air demand of 45.000-50.000 Nm3/hr. Hence the project is not for capacity enhancement but for energy efficiency in the air generation system.

Existing compressors are running fine and there is no major increase in maintenance cost till date. The age of these compressors is more than 25 years if maintained properly and will last for much more years with major overhauls. A supporting email correspondence from the compressor supplier on this issue has been submitted. Thus the age of the existing compressors was not a constraint and the project proponent has installed the new VSD compressor only to cater to the variable air demand. If it would have been for replacement of existing compressors, project proponent could have installed much higher capacity machines to replace more number of machines with a single one with optimum efficiency and lower maintenance.

3.2.3 Conclusion

The project complies with the requirements. The PDD applies SSC methodology version number 07 of 28. November 2005, which was valid at the time of PDD development. Supporting Excel calculations have been submitted that allow a reproduction of energy saving calculations. Data have been verified. Projections as well as baseline caclculations are based on operational data over a period of one year, which seems appropriate.

It has been convincingly demonstrated and evidenced that the project faced technological barriers as well as for measure 1 barriers due to prevailing practice. For measure 1 supporting documentation has been provided evidencing that the compressor technology applied was the first of its kind in the sector and that staff has been trained. In addition it has been evidenced that there would have been no technical limitations in continuation of the pre-project scenario. For measure 2 supporting documentation on difficulties about using biogas in the existing burner has been provided.

Taking all together it is concluded that the project activity itself is not likely baseline scenario.

3.3 Monitoring Plan

3.3.1 Discussion

The selected monitoring methodology is in line with the monitoring methodology provided for the relevant project category.

Within measure 1 the specific power consumption of the pre-project system has been documented and the specific power consumption of the optimised system will be measured. For measure 2 the power consumption of the biogas recovery unit shall be measured together with the quantity and methane content of biogas consumed in process heater.

As the electricity is supplied by a captive power plant, the emission factor for electricity supply will be calculated ex-post based on the weighted average emissions of the current captive power generation. This is in line with methodology II D. which refers to I.D. The actual monitored data will be used for calculations. Respective monitoring parameters have been included in the monitoring plan and a sample calculation has been presented. IPPC values are applied for emission coefficients which is in accordance to the methodology.

There is no leakage within the project activity as the project activity does not involve any transfer of equipment from or to another activity.

The monitoring methodology gives opportunity for real measurements of achieved emission reductions. All relevant parameters to calculate the energy savings are defined in the revised monitoring plan. Main parameters will be measured with on-line DCS (Distributed Control System). The accuracy level of all the instruments is within maximum of 2% of full range. Reasonable calibration procedures have been defined. Recording frequency and archiving methods are based on well established procedures and are considered being reasonable and appropriate as well. The plant has an implemented ISO management system and QA/QC procedures are planned as per management system standard. Thus the delivery of high quality data deemed to be ensured.

The PDD elaborates on the overall responsibility and project management structure. A project specific GHG emission reduction management system has been established. The manual which is part of ISO 9001 documentation clearly defines roles, responsibilities and internal procedures for monitoring and reporting as well as for QA/Q aspects. Overall responsibility is with the Head of Departement of the Central Technical Service (CTS). In addition the general manager CTS has been appointed as CDM coordinator, responsible for coordination, overall implementation and quality assurance. CTS Engineer will monitor and document data as per monitoring plan and monthly reports on emission reductions will be elaborated.

3.3.2 Findings

Clarification Request No. 11

Power consumption of the biogas compressor must be metered. At present no monitoring system is evidenced at site.

Response:

As required by the methodology, power consumption will be monitored. Power consumption will be monitored monthly by portable powermeter, which will be calibrated regularly (see CR 6)

The portable power-meter reads the power consumption as kW. Thus the power will be measured as kWh per hour once a month and the same value will be considered for daily emission reduction calculation for whole of that month.

There is one small blower in the biogas recovery unit. The power consumption of the same will also be monitored similarly.

Clarification Request No. 12

Methane content in the biogas must be monitored from the combined gas flow from the line of storage talk to the compressor not from the individual reactor (same is the present practice).

Please also check the frequency of the monitoring of this parameter. As per table D3, it needs to be done daily. But presently it is been done twice in month.

Response:

New sample of combined gas from gas holder is started and methane content of the same will be monitored. The monitoring frequency is changed to daily.

Clarification Request No. 13

Naptha consumption in HRSG is not being monitored. Naptha consumption is monitored in GT only. Please clarify and revise PDD accordingly.

Response:

Table D.3. is revised to include fuel consumption in HRSGs. The fuel consumed in gas turbines will be allocated in HRSGs and supplementary fuel firing will be monitored directly.

3.3.3 Conclusion

The project does comply with the requirements. All relevant parameters to calculate the energy savings have been included in the monitoring plan. The monitoring approach will deliver data in a reliable and reasonably acceptable accuracy.

3.4 Calculation of GHG Emissions

3.4.1 Discussion

The project design captures all direct and indirect GHG emissions in the baseline and project scenario. The formulae for calculating the project and baseline emissions are documented in a complete and transparent manner. Calculations have been provided as separate Excel-file.

Projections are based on operational data from 09/22/05 – 09/21/06. For the period 09/22/05 – 03/31/06 an emission factor of EF = 0.859 kg CO_{2e}/kWh - calculated based on the monitored data of financial year April 05- March 06 - has been applied. For the period 04/01/06 onwards an emission factor of EF = 0.879 kg CO_{2e}/kWh – calculated based on data from April 06 to September 06 – has been used. These approach is deemed to be appropriate.

Leakage is not to be considered according to the methodology.

3.4.2 Findings

None

3.4.3 Conclusion

The project complies with the requirements.

3.5 Environmental Impacts

3.5.1 Discussion

The environmental impacts can be seen as being low. The same have been discussed in the PDD. The legislation does not require an EIA for this type of project. The project site complies with relevant environmental legislation in the host country. Relevant valid consent for air and water is available and was verified by the audit team.

Negative environmental effects are not expected to be created by the project. Given the nature of the project design this seems to be reasonable. Transboundary effects are not expected.

3.5.2 Findings

None.

3.5.3 Conclusion

The project complies with the requirements.

3.6 Comments by Local Stakeholders

3.6.1 Discussion

Stakeholders have been informed and invited to comment on the project via questionnaire. No stakeholder process is required according to national legislation.

As the project activity comprises plant specific efficiency improvements employees of RIL-PG have been defined as main stakeholders as well as equipment suppliers. The approach is deemed to be appropriate regarding the nature of the project.

All comments received so far are neutral or positive. Comments have been summarised in the revised PDD.

3.6.2 Findings

Clarification Request No. 14:

Stakeholder comments have been collected by field survey questionnaire. However, the PDD does not summarize the comments received in detail. Please revise accordingly.

Response:

Stakeholders' comments are elaborated in the revised PDD. There are no negative comment and hence no action is required by the project proponent.

3.6.3 Conclusion

The project complies with the requirements.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

TÜV SÜD published the project documents on its website and invited comments from Parties, stakeholders and non-governmental organizations during a period of 30 days, from August 25 to September 23, 2006.

Published on:

http://www.netinform.de/KE/Wegweiser/Guide2.aspx?ID=2010&Ebene1_ID=26&Ebene2_ID=578&mode=1.

No comments have been received.

Industrie Service

VALIDATION OPINION

TÜV SÜD has performed a validation of the project "Demand side energy efficiency projects at RIL-PG" in India. The project is a unilateral CDM project. Project participant is Reliance Industries Limited, India. The Party involved is India as the host country. The validation was performed on the basis of UNFCCC criteria 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 subsequent decisions by the CDM Executive Board.

The review of the project design documentation and the subsequent follow-up interviews have provided TÜV SÜD with sufficient evidence to determine the fulfilment of stated criteria. In our opinion, the project does meet all relevant UNFCCC requirements for the CDM and all relevant host country criteria. The project will hence be recommended by TÜV SÜD for registration with the UNFCCC under the CDM.

By both, optimising the compressed air supply system as well as utilising the biogas in process heater instead of flaring the project results in reductions of CO_2 emissions that are real, measurable and give long-term benefits to the mitigation of climate change. An analysis of the barriers demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity. Given that the project is implemented as designed, the project is likely to achieve the estimated amount of emission reductions.

Additionally the assessment team reviewed the estimation of the projected emission reductions. We can confirm that the indicated amount of emission reduction of 122 160 tonnes CO2e over a crediting period of ten years, resulting in a calculated annual average of 12 216 tonnes CO2e, represents a reasonable estimation using the assumptions given by the project documents.

The validation is based on the information made available to us and the engagement conditions detailed in this report. The validation has been performed using a risk based approach as described above. The only purpose of this report is its use during the registration process as part of the CDM project cycle. Hence, TÜV SÜD can not be held liable by any party for decisions made or not made based on the validation opinion, which will go beyond that purpose.

Munich, 2007-04-02

Werner Betzenbichler

Head of certification body "climate and energy"

Munich, 2007-04-02

Dr. Ayse Frey

Project Manager

Industrie Service

Annex 1: Validation Protocol

Table 1 Project's Environment

REQUIREMENT	REFERENCE	Comment	CONCLUSION
1. The host country shall be a Party to the Kyoto Protocol	Marrakech Accords, CDM Modalities §30	India has ratified the Kyoto Protocol on August 26, 2002.	☑
2. Parties participating in the CDM shall designate a national authority for the CDM	Marrakech Accords, CDM Modalities §29	India as participating party has designated a national authority.	☑
3. 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, Marrakech Accords, CDM Modalities §40a	The confirmation by the host country has not been submitted to the validation team and the certification body "Climate and Energy". **Outstanding Issue** Before submitting the project for registration the project owner has to provide an eligible Letter of Approval from involved Parties.	**open**
4. The project shall have the written approval of voluntary participation from the designated national authorities of each party involved.	Kyoto Protocol Art. 12.5a, Marrakech Accords, CDM Modalities §40a	The confirmation by the host country has not been submitted to the validation team and the certification body "Climate and Energy". *Before submitting the project for registration the project owner has to provide an eligible Letter of Approval from involved Parties.*	**open**

REQUIREMENT	REFERENCE	Comment	CONCLUSION
5. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3. A letter of approval for participants originating from Annex-I-Countries should be available.	Kyoto Protocol Art.12.2	No agreement with Annex 1 countries have been established yet. The project is unilateral.	☑
6. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available.	Marrakech Accords, CDM Modalities, §40	The project has been made publicly available from 24th of August 2006 until 22nd of September and no comments has been received..	☑
7. The project design document shall be in conformance with the UNFCCC CDM-PDD format	Marrakech Accords, CDM Modalities, Appendix B, EB Decisions	The PDD is in conformance with the UNFCCC CDM-PDD format.	☑
8. The project participants shall submit a letter on the modalities of communication (MoC) before submitting a request for registration	EB-09 F_CDM_REG form	**Outstanding Issue** The letter on Modalities of Communication must be submitted before submitting a request for registration.	**open**

Table 2 PDD

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
A. General Description of Project Activity					
A.1. Project Title					
A.1.1. Does the used project title clearly enable to identify the unique CDM activity?	1,2	DR,I	The project title is clearly enough to identify the unique CDM activity.	☑	☑
A.1.2. Are there an indication of a revision number and the date of the revision?	2	DR	Yes, there is an indication of a revision number and the date of the revision.	☑	☑
A.1.3. Is this in consistency with the time line of the project's history?	1,2	DR, I	Yes, it is consistent.	☑	☑
A.2. Description of the project activity					
A.2.1. Is the description delivering a transparent overview of the project activities?	1,2,3, 4	DR, I	The description is delivering a transparent overview of the project activities.	☑	☑
A.2.2. Is all information provided in compliance with actual situation or planning?	1,2,6 ,7	DR,I	All information is provided in compliance with actual situation or planning.	☑	☑
A.2.3. Are proofs available evidencing all information with relevance for the validity, for the determination of baseline and project emissions and for emission projections?	1,2,3 ,4,5, 6,7,8	DR,I	Yes. In general there is detailed information in the project activity available on determination of baseline and project emissions. Specific issues have been discussed in details below.	☑	☑
A.2.4. Is all information provided in consistency with	2	DR	Yes. Information is consistent.	☑	☑

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
details provided by further chapters of the PDD?					
A.3. Project Participants					
A.3.1. Is the form required for the indication of project participants correctly applied?	2,18	DR	The form for the indication of project participants is correctly applied.	☑	☑
A.3.2. Is the voluntary participation of all listed entities or Parties confirmed by each of them?	1,2	DR,I	Yes.	☑	☑
A.3.3. Is all information provided in consistency with details provided by further chapters of the PDD (in particular annex 1)?	2	DR	Yes. All provided information is in consistency.	☑	☑
A.4. Technical description of the project activity					
A.4.1. Does the information provided on the location of the project activity allow for a clear identification of the site(s)?	1,2,16	DR, I	The location information of the project activity is very clear and does allow a clear identification of the site.	☑	☑
A.4.2. Do the project participants possess ownership or licenses which will allow the implementation of the project at that site / those sites?	1,2, 16	DR, I	Yes. The project has been established in the own site.	☑	☑
A.4.3. Is the category(ies) of the project activity correctly identified?	2,17, 18	DR	Yes. The categories of the project activity have been identified as II D: Energy efficiency and fuel switching measures for industrial facilities	☑	☑
A.4.4. Does the project design engineering reflect current good practices?	2,3,4	DR	Yes, the project design does reflect current good practice. The design has been professionally developed.	☑	☑
A.4.5. Does the description of the technology to be	1,2,	DR,	Measure 1:	**CR 1**	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
applied provide sufficient and transparent input to evaluate its impact on the greenhouse gas balance?	19	I	A new screw compressor with variable frequency drives (design capacity 5.000-9000 Nm^3/h) has been added to the Low Pressure (LP) compressed air system in order to meet the variable LP demand more efficiently than with the existing equipment (centrifugal compressors 10.000 Nm^3/h, 1050 kW). The increased system efficiency will reduce power consumption and thus related GHG emissions. **Clarification Request No 1** Please provide a detailed and clear schematic diagram of equipment involved in the measure 1. Measure 2: The effluent treatment plant has been retrofitted. The new system involves additional anaerobic digesters and a biogas capturing system. In the post project scenario biogas is used as fuel in a process heater, while in the pre-project scenario biogas was being flared. The biogas replaces fossil fuel consumption in process heater, thus reducing GHG emissions.		
A.4.6. Is the brief explanation how the project will re-	2	DR	Yes, the explanation how the project will re-	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
duce greenhouse gas emission transparent and suitable?			duce greenhouse gas emission is transparent and suitable.		
A.4.7. Is all information provided in compliance with actual situation or planning as available by the project participants?	2	DR, I	Yes. All information is provided in compliance with actual situation or planning as available by the project participants.	☑	☑
A.4.8. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	1,2,3,4,5,6,7,8,9,10	DR, I	The projects use modern technologies which results in better performance as compared to the commonly used technologies in Indian Industry.	☑	☑
A.4.9. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	1,2,3,4,5,6,7,8,9,10	DR, I	It is not likely that the project technology will be substituted by other or more efficient technologies.	☑	☑
A.4.10. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	1,2,3,4,5,6,7,8,9,10,20	DR,I	The proper operation of the optimised LP air supply system requires training and maintenance efforts. Training has been provided and adequate maintenance procedures are defined.	☑	☑
A.4.11. Does the project make provisions for meeting training and maintenance needs?	1,2,3,4,5,6,7,8,9,10	DR,I	Yes, the project makes provisions for meeting training and maintenance needs.	☑	☑
A.4.12. Is a schedule available on the implementation of the project and are there any risks for delays?	1,2,7,8	DR,I	There is a detailed schedule available about the single steps of the project. The project has been implemented as per the schedule without any delay.	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
A.4.13. Is the form required for the indication of projected emission reductions correctly applied?	2,18	DR	The form required for the indication of projected emission reductions is correctly applied.	☑	☑
A.5. Public Funding					
A.5.1. Is all information on public funding provided in compliance with actual situation or planning as available by the project participants?	1,2	DR,I	No public funding has been taken for the project.	☑	☑
A.5.2. Is all information provided in consistency with details provided by further chapters of the PDD (in particular annex 2)?	2	DR	Yes. All information is consistent.	☑	☑
B. Baseline Methodology					
B.1. Choice and Applicability					
B.1.1. Is the baseline methodology previously approved by the CDM Methodology Panel?	2,18	DR	Yes. The small-scale baseline methodology Type II D: Energy efficiency and fuel switching measures for industrial facilities has been approved by the CDM Methodology Panel.	☑	☑
B.1.2. Is the choice of the methodology correctly justified by the PDD?	2,18	DR	The choice of the methodology is correctly justified by the PDD.	☑	☑
B.1.3. Is the baseline methodology the one deemed most applicable for this project?	2,18, 19, 21	DR,I	The baseline methodologies are the ones most applicable for this project. The project consists of a small-scale project, therefore and under consideration of all other aspects the chosen baseline methodologies II D. are	**CR 2 CR 3**	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			the most applicable for this project. **Clarification Request No. 2** Please include information on the version number and date of the methodology applied. **Clarification Request No. 3** It must be demonstrated that the combined energy savings of the entire project activity is below 15 GWhe or 45 GWhth. Please submit the supporting calculation in excel form.		
B.1.4. Is the project in conformance with all applicability criteria of the applied methodology?	2,18	DR,I	The project is in conformance with all applicability criteria of the applied methodology.	☑	☑
B.2. Application of the Baseline Methodology / Identification of the Baseline Scenario					
B.2.1. Is the application of the methodology and the discussion and determination of the chosen baseline transparent?	1, 2,18, 19, 22	DR,I	The application of the methodology is generally transparent. However, the discussion and determination of the chosen baseline is in some points not clear. Some baseline parameters, indicated in Table B.1 of the PDD have to be reviewed. **Clarification Request No. 4:** The time period which has been considered	**CR 4** **CR 5**	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			for calculation of energy baseline in section B2 in the PDD needs to be clarified in the PDD (for example, average LP air generation, average power consumption). **Clarification Request No. 5:** The table in section B2 for the measure II considers the methane content of the biogas as 68%. But the same can not be verified as true figure during the site audit. Please clarify and use the actual calculated average value in the PDD.		
B.2.2. Does the application consider all potential baseline scenarios in the discussion?	2,18, 19	DR	Yes. The application considers all potential baseline scenarios.	☑	☑
B.2.3. Is conservativeness addressed in the way of identifying the baseline?	2	DR	Yes. Conservativeness addressed in the way of identifying the baseline.	☑	☑
B.2.4. Has the baseline been established on a project-specific basis?	1,2	DR	The baseline has been established on a project-specific basis.	☑	☑
B.2.5. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	1,2	DR, I	The baseline scenario does sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations.	☑	☑
B.2.6. Is the baseline determination compatible with the available data?	1,2,3, 4,5,6, 7,8,9, 10,17,	DR,I	Yes.	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
	18				
B.2.7. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	1,2, 3,4,5 ,6,7, 8,9,1 0,17, 18	DR	Yes, the selected baseline – continuation of current practice - represents the most likely scenario.	☑	☑
B.2.8. Does the PDD follow the approach for identifying the baseline scenario as given by the approved methodology?	2	DR	Yes.	☑	☑
B.2.9. Is all literature and sources clearly referenced?	2,19	DR	Partially. **Clarification Request No. 6:** Exact sources of data for power consumption of the biogas compressor must be included in the PDD. Retraceable data source for NCV methane should also be included in the PDD**.**	**CR 6**	☑
B.3. Additionality					
B.3.1. Is the discussion of how emission reductions are achieved by the project scenario in comparison to the identified baseline scenario provided in a transparent manner?	1,2, 17,18, 19,20, 23,24	DR	Partially. According to a recent decision of the EB, it is required that project proponents concentrate on the main barrier(s) and remove barriers without strong documentary evidence from the PDD.	**CR 7, CR 8**	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			The barriers listed in the PDD either need to be enhanced and supported with additional documentary evidence or removed. **Clarification Request No. 7** Barriers described in the PDD needs to be supported with authentic and retraceable documentary evidence. **Clarification Request No. 8:** For the measure I it should be clearly evidenced that there would have been no technical limitations (capacity, lifetime of compressors) in the continuation of pre-project setup.		
B.3.2. In case of using calculation models in order to demonstrate emission reductions: Are all formulae and input data based on provable records?	1,2,3,4,5,6,7,8,9,10,17,18	DR,I	Yes. Relevant input data are based on operational data that has been recorded.	☑	☑
B.3.3. Does the PDD clearly demonstrate the additionality using the approach as given by the methodology?	2,17,18,19	DR	Yes. Additionality is demonstrated via barrier analysis.	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
B.3.4. In case of using the additionality tool: Are all steps followed in a transparent and provable manner?	2,17, 18	DR	Not applicable as project is small scale project.	☑	☑
B.3.5. Does the discussion sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	1,2	DR	Yes. For the petrochemical sector in India, energy efficiency projects as well as utilisation of biogas are not under preview of any legal act.	☑	☑
B.3.6. Does the CDM registration have any impact on the implementation of the project?	1,2, 9,10	DR	The CDM registration plays a key role for the project. The benefit of CDM has been considered during the approval of the project from the top management.	☑	☑
B.3.7. Is the approach for demonstrating additionality provided by the most recent (or still applicable) methodology correctly applied?	2,17, 18	DR	Yes.	☑	☑
B.3.8. Are other proofs than anecdotal evidence for all assumptions and statements used by the additionality discussion?	2,19	DR	Partially. See B.3.1.	☑	☑
B.4. Project Boundary					
B.4.1. Are all emission related to the baseline scenario clearly identified and described in a complete manner?	1,2, 3,4,5, 6,7,8, 9,10, 17,18, 19	DR,I	**Clarification Request No. 9** Considering the given information on site (see B.2.1. also) the project boundary has to be rechecked in the PDD. For the measure II, It should include the biogas recovery unit as well as all the heaters in the PX plant in the project boundary.	**CR 9 CR 10**	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			Please revise the project boundary diagram in the PDD accordingly.		
B.4.2. In case of grid connected electricity projects: Is the relevant grid correctly identified due to the EB guidance and the underlying methodology?	1,2, 19	DR, I	Not relevant.	☑	☑
B.4.3. Are all emission related to the project scenario clearly identified and described in a complete manner?	1,2, 19	DR, I	Yes.	☑	☑
B.4.4. Are all emission related to leakage clearly identified and described in a complete manner?	1,2	DR,I	Yes. No emission related to leakage is in the project.	☑	☑
B.5. Detailed Baseline Information					
B.5.1. Is there any indication of a date when determine the baseline?	2,19	DR	Yes. This is indicated as July 1, 2006 in the first version of the PDD and has been revised to the 15/01/2007.	☑	☑
B.5.2. Is this in consistency with the time line of the PDD history?	1,2	DR, I	Yes. It is consistent with time line of the PDD history.	☑	☑
B.5.3. Is all data required provided in a complete manner by annex 3 of the PDD?	2	DR	Yes. All data required provided in a complete manner.	☑	☑
B.5.4. Is all data given in compliance with the methodology?	2,17, 18	DR	Yes. All data is in compliance with the methodology.	☑	☑
B.5.5. Is all data evidence by official data sources or replicable records?	1,2	DR,I	Yes mainly all data is evidenced correctly by official data sources or replicable records. See B 2.1. and B.2.9.	☑	☑
B.5.6. Is the vintage of the baseline data correct?	2	DR	Yes, most current data has been used. But	☑	☑

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			see B.2.1. and B.2.9.		
***C.* Duration of the Project / Crediting Period**					
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	1,2, 19	DR, I	The project's starting date and operational lifetime are clearly defined. **Clarification Request No. 10** Which one is the project starting date – approval or commission date? In addition please justify why CDM registration process has not been initiated until 2006, although decision of investment was taken in August 2003 (measure II) and January 2004 (measure I) and CDM is claimed to be important for project implementation.	**CR 10**	☑
C.1.2. Is the assumed crediting time clearly defined and reasonable (renewable crediting period of max 7 years with potential for 2 renewals or fixed crediting period of max. 10 years)?	2,19	DR	Yes. The crediting period is clearly defined with 10 years.	☑	☑
D. Monitoring Plan					
D.1. Monitoring Methodology					
D.1.1. Is the monitoring methodology previously approved by the CDM Methodology Panel?	2,17, 18	DR	Yes. The monitoring methodology II.D. (Version 07) "Energy efficiency and fuel switching measures for industrial facilities" have been approved together with the simplified baseline methodology on November 28,	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			2005.		
D.1.2. Is the choice of the methodology correctly justified by the PDD?	2,17, 18	DR	Yes. The choice of the methodology is correctly justified by the PDD.	☑	☑
D.1.3. Is the project in conformance with all applicability criteria of the applied methodology?	2,17, 18	DR	The project is in conformance with all applicability criteria of the applied methodology.	☑	☑
D.1.4. Does the monitoring methodology provide a consistent approach in the context of all parameter to be monitored and further information provided by the PDD?	2,3,4, 5,6,7, 8,9,10 ,17,18	DR	Yes.	☑	☑
D.1.5. Does the monitoring methodology apply consistently the choice of the option selected for monitoring both of project and baseline emissions?	2,17, 18	DR	Yes.	☑	☑
D.2. Monitoring of Project Emissions (if applied)					
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?	1,2, 17,18, 19,21, 22	DR, I	All relevant data necessary for estimation or measuring the GHG emissions within the project boundary are summarized in Table D.3. **Clarification Request No. 11** Power consumption of the biogas compressor must be metered. At present no monitoring system is evidenced at site. **Clarification Request No. 12** Methane content in the biogas must be monitored from the combined gas flow from	**CR 11** **CR 12** **CR 13**	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			the line of storage tank to the compressor not from the individual reactor (same is the present practice). Please also check the frequency of the monitoring frequency of this parameter. As per table D3, it needs to be done daily. But presently it is been done twice in month. **<u>Clarification Request No. 13</u>** Naptha consumption in HRSG is not being monitored. Naptha consumption is monitored in GT only. Please clarify and revise PDD accordingly.		
D.2.2. Are the choices of project GHG indicators reasonable and in conformance with the requirements set by the approved methodology applied?	1, 2, 17,18	DR,I	Yes. The choices of project GHG indicators are reasonable and in conformance with the requirements set by the approved methodology. See D 2.1.	☑	☑
D.2.3. Will it be possible to determine the specified project GHG indicators?	1, 2, 17,18	DR,I	Yes. The necessary monitoring data and its accuracy will be guaranteed.	☑	☑
D.2.4. Will the indicators enable comparison of project data and performance over time?	1, 2, 17,18	DR,I	Yes. The indicators will enable comparison of project data and performance over time.	☑	☑
D.2.5. Is the information given for each monitoring variable by the presented table sufficient to ensure the verification of a proper implementation	1, 2, 17,18	DR,I	Yes. The information is sufficient to ensure the verification of a proper implementation of the monitoring plan.	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
of the monitoring plan?			However, additional information needs to be included in the monitoring plan. See D.2.1.		
D.2.6. Is the information given for each monitoring variable by the presented table sufficient to ensure the delivery of high quality data free of potential for biases or intended or unintended changes in data records?	1, 2, 17,18	DR,I	The given information is sufficient to ensure the delivery of high quality data free of potential for biases or intended or unintended changes in data records.	☑	☑
D.2.7. Is the monitoring approach in line with current good practice, i.e. will it deliver data in a reliable and reasonably acceptable accuracy?	1, 2, 13, 17, 18, 19	DR,I	Yes. The monitoring approach is in line with current good practice. It is expected to deliver reliable data. Main parameters will be measured with on-line DCS (Distributed Control System). The accuracy level of all the instruments is within maximum of 2% of full range. Reasonable calibration procedures have been defined. A separate manual is detailing the GHG management system.	☑	☑
D.2.8. Are all formulae used to determine project emission clearly indicated and in compliance with the monitoring methodology.	1, 2, 17,18	DR,I	All formulae used to determine baseline emissions are clearly indicated.	☑	☑
D.3. Monitoring of Baseline Emissions (if applied)					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas	1, 2, 17,18	DR,I	All relevant data necessary for estimation or measuring the GHG emissions within the project boundary are summarized in Table	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
emissions of the baseline emissions during the crediting period?			D.3 of the PDD.		
D.3.2. Are the choices of project GHG indicators reasonable and in conformance with the requirements set by the approved methodology applied?	1, 2, 17,18	DR,I	Yes. The choices of project GHG indicators are reasonable and in conformance with the requirements set by the approved methodology.	☑	☑
D.3.3. Will it be possible to determine the specified project GHG indicators?	1, 2, 17,18	DR,I	Yes. The necessary monitoring data and its accuracy will be guaranteed.	☑	☑
D.3.4. Is the information given for each monitoring variable by the presented table sufficient to ensure the verification of a proper implementation of the monitoring plan?	1, 2, 17,18	DR,I	Yes. The information is sufficient to ensure the verification of a proper implementation of the monitoring plan. See D.2.1.	☑	☑
D.3.5. Is the information given for each monitoring variable by the presented table sufficient to ensure the delivery of high quality data free of potential for biases or intended or unintended changes in data records?	1, 2, 17,18	DR,I	The given information is sufficient to ensure the delivery of high quality data free of potential for biases or intended or unintended changes in data records. See D.2.1.	☑	☑
D.3.6. Is the monitoring approach in line with current good practice, i.e. will it deliver data in a reliable and reasonably acceptable accuracy?	1, 2, 17,18	DR,I	Yes. The monitoring approach is in line with current good practice. See D.2.7.	☑	☑
D.3.7. Are all formulae used to determine baseline emission clearly indicated and in compliance with the monitoring methodology.	1, 2, 17,18	DR,I	All formula used to determine baseline emission clearly indicated and in compliance with monitoring methodology.	☑	☑

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
D.4. Direct Monitoring of Emission Reductions (if applied)					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring directly the greenhouse gas emissions reductions during the crediting period?	1, 2, 17,18	I,DR	Not applicable.	☑	☑
1.1.1 Are the choices of project GHG indicators reasonable and in conformance with the requirements set by the approved methodology applied?	1, 2, 17,18	DR,I	See D.4.1.	☑	☑
D.4.2. Will it be possible to determine the specified project GHG indicators?	1, 2, 17,18	DR,I	See D.4.1	☑	☑
D.4.3. Is the information given for each monitoring variable by the presented table sufficient to ensure the verification of a proper implementation of the monitoring plan?	1, 2, 17,18	DR,I	See D.4.1.	☑	☑
D.4.4. Is the information given for each monitoring variable by the presented table sufficient to ensure the delivery of high quality data free of potential for biases or intended or unintended changes in data records?	1, 2, 17,18	DR,I	See D.4.1	☑	☑
D.4.5. Is the monitoring approach in line with current good practice, i.e. will it deliver data in a reliable and reasonably acceptable accuracy?	1, 2, 17,18	DR,I	See D.4.1.	☑	☑
D.4.6. Are all formulae used to determine project	1, 2,	DR	See D.4.1	☑	☑

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
emission reductions clearly indicated and in compliance with the monitoring methodology.	17,18				
D.5. Monitoring of Leakage (if applicable)					
D.5.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring of leakage emissions during the crediting period?	1, 2, 17,18	DR,I	There is no leakage within the project activity.	☑	☑
1.1.2 Are the choices of project GHG indicators reasonable and in conformance with the requirements set by the approved methodology applied?	1, 2, 17,18	DR,I	see D.5.1.	☑	☑
D.5.2. Will it be possible to determine the specified project GHG indicators?	1, 2, 17,18	DR,I	See D.5.1.	☑	☑
D.5.3. Is the information given for each monitoring variable by the presented table sufficient to ensure the verification of a proper implementation of the monitoring plan?	1, 2, 17,18	DR,I	See D.5.1.	☑	☑
D.5.4. Is the information given for each monitoring variable by the presented table sufficient to ensure the delivery of high quality data free of potential for biases or intended or unintended changes in data records?	1, 2, 17,18	DR,I	See D.5.1.	☑	☑
D.5.5. Is the monitoring approach in line with current good practice, i.e. will it deliver data in a reliable and reasonably acceptable accuracy?	1, 2, 17,18	DR,I	See D.5.1.	☑	☑
D.5.6. Are all formulae used to determine leakage	1, 2,	DR,I	See D.5.1.	☑	☑

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
emissions clearly indicated and in compliance with the monitoring methodology.	17,18				
D.6. Determination of Emission Reductions					
D.6.1. Are all formulae used to determine emission reductions clearly indicated and in compliance with the monitoring methodology..	1, 2, 17,18	DR,I	Yes. The formulae used are adequate to determine emission reductions in a proper manner.	☑	☑
D.6.2. Is the information given for each calculated variable sufficient to ensure the delivery of high quality data free of potential for biases or intended or unintended changes in data records?	1, 2, 17,18	DR,I	Yes.	☑	☑
D.7. Quality Control (QC) and Quality Assurance (QA) Procedures					
D.7.1. Is the selection of data undergoing quality control and quality assurance procedures complete?	1, 2, 13,17, 18,19	DR	A detailed monitoring plan including procedures referring to the parameters, calibration, maintenance, responsibilities and QC/QA aspects is available in GHG management manual which is part of ISO 9001 documentation.	☑	☑
D.7.2. Is the belonging determination of uncertainty levels done correctly for each ID in a correct and reliable manner?	2,13, 19	DR	Yes.	☑	☑
D.7.3. Are quality control procedures and quality assurance procedures sufficiently described to ensure the delivery of high quality data?	2,13	DR	The control procedures and quality assurance procedures are sufficiently described.	☑	☑
D.7.4. Is it ensured that data will be bound to national or internal reference standards?	2,13	DR	Yes. That data will be bound to national reference standards.	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
D.7.5. Is it ensured that data provisions will be free of potential conflicts of interests resulting in a tendency of overestimating emission reductions?	1, 13	DR, I	As main data are operation parameters it is expected that data provisions are free of potential conflict of interest.	☑	☑
D.8. Operational and management structure					
D.8.1. Is the authority and responsibility of project management clearly described?	1,2, 13	DR,I	The authority and responsibility of project management is clearly described.	☑	☑
D.8.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	1,2, 13	DR,I	The authority and responsibility for registration, monitoring, measurement and reporting is clearly mentioned in the GHG manual.	☑	☑
D.8.3. Are procedures identified for training of monitoring personnel?	1,2, 13	DR,I	Yes. GHG manual clearly indicates the procedures of training with responsibility for all personnel involved in the CDM activity.	☑	☑
D.8.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	1,2, 13	DR,I	A procedure for emergency preparedness is defined in the GHG manual.	☑	☑
D.9. Monitoring Plan (Annex 4)					
D.9.1. Is the monitoring plan developed in a project specific manner clearly addressing the unique features of the CDM activity?	2	DR	A separate monitoring plan in Annex 4 is not required as it is a small scale project.	☑	☑
D.9.2. Does the monitoring plan completely describes all measures to be implemented for monitoring all parameter required?	2	DR	See D.9.1.	☑	☑
D.9.3. Does the monitoring plan completely describes all measures to be implemented for ensuring	2	DR	See D.9.1.	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
data quality of all parameter to be monitored?					
D.9.4. Does the monitoring plan provide information on monitoring equipment and respective positioning in order to safeguard a proper installation?	2	DR	See D.9.1.	☑	☑
D.9.5. Are procedures identified for calibration of monitoring equipment?	1, 2,13	DR,I	Yes. These are defined in the GHG management system procedure: RIL/CDM/MS/PDD/0607/005	☑	☑
D.9.6. Are procedures identified for maintenance of monitoring equipment and installations?	2,13	DR	Yes, these are identified in the GHG management system procedure: RIL/CDM/MS/PDD/0607/005	☑	☑
D.9.7. Are procedures identified for monitoring, measurements and reporting?	2,13	DR	Yes, these are identified in the GHG procedure mentioned above.	☑	☑
D.9.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	2,13	DR	Yes, these are identified in the GHG management procedure.	☑	☑
D.9.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	2,13	DR	Yes, see D.9.5.	☑	☑
D.9.10. Does the monitoring plan provide procedures identified for troubleshooting allowing redundant reconstruction of data in case of monitoring problems?	2,13	DR	Yes, see D.9.5.	☑	☑
D.9.11. Are procedures identified for review of reported results/data?	2,13	DR	Yes, see D.9.5.	☑	☑
D.9.12. Are procedures identified for internal audits of	2,13	DR	Yes. The same has been addressed in	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
GHG project compliance with operational requirements where applicable?			GHG Emission Reduction management System which is linked with ISO system.		
D.9.13. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	2,13	DR	Yes. The same has been addressed in GHG Emission Reduction management System which is linked with ISO system.	☑	☑
D.9.14. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	2,13	DR	Yes. The same has been addressed in GHG Emission Reduction management System which is linked with ISO system.	☑	☑
E. Calculation of GHG Emissions by Source					
E.1. Predicted Project GHG Emissions					
E.1.1. Are all aspects related to direct and indirect GHG emissions captured in the project design?	2,19	DR	Yes. All the aspects related to direct and indirect GHG emissions captured in the project design.	☑	☑
E.1.2. Are the GHG calculations documented in a complete and transparent manner?	2,19	DR	No. The GHG calculations in the PDD are not documented in a complete and transparent manner. See B.1.3.	**CR 3**	☑
E.1.3. Have conservative assumptions been used to calculate project GHG emissions?	2	DR	See E.1.2.	**CR 3**	☑
E.1.4. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	1,2	DR,I	Yes, all possibilities have been considered.	☑	☑
E.1.5. Is the projection based on same procedures as used for later monitoring or acceptable alterna-	2,17, 18,19	DR	The estimation of emission reductions is based on historic values. The actual energy	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
tive models?			savings will be based on monitored values.		
E.1.6. Is the projection based on provable input parameter?	2,17, 18,19	DR	Yes.	☑	☑
E.2. Leakage					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	1,2,17,18	DR,I	Not relevant. See D 5.1	☑	☑
E.2.2. Have these leakage effects been properly accounted for in calculations?	1,2,17,18	DR,I	See E.2.1.	☑	☑
E.2.3. Have conservative assumptions been used to calculate leakage emissions?	1,2,17,18	DR,I	See E.2.1.	☑	☑
E.2.4. Are uncertainties in the leakage estimates properly addressed in the documentation?	1,2,17,18	DR,I	See E.2.1.	☑	☑
E.2.5. Is the projection based on same procedures as used for later monitoring or acceptable alternative models?	1,2,17,18	DR,I	See E.2.1.	☑	☑
E.2.6. Is the projection based on provable input parameter?	1,2,17,18	DR,I	See E.2.1.	☑	☑
E.3. Baseline Emissions					
E.3.1. Have the most relevant and likely operational characteristics and baseline indicators been chosen as reference for baseline emissions?	2,19	DR	Yes. All aspects related to direct and indirect GHG emissions are captured in the project design.	☑	☑
E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for	1,2,	DR,I	Yes.	☑	☑

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
baseline emissions?	19		See B 4.1		
E.3.3. Are the GHG calculations documented in a complete and transparent manner?	1,2, 19, 21	DR,I	GHG calculations are documented in a complete and transparent manner. See B.2.1.	☑	☑
E.3.4. Have conservative assumptions been used when calculating baseline emissions?	2	DR	Yes. Conservative assumptions been used when calculating baseline emissions.	☑	☑
E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the documentation?	1,2,13	DR,I	Yes. All the possibilities have been considered.	☑	☑
E.3.6. Is the projection based on same procedures as used for later monitoring or acceptable alternative models?	1,2,13	DR,I	Yes.	☑	☑
E.3.7. Is the projection based on provable input parameter?	1,2	DR,I	Yes.	☑	☑
E.4. Emission Reductions					
E.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	2	DR	Yes. The project will result in fewer GHG emissions than the baseline scenario.	☑	☑
E.4.2. Is the form/table required for the indication of projected emission reductions correctly applied?	2	DR	The form required for the indication of projected emission reductions is correctly applied.	☑	☑
E.4.3. Is the projection in line with the envisioned time schedule for the project's implementation and the indicated crediting period?	1, 2	DR,I	Yes. The project has started operation in line with the envisioned time schedule.	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
F. Environmental Impacts					
F.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	1, 2	DR,I	Yes. Environmental impacts of the project have been discussed.	☑	☑
F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	1, 2	DR,I	There is no need for an EIA for this kind of project as per the regulations of Government of India.	☑	☑
F.1.3. Will the project create any adverse environmental effects?	1,2, 11,12	DR,I	No. The project will not create any adverse environmental effects.	☑	☑
F.1.4. Are transboundary environmental impacts considered in the analysis?	1, 2	DR,I	There are no transboundary environmental impacts.	☑	☑
F.1.5. Have identified environmental impacts been addressed in the project design?	1,2, 11,12	DR,I	Identified environmental impacts have been addressed in the project design.	☑	☑
F.1.6. Does the project comply with environmental legislation in the host country?	1,2, 11,12	DR,I	Yes, project complies with relevant environmental legislation in the host country. Relevant valid consent for air and water is available and was verified by the audit team.	☑	☑
G. Stakeholder Comments					
G.1.1. Have relevant stakeholders been consulted?	1,2, 14,15	DR,I	Employees, technicians, and contract supervisor as well as equipment suppliers and external manpower operating the plant has been consulted. This is deemed appropriate in view of the nature of the project.	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	1, 2, 14,15	DR,I	A field survey questionnaire was sent to local stakeholders.	☑	☑
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, 2, 14,15	DR,I	A stakeholder consultation process is not required by the Government of India for such kind of project.	☑	☑
G.1.4. Is the undertaken stakeholder process described in a complete and transparent manner?	2	DR	See G 1.1.	☑	☑
G.1.5. Is a summary of the stakeholder comments received provided?	1, 2, 14,15	DR,I	**Clarification Request No. 14:** Stakeholder comments have been collected by field survey questionnaire. However, the PDD does not summarize the comments received in detail. Please revise accordingly**.**	**CR 14**	☑
G.1.6. Has due account been taken of any stakeholder comments received?	1,2	DR,I	As only neutral or positive comments have been received, no action was required.	☑	☑

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to check-list question in tables 1 and 2	Summary of project owner response	Validation team conclusion
Outstanding Issue Before submitting the project for registration the project owner has to provide an eligible Letter of Approval from involved Parties.	Table 1		
Outstanding Issue The letter on Modalities of Communication must be submitted before submitting a request for registration.	Table 1		
Clarification Request No 1 Please provide a detailed and clear schematic diagram of equipment involved in the measure 1.	A.4.5.	A scheme is provided in A 4.2 of the revised PDD. In addition the scheme for Measure II has been revised to include the blower, a small drive before the compressor.	☑ Both schemes clearly present the equipments involved in the respective measures.
Clarification Request No. 2 Please include information on the version number and date of the methodology applied.	B.1.3.	Included in revised PDD.	☑ The PDD applies version number 7 of 28. November 2005.
Clarification Request No. 3 The combined energy savings of the entire project activity is below 15 GWhe or 45 GWhth. Please submit the supporting calcu-	B.1.3.	The excel sheet for calculation of combined energy saving is attached herewith. The period for calculations is 22.09.05 – 21.09.06 to cover one complete year.	☑

Draft report clarifications and corrective action requests by validation team	Ref. to check-list question in tables 1 and 2	Summary of project owner response	Validation team conclusion
lation in excel form.			
Clarification Request No. 4: The time period which has been considered for calculation of energy baseline in section B2 in the PDD needs to be clarified in the PDD (for example, average LP air generation, average power consumption).	B.2.1.	The time period is considered to be Sep'2003-August'04 i.e. one year before the implementation of project activity. The same is written in the revised PDD.	☑ One year time period seems appropriate to determine energy baseline. New compressor within measure 1 has been commissioned in November 2004, thus September 2003 to August 2004 is deemed appropriate, too.
Clarification Request No. 5: The table in section B2 for the measure II considers the methane content of the biogas as 68%. But the same can not be verified as true figure during the site audit. Please clarify and use the actual calculated average value in the PDD.	B.2.1.	Actual methane content of 70.96 % is considered in revised PDD.	☑ PDD has been revised accordingly.
Clarification Request No. 6 Exact sources of data for power consumption of the biogas compressor must be included in the PDD. Retraceable data source for NCV methane should also be included in the PDD**.**	B.2.9.	Power consumption of biogas was calculated through proportional allocation of design motor power as per biogas flow. The same is now changed and power will be monitored monthly by portable powermeter, which will be calibrated regularly. The power consumption of the compressor and blower is actually negligible (2-3%) as compared	☑ Metering of power consumption seems appropriate. The value for NCV of methane 50 MJ/kg is considered conservative, it is slightly lower than IPCC

Draft report clarifications and corrective action requests by validation team	Ref. to check-list question in tables 1 and 2	Summary of project owner response	Validation team conclusion
		to reduction in energy consumption. The motor ratings of these two drives are 30 and 7 kW respectively. Even if full load power of these drives is considered, it is 0.888 MWh/day which is equivalent to emission of 0.76 t CO_2/day. Hence measurement of power consumption of these two drives on monthly basis will serve the purpose. Otherwise, maximum drive power could be taken as conservative approach, however, the methodology demands measurement of energy consumption of project, so it is included in monitoring. Source of NCV is a report from Department of Energy, US. The same is mentioned in section D.3 of revised PDD.	data for biogas.
According to a recent decision of the EB, it is required that project proponents concentrate on the main barrier(s) and remove barriers without strong documentary evidence from the PDD. The barriers listed in the PDD either need to be enhanced and supported with additional documentary evidence or removed.	B.3.1	Only technological barriers are now explained in the PDD after removing other minor barriers. Evidences have been submitted. Measure 1: The technology used in this VSD screw compressor was very recent when the project was implemented. From the documents available from M/s Atlas Copco, the machines were developed in Year 2002 and are modified in steps to obtain maximum efficiency. It is normal practice to visit similar installations before purchasing anything	☑ Measure 1: It has been evidenced that the compressor technology applied was the first of its kind in the sector. Additional barriers are related to increased monitoring requirements and generally an increased risk of process disturbances

Draft report clarifications and corrective action requests by validation team	Ref. to check-list question in tables 1 and 2	Summary of project owner response	Validation team conclusion
Clarification Request No. 7 Barriers described in the PDD needs to be supported with authentic and retraceable documentary evidence.		new. When supplier was asked to arrange such visit, we were not offered any installation of such machine in India. It was told that there was no other installation in India. Measure 2: The heater where biogas is used plays a crucial role in PX Xyfrac section. Any failure in this heater results directly into production loss. No other heater can serve the purpose of this heater. Each one of the heaters is used to maintain the temperature of different process streams in various units of PX plant. The temperature of these streams play critical role in operation of each unit. Risk of production loss in PX plant due to fluctuation in biogas quantity and composition is a very important and significant barrier for a manufacturer for whom production is more important than energy consumption.	when changing well proven processes. Measure 2: A copy of the communication with the burner designer has been provided evidencing the difficulties about using biogas in the existing burner.
Clarification Request No. 8: For the measure I it should be clearly evidenced that there would have been no technical limitations (capacity, lifetime of compressors) in the continuation of pre-project	B.3.1.	Specification sheets for all the LP air compressors have been submitted. It could be seen that the total installed capacity of the compressors (73.704 Nm3/hr) is much higher than LP air demand of 45.000-50.000 Nm3/hr. Hence the project is not for capacity enhancement but for energy effi-	☑

Draft report clarifications and corrective action requests by validation team	Ref. to check-list question in tables 1 and 2	Summary of project owner response	Validation team conclusion
setup.		ciency in the air generation system. Existing compressors are running fine and there is no major increase in maintenance cost till date. The age of these compressors is more than 25 years if maintained properly and will last for much more years with major overhauls. A supporting email correspondence from the compressor supplier on this issue has been submitted. Thus the age of the existing compressors was not a constraint and the project proponent has installed the new VSD compressor only to cater to the variable air demand. If it would have been for replacement of existing compressors, project proponent could have installed much higher capacity machines to replace more number of machines with a single one with optimum efficiency and lower maintenance.	
Clarification Request No. 9 Considering the given information on site (see B.2.1. also) the project boundary has to be rechecked in the PDD. For the measure II, it should include the biogas recovery unit as well as all the heaters in the PX plant in the project boundary. Please	B.4.1.	The project boundary is revised so as to include biogas recovery unit and all process heaters in PX plant. The biogas is utilised in a single heater in PX plant, however all heaters in the PX plant are considered within project boundary because the fuel gas displaced from the said heater may be utilised in any other heaters. The excess gas used in other heater will reduce fuel oil consump-	☑

Draft report clarifications and corrective action requests by validation team	Ref. to check-list question in tables 1 and 2	Summary of project owner response	Validation team conclusion
revise the project boundary diagram in the PDD accordingly.		tion in those heaters.	
Clarification Request No. 10 Which one is the project starting date – approval or commissioning date? In addition please justify why CDM registration process has not been initiated until 2006, although decision of investment was taken in August 2003 (measure II) and January 2004 (measure I) and CDM is claimed to be important for project implementation.	C.1.1.	Date of approval of project may be considered as start date because that is one of the major activity in the project. Though RIL was aware of CDM concept and assistance for the project it may get through the same, there was not much of clarity on the procedures and documentation required for application. The actual CDM potentiality of these projects was being discussed with experts in this area. RIL could gain some clarity on the subject after a workshop conducted by CDM-India for RIL engineers (Oct'04) and real activity on application to UNFCCC started. Due to the deadline of 31.12.05 for retroactive projects, we experienced that DOEs were short of manpower to accept our projects. RIL had several projects to be developed. We have developed four new methodologies. We have completed documentation for bigger, major projects on priority followed by small scale projects. As you are aware, the documentation required for	☑

Draft report clarifications and corrective action requests by validation team	Ref. to check-list question in tables 1 and 2	Summary of project owner response	Validation team conclusion
		application is huge, time consuming because many guidelines / methodologies are being revised at UNFCCC end from time to time. We understand that it is a fact that many projects all over world are delayed due to lack of procedural clarity and system delays. You may note that we started documentation for this project in the month of March'06. It took 10 months to receive draft validation protocol.	
Clarification Request No. 11 Power consumption of the biogas compressor must be metered. At present no monitoring system is evidenced at site.	D.2.1.	As required by the methodology, power consumption will be monitored. As explained in CR No. 6, power consumption will be monitored monthly by portable powermeter, which will be calibrated regularly The portable power-meter reads the power consumption as kW. Thus the power will be measured as kWh per hour once a month and the same value will be considered for daily emission reduction calculation for whole of that month. There is one small blower in the biogas recovery unit. The power consumption of the same will also be monitored similarly.	☑ In case power consumption is varying substantially platename capacity will be available for conservative estimation. See also CR 6.
Clarification Request No. 12 Methane content in the biogas must be moni-	D.2.1	New sample of combined gas from gas holder is started and methane content of the same will be	☑

Draft report clarifications and corrective action requests by validation team	Ref. to check-list question in tables 1 and 2	Summary of project owner response	Validation team conclusion
tored from the combined gas flow from the line of storage talk to the compressor not from the individual reactor (same is the present practice). Please also check the frequency of the monitoring of this parameter. As per table D3, it needs to be done daily. But presently it is been done twice in month.		monitored. The monitoring frequency is changed to daily.	
Clarification Request No. 13: Naptha consumption in HRSG is not being monitored. Naptha consumption is monitored in GT only. Please clarify and revise PDD accordingly.	D.2.1.	Table D.3. is revised to include fuel consumption in HRSGs. The fuel consumed in gas turbines will be allocated in HRSGs and supplementary fuel firing will be monitored directly.	☑
Clarification Request No. 14: Stakeholder comments have been collected by field survey questionnaire. However, the PDD does not summarize the comments received in detail. Please revise accordingly.	G.1.5.	Stakeholders' comments are elaborated in the revised PDD. There are no negative comment and hence no action is required by the project proponent.	☑

Industrie Service

Annex 2: Information Reference List

Reference No.	Document or Type of Information
1.	On-site interviews at the project site of the “Demand Side energy efficiency projects at RIL-PG” by auditing team of TÜV SÜD, performed on October 13 and 14, 2006: Validation team on site: Bratin Roy — TUV South Asia TÜV SÜD Group Interviewed persons: Mr. B.K.Jindel — HOD, Utilities Mr. Naveen Dave — GM, Utilities Mr. A.P.Mitra — GM, CTS Mr Shashank Goel — GM, CTS Ms Gauri Bholay — CDM Cell Mr Sanjay Seal — CDM Cell
2.	Project Design Document, version No. 01, dated 01.07.2006 submitted by RIL-PG July 2006.
3.	Copy of the project specification/design condition for the compressor submitted by RIL-PG October 2006.
4.	Copy of data sheet of the biogas compressor, submitted by RIL-PG October 2006.
5.	Copy of document of project performance review at RPU plant dated September 27, 2004, submitted by RIL-PG October 2006.
6.	Copy of the document of project performance review for biogas project, submitted by RIL-PG October 2006.
7.	Copy of the project schedule for the LP Screw compressor project, submitted by RIL-PG October 2006.
8.	Copy of the project schedule for the biogas project, submitted by RIL-PG October 2006.
9.	Copy of the document of the Capex approval for the LP Screw compressor project, submitted by RIL-PG October 2006.
10.	Copy of the document of the Capex approval for the Bio gas project, submitted by RIL-PG October 2006.
11.	Copy of the aspect impact document for the LP Screw compressor project, submitted by RIL-PG October 2006.
12.	Copy of the aspect impact document for the Bio gas project, submitted by RIL-PG October 2006.
13.	Copy of the GHG management procedure, submitted by RIL-PG October 2006.
14.	Copy of the local stakeholder comment for the LP Screw Compressor, submitted by RIL-PG October 2006.

Reference No.	Document or Type of Information
15.	Copy of the local stakeholder comment for the Biogas project, submitted by RIL-PG October 2006.
16.	Copy of the air and water consent from the Maharashtra Pollution Control Board, submitted by RIL-PG October 2006.
17.	Approved Consolidated Baseline Methodology II.D./Version 7
18.	UNFCCC homepage http://www.unfccc.int
19.	Revised Project Design Document, version No. 03, dated 16.01.07 submitted by RIL-PG January 2007.
20.	Training records on screw compressor, dated 18-20.10.2004, submitted by RIL-PG December 2006.
21.	Baseline and Emission reduction calculation - Excel sheet, submitted by RIL-PG December 2006
22.	Thomas, George; Sandia National Laboratories, Overview of Storage Development - DOE Hydrogen Program, presentation at US DOE Hydrogen Program 2000 Annual Review May 9-11,2000 in San Ramon, California, submitted by RIL-PG December 2006
23.	E-mail correspondance with compressor supplier, dated 30.10.06 and 2.2.07, submitted by RIL-PG December 2006 and February 2007
24.	Correspondance with burner supplier about biogas utilisation in burners, undated submitted by RIL-PG February 2007.