



VALIDATION REPORT

DEMAND SIDE ENERGY EFFICIENCY PROGRAMMES FOR SPECIFIC TECHNOLOGIES AT ITC BHADRACHALAM PULP AND PAPER MAKING FACILITY IN INDIA

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DET NORSKE VERITAS



VALIDATION REPORT

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Approved by: Einar Telnes Director.	Organisational unit: DNV Certification Ltd, International Climate Change Services
Client: ITC Limited-Paperboards & Speciality Papers Division, Unit: Bhadrachalam	Client ref.: Mr. Pradeep Dhobale

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Summary:

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “Demand side energy efficiency programmes for specific technologies at ITC Bhadrachalam pulp and paper making facility in India” project on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, the simplified modalities and procedures for small-scale CDM project activities and the subsequent decisions by the CDM Executive Board. This validation report summarizes the findings of the validation.

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

In summary, it is DNV’s opinion that the project as described in the project design document version-03 of 2006-08-28, meets all relevant UNFCCC requirements for the CDM and correctly applies the approved small scale methodology AMS-II.D, version-07. Hence, DNV requests the registration of the “Demand side energy efficiency programmes for specific technologies at ITC Bhadrachalam pulp and paper making facility in India” project as a CDM project activity

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<i>Table of Content</i>	<i>Page</i>
1 INTRODUCTION.....	1
1.1 Validation Objective	1
1.2 Scope	1
1.3 Description of Proposed CDM Project	1
2 METHODOLOGY.....	2
2.1 Review of Documents	4
2.2 Follow-up Interviews	4
2.3 Resolution of Clarification and Corrective Action Requests	4
2.4 Internal Quality control	4
3 VALIDATION FINDINGS	5
3.1 Participation Requirements	5
3.2 Project Design	5
3.3 Project Baseline	6
3.4 Additionality	6
3.5 Monitoring Plan	7
3.6 Calculation of GHG Emissions	8
3.7 Environmental Impacts	9
3.8 Comments by Local Stakeholders	9
4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS	9
5 VALIDATION OPINION	12
REFERENCES	13
Appendix A Validation Protocol	
Appendix B Certificates of Competence	

***Abbreviations***

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CH ₄	Methane
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
N ₂ O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
PSPD	Paperboards and Speciality Papers Division
UNFCCC	United Nations Framework Convention on Climate Change



1 INTRODUCTION

ITC Bhadrachalam has commissioned Det Norske Veritas Certification Ltd. (DNV) to validate the “Demand side energy efficiency programmes for specific technologies at ITC Bhadrachalam pulp and paper making facility in India” project (hereafter called “the project”). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for small-scale CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation team consists of the following personnel:

Santhosh Jayaram	DNV, Colombo	Team Leader, CDM Validator
Swapan Kumar Ghosh	DNV, India	GHG Auditor
Astakala Vidyacharan	DNV, India	GHG auditor
Michael Lehmann	DNV, Oslo	Energy sector expert
C Kumaraswamy	DNV, India	Technical reviewer

1.1 Validation Objective

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

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords, the simplified modalities and procedures for small-scale CDM project activities /8/ and the relevant decisions by the CDM Executive Board. The validation team has, based on the recommendations in the Validation and Verification Manual /7/ employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

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

1.3 Description of Proposed CDM Project

ITC Paperboards and Speciality Papers Division (PSPD), Bhadrachalam unit, located at Sarapaka near Bhadrachalam town in Andhra Pradesh State, India, a part of ITC Limited, has taken voluntary initiatives to identify and implement energy efficiency programmes, primarily power conservation, at their Bhadrachalam Unit.

The measures adopted under the energy efficiency programme can be broadly classified into:



- a) Replacement of inefficient equipment (such as pumps, compressors, lamps) with energy efficient alternatives;
- b) Application of retrofit measures for various types of equipment through measures such as power factor improvement, harmonic filters and variable frequency drives.

The total anticipated energy savings due to the project is around 13.38 GWh per annum. The project is estimated to reduce on an average of 21 505 tonnes of CO_{2e} per annum.

2 METHODOLOGY

The validation consists of the following three phases:

- I a desk review of the project design and the baseline and monitoring methodology
- II follow-up interviews with project stakeholders
- III The resolution of outstanding issues and the issuance of the final validation report and opinion.

This validation report summarizes the findings of the validation.

In order to ensure transparency, a validation protocol was customised for the project, according to the Validation and Verification Manual /7/. The protocol shows in transparent manner criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

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

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

The completed validation protocol for the “Demand side energy efficiency programmes for specific technologies at ITC Bhadrachalam pulp and paper making facility in India” is enclosed in Appendix A to this report.

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

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

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



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

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

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

Figure 1 Validation protocol tables



2.1 Review of Documents

The project design document (PDD) for “Demand side energy efficiency programmes for specific technologies at ITC Bhadrachalam pulp and paper making facility in India” in its previous versions and the final version 03 dated 2006-08-28 submitted by ITC PSPD and additional background documents related to the project design, baseline determination and technological details were assessed during the validation.

2.2 Follow-up Interviews

On 23 and 24 September 2005, DNV performed interviews with project stakeholders to confirm selected information and to resolve issues identified during the document review. Representatives of ITC, Paperboards & Speciality Papers Division, and Bhadrachalam unit were interviewed. The main topics of the interviews are summarised in Table 1 Interview topics

Table 1 Interview topics

Interviewed organisation	Interview topics
ITC – PSPD, Bhadrachalam Unit	➤ Verification of baseline information and technical details of the modifications carried out under the project.
	➤ Verification of project information e.g. start date of project and expected time for completion of project.
	➤ Stakeholder consultation procedure and resolving of comments received therein.
	➤ Validation of monitoring plan, organisational capacity and preparedness to fulfil the monitoring plan.

2.3 Resolution of Clarification and Corrective Action Requests

Issues identified in DNV’s draft validation report of 2005-10-07 (rev.1) were resolved to DNV’s satisfaction during communications between ITC and DNV. To guarantee the transparency of the validation process, the concerns raised and responses given are documented in the validation protocol in Appendix A.

Since modifications to the project design were necessary to resolve DNV’s concerns, ITC limited decided to revise the PDD and resubmitted the same as version 03, dated 2006-08-28. After assessing the revised PDD, DNV issued this final validation report and opinion.

2.4 Internal Quality Control

The draft validation report including the initial validation findings underwent a technical review before being submitted to the project participants. The final validation report underwent another technical review before requesting registration of the project activity. The technical review was performed by a technical reviewer qualified in accordance with DNV’s qualification scheme for CDM validation and verification.



3 VALIDATION FINDINGS

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

The final validation findings relate to the project design as documented and described in the revised and resubmitted project design documentation version 3.

3.1 Participation Requirements

The project is proposed by ITC Paperboards and Speciality Paper Divisions (PSPD) Bhadrachalam, India and ABN AMRO Bank NV, United Kingdom. India is the Host Party and United Kingdom is the Annex I Party involved in the project. The project has received the approval of the host country India on 2006-10-28. Approval from the Department for Environment, Food and Rural Affairs, the DNA of UK, has been received on 2006-09-25. The Host Party, India, and the Annex - I country, United Kingdom, both meet requirements to participate in the CDM.

3.2 Project Design

The project involves a phase wise implementation of the following measures to reduce energy consumption in the PSPD unit of Bhadrachalam.

- Replacement of inefficient equipment with energy efficient alternatives to reduce the energy consumption, such as
 - o Replacement of twenty pumps within the unit with more efficient and correctly rated pumps
 - o Replacement of 10 reciprocating compressors (with heat of compression (HOC) air dryer) by one centrifugal compressor (with refrigerant dryer).
 - o Replacement of 3025 fluorescent tube lights (FTL) of 2x44W by 2x22W FTL fittings with electronic ballast and 100 HPMV lamps with metal halide lamps to augment energy efficiency of all light fittings.
- Application of retrofit measures for improvement of power factors, such as installation of capacitor banks, harmonic filters and variable frequency drives at identified places within the unit.

In the absence of the project the inefficient equipment and drives would have continued operation resulting in excess power consumption.

All equipment affected by the project is identified in the PDD/1/. The project is scheduled to be completed in a phased manner by June 2006. The project proponent has chosen a fixed crediting period of 10 years with the starting date of the crediting period as 2007-02-01.

DNV has not come across any diverted ODA being used for this project.



3.3 Project Baseline

The most likely baseline scenario of the project is the continuation of the existing setup with emissions due to the additional consumption of electricity and steam/coal.

The project applies the approved baseline methodology AMS II.D version-07 for small scale CDM projects. The project also uses the approved methodology AMS I D version-09 to estimate the regional grid emission factor for the project activity.

The energy baseline of the retrofitted/replaced equipment is the differential of the amount of power drawn by the equipment in the baseline scenario and the power drawn by the retrofitted/replaced equipment after implementation of the project. Thus the energy baseline is the additional amount of electricity that would have been consumed by the existing equipment in absence of the project. All the equipment replaced/retrofitted under the project is included in the project boundary. There is no equipment likely to be substituted or replaced within the crediting period. The equipment which have been disposed off due to the project have not been transferred for any other service. Records of disposal of the inefficient machines have been presented and are found to be in order

The unit consumes electricity both from coal based captive generation and imports from the grid. As the project activity is importing power from the Andhra Pradesh grid which is a part of the southern regional grid, the baseline for this project activity is the function of the generation mix of southern region grid. The selection of the southern region grid as the grid system boundary for the project activity is in line with the recent EB guidance for large countries such as India. The weighted average of the emission factor due to self generation and the grid emission factor is used to determine the emission factor for the project plant.

The energy saving measures results in a total saving of around 13.38 GWh per annum and an estimated equivalent emission reduction of around 21 505 tonnes of CO₂ per annum.

3.4 Additionality

The project additionality has been demonstrated by assessing the investment barrier, technological barrier, barriers due to prevailing practice and other barriers relevant to the project.

The project was initiated with the appointment TERI, a premier engineering and research institute in India, for conducting energy audit across the pulp and paper mills along with PSPD Bhadrachalam energy engineers. Documentary evidence in the form of report has been presented as evidence of start of project activity and is found acceptable.

Investment barrier:

The project activity involves a total investment of 61 million INR which is initiated only with the view of reduction of GHG emissions. Records pertaining to investment and purchases for the measures initiated were presented where the justification of the change indicates that energy savings and reduction in emission was the sole driver for the projects. As discussed above, TERI was engaged by ITC PSPD for conducting an audit to identify areas of possible energy savings that required additional investment and adoption of technologies not prevalent in the industry sector in 2001. This initiative has ascertained that the prime objective of a third party audit was to continually improve on energy efficiency with a target a 10% annual savings on gross CO₂ emission from the plant every year. As it is a more attractive venture to invest in modern



technologies either during the design phase of a plant or during a total revamp of the unit, this partial investment does not bring in sufficient returns to make it financially attractive.

Common practice barrier:

The barrier for common practice demonstrates that there is no law in India that mandates adoption of energy efficiency programmes. The energy conservation initiative taken by ITC limited is not a common practice in this segment of process industries. The power tariff structure of the regions being subsidised in nature makes such energy conservation drives an unattractive business proposition compared to other investment opportunities.

Technological barriers:

Most of the measures result in replacement of inefficient drives with more energy efficient drives. Under the replacement plan most of the units are replaced with a single drive in stead of a set of main and standby drives, thus increasing the risks associated with the failure of the drives. Due to the lack of redundancy, failure of the drives installed under the project activity would lead to stoppage of the entire unit operation. Being a paper production unit wherein all unit operations are interlocked, this will affect the overall productivity of the unit.

Moreover, the use of variable frequency drives would result in emission reductions only during low load periods and do not assure reductions over the entire operating hours of the unit. The initiatives on paper machine #1 retrofit, centrifugal compressor and TG2 electronic governor have required specialized external support for maintenance in case of equipment failure on account of their technological complexities. These necessitate larger lead times as compared to operating the existing equipment whose maintenance was well understood by the plant maintenance and operational personnel.

Thus, the risks due to higher lead times for maintenance on some of the key equipment and reduced productivity due to failure of the drives are deemed to be barriers for the project activity.

Others Barriers:

It is argued that the organisation faced barriers due to lack of technical know how of the CDM and lack of organisational capacity to conduct the feasibility study and carry out the equipment selection and procurement. DNV could not confirm this claim as the procurement of equipment as a part of the energy efficiency improvement initiatives is not different from that of the main process plant.

It is however sufficiently demonstrated that the investment, technological and common practice barrier is real for the project activity and prevents any widespread replication.

The above mentioned arguments thus demonstrate that the project is not a likely baseline scenario and that the emission reductions resulting from the project are additional.

3.5 Monitoring Plan

The selected monitoring methodology is in line with the monitoring methodology for project category type II D, "Energy efficiency and fuel switching measures for industrial facilities" version-07. It is justifiably demonstrated that the selected monitoring methodology is applicable for the project activity.



The methodology involves monitoring and measurement of electricity consumption by the equipment in the baseline, electricity consumed by the new installations, determination of the emission co-efficient for the electricity based on self generation and import from the grid. For drives where in the energy meters are installed after implementation of the project, the baseline energy requirement by the equipment is monitored for a period of one month prior to implementation of the project using a fluke meter. The monitoring plan provides for accounting the annual operating hours of the main drives to which the equipment is interlocked. The energy savings due to the project is calculated as the difference of the energy consumed by the baseline equipment and the project equipment. The difference of energy consumed is annualised using the annual operating hours of the main drive. For equipment and devices with variable loads metering of the actual energy use is been planned.

The specifications of the retrofitted/replaced equipment are also monitored under the project activity.

Procedures for monitoring and verification have been presented and found to be in order. The plan details the parameters, source, method of collection and method of archiving the data which is sufficiently adequate. The organisation has established a management structure for the CDM project with clear roles and responsibilities, calibration of measuring instruments and authority for necessary corrective actions

3.6 Calculation of GHG Emissions

The project essentially involves replacement and/or retrofitting of equipment/drives with energy efficient devices or drives.

The GHG emission reduction due to electricity savings measures is calculated as the difference in power consumed by the baseline equipment and the newly installed/retrofitted drive under the project activity. The baseline energy requirement of the equipment is calculated based on the monitored energy requirement of the drive and the annual operating hours of the main equipment to which the drive is interlocked. The actual energy consumed by the retrofitted/replaced equipment under the project activity is measured by energy meters. Only in the measures involving lamps, the rated power of the device replaced/ retrofitted at the baseline are considered. Thus, the saving in energy consumption is converted to tonnes of CO₂ equivalent using the emission factor for the electricity consumed in the project.

In the project activity the electricity consumed is a mix of self generation which is coal based captive power plant and grid electricity. The southern regional grid from which the plant imports power is taken as a baseline electrical grid. The grid emission factor is calculated *ex-ante* by applying the approved methodology AMS ID version-09. The grid emission factor is computed using the combined margin method comprising of simple operating margin and build margin for the southern regional grid. For the OM calculation the vintage data for the years 2002~2003, 2003~2004 and 2004~2005 is used and the OM emission factor has been evaluated to be 1051.06 t CO₂/GWh. For the build margin, the most recently installed plants that account for 20% of the electricity generation have been considered. The build margin emission factor has been evaluated to be 731.95 tCO₂/GWh. The completeness of the set of power plants as well as the correctness of the reported fuel consumption and electricity generation data has been verified. All data has been sourced from data published by the Central Electricity Authority. The emission factor for self generation is determined *ex-post* computed from the annual “gross” electricity generated and annual consumption of coal for generation depending on the grades. The emission factor for self



generation is evaluated to 1929 tCO₂/GWh. The energy baseline for the project activity is multiplied by an emission coefficient for the electricity displaced (both captive and grid power). The weighted average emission factor for the project has thus been concluded to be 1606 tCO₂/GWh, based on the proportion of captive power generated and grid power imported.

There is no leakage associated with the project as the equipment which have been disposed off due to the project have not been transferred for any other service. Records of disposal of the inefficient machines have been presented and are found to be in order.

The conservative estimate of emission reduction as a result of the project is around 21 505 tonnes of CO₂ equivalent per year over the selected 10 years crediting period

3.7 Environmental Impacts

The project being an energy efficiency improvement projects within a industrial facility, does not fall under the purview of the Environmental Impact Assessment (EIA) notification of the ministry of Environment and Forest, Government of India.

The environmental benefits of the projects energy efficiency measures are in terms of conservation of fossil fuel which is a scarce natural resource and reduction of environmental deterioration due to extraction of fossil fuel.

The aspects of the projects are evaluated under the EMS of the organisation and are found to be insignificant

3.8 Comments by Local Stakeholders

The organisation has suitably identified the relevant stakeholders for the project which include the employees, local community, suppliers and government of the host country.

The stakeholder consultation was carried out in the Bhadrachalam unit on July 13, 2005, which was well publicised in advance. The stakeholders were given an overview of the project activity and opinion invited for the project activity from all the present participants.

No adverse feedback has been received and thus no changes were necessary for the project.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The Initial PDD, version-01 was made publicly available on DNV's climate change website (www.dnv.com/certification/climatechange) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 2005-08-10 to 2005-09-08. The PDD was re-web hosted during the period 2005-11-10 to 2005-12-09 due to change in the applicable methodology.

One comment was received on 2005-12-11. The comments received (in unedited form) are given in the text box.



Comment by: [perumal, CMC Pvt Ltd, Kolkata](#)

Inserted

2005-12-11

On:

Subject: Investment analysis is debatable

Comment: Investment Barrier.

The project investment = 61 million

The consultancy charges for Energy audit 0.5 millions (high end)

The total investment = 61.5 millions

The total electricity saving = 13.383 Gwh

At an average of Rs 3.50 /unit the savings would translate into 46.84 millions

The total savings could be 46.84 millions

Hence the pay back could be = 1 years and 5 months

The pay back period of less than 1.5 years is a low risk project in terms of Investment. So I feel that the project is BAU with respect to Investment. The above calculation does not involve any ESCO concept on contrary if so applied then the companies burden on investment would be still less .

I would like to know whether the energy efficiency measures are being taken up the PP under any ESCO contract.(i.e where by the supplier supply the machinery at a nominal rate say 30% of the total cost of the equipment and the remaining he takes based on the performance and saving realized).

ITC PSPD response:

The investment on the energy efficiency measures is through internal accruals only and there is no guarantee on the performance on the new equipments from the supplier. It is the unit's responsibility to achieve the energy savings and synchronize with the process.

Further, the investment per unit of energy savings has increased by 99% from the period of 1998 – 2001, i.e. 3 years average prior to project implementation. The analysis as follows:

Conclusion		1998-01 (3 years before the project)	2002-05 (during project period)
Savings	Lac kwh	222.02	452.56
Investment	Rs. Lac	238.9	667.78
Specific Investment	Rs/kwh	1.08	1.48

Thus, Investment to save 1kwh of energy has increased from INR. 1.08 during (1998-01) to INR. 1.48 (2002-05). Resulting 99% increase in investment to save one unit of electricity consumed. This is due to the fact that with increase number of internal targets it is difficult to achieve energy savings and large investment is required to achieve higher targets. Thus the



unit seriously considered CDM incentive to overcome the additional investment that is required in the project period.

How DNV has considered the comment received in its validation:

The project additionality has been analysed by assessing the presented barriers, barriers due to prevailing practice, technological barriers, and investment barrier along with the other barriers for the project. DNV has validated the claims and it is sufficiently demonstrated that the investment and common practice barrier affect the project activity and prevents any widespread replication of the project activity. The organisation had authorized third party energy consultants such as TERI, M K Raju Consultants Pvt Ltd and Dilzer Consultants Ltd, voluntarily to identify areas of improvement and further reduce specific energy consumption in the process. The analysis as provided by ITC indicates that a cost to save 1kwh of energy has increased from INR. 1.08 during 1998-01 to INR 1.48 in 2002-05, thus making it difficult to achieve increased energy efficiency targets in the absence of CDM.

The above mentioned arguments thus demonstrate that the project is not a likely baseline scenario and that the emission reductions resulting from the project are additional



5 VALIDATION OPINION

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “Demand side energy efficiency programmes for specific technologies at ITC Bhadrachalam pulp and paper making facility in India”. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

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

The host country is India and Annex I country is United Kingdom. Both the Host Party India and the annex-01 country United Kingdom fulfil the participation criteria to participate in CDM. The DNA of India has approved the project and authorized the project participant CESC Limited. The DNA of India confirmed that the project assists in achieving sustainable development Approval from department of environment, food and rural affairs, UK has been received on 2006-09-25.

Having a net energy conservation capability of less than 15 GWh_e per annum, the project is eligible as type II small-scale CDM project activity. The project correctly applies the simplified baseline and monitoring methodology AMS-II D Version-07.

ITC PSPD has taken voluntary initiatives to identify and implement energy efficiency programmes, primarily for power conservation, at their Bhadrachalam Unit. These energy savings result in reduction of GHG emissions due to the project activity. It is demonstrated that the project 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.

The total emission reductions from the project are estimated to be on the average 21 505 tCO_{2e} per year over the selected 10 year crediting period. The emission reduction forecast has been checked and is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

In summary, it is DNV’s opinion that the project, as described in the project design document version-03 dated 2006-08-28, meets all relevant UNFCCC requirements for the CDM, is eligible as category II small-scale CDM project activity and correctly applies the approved simplified baseline and monitoring methodology AMS-II.D Version-07. Hence, DNV requests the registration of the “Demand side energy efficiency programmes for specific technologies at ITC Bhadrachalam pulp and paper making facility in India” project as CDM project activity.



REFERENCES

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

- /2/ Project design document “*Demand side energy efficiency programmes for specific technologies at ITC Bhadrachalam pulp and paper making facility in India.*” Version-01, 02 and final version -03 dated 2006-08-28.
- /3/ Approval letter from government of India, Ministry of Environment & Forests dated 2005-10-28.
- /4/ Approval letter from Department of environment, food and rural affairs, UK dated 2006-09-25.
- /5/ Plant monitoring records for baseline energy consumption of the retrofitted/replace drives.
- /6/ Capital expense budget estimates and approvals for project activities.
- /6/ Energy audit report, by TERI.

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

- /7/ International Emission Trading Association (IETA) & the World Bank’s Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>
- /8/ Appendix B of the simplified modalities and procedures for small-scale CDM project activities: *Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories*. Version 06: 30 September 2005.
- /9/ Revised 1996 IPCC guidelines for national green house gas inventories – Reference Manual (Volume 3)

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

- /10/ Mr. K. Sanjay Singh, Executive Vice President – Manufacturing, ITC – Paperboards and Speciality Papers Division (PSPD).
- /71/ Mr. A.V. Rao, Vice President, ITC – PSPD, Bhadrachalam Unit.
- /82/ Mr. H.D. Kulkarni, Dy General Manager, ITC – PSPD, Bhadrachalam Unit.
Mr. P.V. Srinivasa Rao, Manager – Technical Cell, ITC – PSPD, Bhadrachalam Unit.
Mr. N. Alagiri, Asst Manager – Energy Conservation Cell, ITC – PSPD, Bhadrachalam Unit.
Mr. V. Rajendra Prasad, Engineer – Energy Conservation Cell, ITC – PSPD, Bhadrachalam Unit.

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APPENDIX A

VALIDATION PROTOCOL FOR SMALL-SCALE CDM PROJECT ACTIVITIES

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

Requirement	Reference	Conclusion	Cross Reference/ Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art. 12.2	Annex I party has not been identified yet.	Table 2, Section E.4.1
2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof	Kyoto Protocol Art. 12.2, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	OK	Table 2, Section A.3
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art. 12.2.	OK	Table 2, Section E.4.1
4. The project shall have the written approval of voluntary participation from the designated national authority of each party involved	Kyoto Protocol Art. 12.5a, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	GAR-2	The project has received host country approval from the DNA of India and the United Kingdom.
5. The emission reductions should be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	OK	Table 2, Section E.1 to E.4
6. Reduction in GHG emissions must be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5.c, Simplified Modalities and Procedures for Small Scale CDM Project Activities §26	OK	Table 2, Section B.2.1
7. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance	Decision 17/CP.7	OK	No public funding from any Annex-I country has been received.

Requirement	Reference	Conclusion	Cross Reference/ Comment
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures § 29	OK	The Ministry of Environment and Forests (MoEF) is the DNA of India. The Department of Environment, Food and Rural Affairs is the DNA of the United Kingdom..
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities and Procedures § 30, 31b	OK	India ratified the Kyoto Protocol on 26 August 2002. UK ratified the Kyoto Protocol on 31 May 2002.
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	OK	The assigned amount for the United Kingdom. is 92% of the 1990 emission level.
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7	CDM Modalities and Procedures §31b	OK	
12. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakesh Accords and shall not be a debundled component of a larger project activity	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	OK	Table 2, Section A.1
13. The project design document shall conform with the Small Scale CDM Project Design Document format	Simplified Modalities and Procedures for Small Scale CDM Project Activities, Appendix A	OK	
14. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and uses the simplified baseline and monitoring methodology for that project category	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	OK	Table 2, Section A.1.3

Requirement	Reference	Conclusion	Cross Reference/ Comment
15. Comments by local stakeholders are invited, and a summary of these provided	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22b	OK	Table 2, Section G
16. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	OK	Table 2, Section F
17. Parties, stakeholders and UNFCCC accredited NGOs have been invited to comment on the validation requirements and comments have been made publicly available	Simplified Modalities and Procedures for Small Scale CDM Project Activities §23b,c,d	OK	The PDD was be made publicly available on www.dnv.com/certification/cli/matechange and Parties, stakeholders and NGOs will through the CDM website be invited to provide comments during the 30 day period from 2005-08-10 to 2005-09-08 and 2005-11-10 to 2005-12-09.

Table 2 Requirements Checklist

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A. Project Description The project design is assessed.					
A.1. Small scale project activity It is assess whether the project qualifies as small scale CDM project activity.					
A.1.1. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?	/2/	DR, I	The project basically involves energy saving measures implemented in different locations of the plant and the total energy savings is around 12.58 GWh per annum which is below the stipulated upper limit of 15 GWh for small scale projects. Thus the project qualifies as a small scale CDM project.		OK
A.1.2. The small scale project activity is not a debundled component of a larger project activity?	/2/	DR I	No, this project activity is not a debundled component of a larger project since the project proponent has not registered any small scale CDM activity or applied for registration another small scale CDM project activity within 1km of the respective project boundaries of these proposed projects, in the same project category and technology/measure.		OK
A.1.3. Does proposed project activity confirm to one of the project categories defined for small scale CDM project activities?	/2/	DR	The project confirms to the applicability criteria of category AMS II D of the small scale CDM activity which is basically for demand side energy efficiency measures.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A.2. Project Design Validation of project design focuses on the choice of technology and the design documentation of the project.					
A.2.1. Are the project's spatial (geographical) boundaries clearly defined?	/2/	DR	The project activity involves several individual equipment/drives which are either retrofitted or replaced with higher efficiency unit. So the project boundary has suitably defined the physical and geographical location of each of this individual equipment.		OK
A.2.2. Are the project's system (components and facilities used to mitigate GHG's) boundaries clearly defined?	/2/	DR I	<p>The systems associated with each of the equipment have been identified in the design document.</p> <p>In the enclosure #1 of the PDD, the specification given does not match with the specifications noted during the site visit. E.g. PCC pump under paper machine 3, Capacitor bank at SFT A & B, Specification of old evaporator cooling water pump. Also it is found that equipment given under SL 1 in enclosure 1 is not replaced.</p> <p>In the enclosure #1 of PDD, the specifications of the old equipment or replaced equipment was not available for verification. E.g. Name plates or other proofs of the specification of the old pumps were not available.</p> <p>During the site visit it was confirmed by the CDM project Co-ordinators that the replaced equipments will be scrapped and not transferred or sold. But the system was not found to individually trace each</p>	CAR-1	OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			unit of the equipment which is replaced. These replaced equipment units are not included in the project boundary.		
A.2.3. Does the project design engineering reflect current good practices?	/2/	DR I	Yes, the project uses technologies for replacement of inefficient equipments such as pumps, compressors, lamps as a measure of savings of electricity and for retrofit measures for various types of equipments to improve the power factors.		OK
A.2.4. Will the project result in technology transfer to the host country?	/2/	DR I	This technology is already available in India and thus no technology transfer is envisaged in the project.		OK
A.2.5. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period? Does the project make provisions for meeting training and maintenance needs?	/2/	DR I	The measures comprise of retrofits in existing equipment or replacement of drives with energy efficient drives of similar class, so extensive training is not required. The maintenance procedure under QMS is adequate for the new installations also.		OK
A.3. Contribution to Sustainable Development The project's contribution to sustainable development is assessed					
A.3.1. Will the project create other environmental or social benefits than GHG emission reductions?	/2/	DR I	The project is envisaged to contribute to the socio-economic and technological development of the region by encouraging other large facilities to go in for similar energy efficiency improvement drives and save energy and protect the environment in turn.		OK
A.3.2. Will the project create any adverse environmental or social effects?	/2/	DR	No adverse environmental and social effects are envisaged.		OK

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

Page A-6

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A.3.3. Is the project in line with sustainable development policies of the host country?	/2/	DR, I	The project has been put up for host country approval and clarification is sought regarding the status of the same	CAR-2	OK
A.3.4. Is the project in line with relevant legislation and plans in the host country?	/2/	DR, I	The project site has all necessary statutory and regulatory clearances from the concerned bodies and clearance of the project by the Indian DNA further substantiates the same.		OK
B. Project Baseline					
The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.					
B.1. Baseline Methodology					
It is assessed whether the project applies an appropriate baseline methodology.					
B.1.1. Is the selected baseline methodology in line with the baseline methodologies provided for the relevant project category?	/2/	DR	The baseline methodology selected for this project is as detailed under type II.C projects which is for demand side energy efficiency programme for specific technology and the applicability criteria is for programmes at multiple sites.		OK
B.1.2. Is the baseline methodology applicable to the project being considered?	/2/	DR	The project activity involves retrofit measures in different equipment which are unique in itself and technicalities of each drive is unique as no two drives are in the same service or connected to the same main equipment. The project category IIC holds for energy efficiency measures of specific technology being replicated in different locations and thus the baseline guideline of summation of	CL-1	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			number of similar drives times the power of individual drive times the average operating hours of the similar drives is appropriate. In the project of ITC no two drives operating hours can be computed from each other as well as each are in unique service. Clarification is sought as why the project is applicable for category IIC and not IID which is energy efficiency drive in a single industrial facility.		
B.2. Baseline Determination It is assessed whether the project activity itself is not a likely baseline scenario and whether the selected baseline represents a likely baseline scenario.					
B.2.1. Is it demonstrated that the project activity itself is not a likely baseline scenario due to the existence of one or more of the following barriers: investment barriers, technology barriers, barriers due to prevailing practice or other barriers?	/2/	DR I	<p>Barrier analysis has been conducted and the project has been evaluated with respect to investment, barrier due to prevailing practice and other barriers.</p> <p>As regards to the investment barrier, it is indicated that the large capital investment was made against low returns; no evidence is presented to substantiate the same.</p> <p>In the analysis of barrier due to prevailing practise indicates that the specific energy consumption of the unit in 2002-2003 was already below that of a modern pulp and paper making unit. But the study referred here indicates the benchmark figure is related to paper making units and ITC – PSPD, while the Bhadrachalam unit produces mainly paper boards. Hence, the reference of this study</p>	CL-2	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			<p>may not be applicable for ITC – PSPD, Bhadrachalam unit.</p> <p>The organisation has regularly been conducting energy conservation programmes. It is not clear how these projects will not come under the normal energy conservation programmes in terms of investment and quantity of energy conserved. It is also not evident that the incentive from CDM was considered in the decision to proceed with the project activity.</p> <p>The criteria of selecting the projects for bundling are not clear. Only some energy saving projects are selected and bundled. As the new and old equipment have different, specifications, it is not evident that the replacement is not a process requirement.</p>		
B.2.2. Is the application of the baseline methodology and the discussion and determination of the chosen baseline transparent and conservative?	/2/	DR	<p>The project consumes electricity both from in-house generation and from APTRANSCO (Andhra Pradesh Transmission Company) and the weighted average of the emission coefficient of both the sources has been used as reference to calculate the actual emission at the baseline.</p> <p>The fact that the year 2002-2003 has been considered the base year as the first initiative under the energy conservation programme is found to be not in line with the project starting date nor the project completion date.</p>	CL-3	OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
B.2.3. Are relevant national and/or sectoral policies and circumstances taken into account?	/2/	DR	The baseline takes into account all applicable national policies and the recent trends in the energy sector are accounted for in the calculation of the emission co-efficient.		OK
B.2.4. Is the baseline selection compatible with the available data?	/2/	DR	The baseline selection is compatible with the data available for estimation of in-house emission factor, but with regard to the emission factor of the grid, comments reserved till comments under B.2.2 are resolved.	CL-3	OK
B.2.5. Does the selected baseline represent the most likely scenario describing what would have occurred in absence of the project activity?	/2/	DR	The selected baseline is energy displaced as electricity, which is the most likely scenario.		OK
C. Duration of the Project / Crediting Period It is assessed whether the temporary boundaries of the project are clearly defined.					
C.1.1. Are the project's starting date and operational lifetime clearly defined?	/2/	DR I	The project starting date is not explicit in the PDD. It was informed during the interviews at site that the starting date was 1/11/2000, the date of installation of the very first equipments, the AC drives in place of DC drives. But The proof of the same was not provided. This is not consistent with the statement in the first page of PDD that In 2001, the management of ITC PSPD decided to launch a mill-wide energy conservation programme. The lifetime of projects implemented will be not less than 15 years.	CL-4	OK
C.1.2. Is the assumed crediting time clearly defined (renewable crediting period of	/2/	DR	A fixed crediting period of 10 years has been chosen and while it is clearly stated in the PDD that	CL-4	OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
seven years with two possible renewals or fixed crediting period of 10 years with no renewal)?		I	the starting date of crediting period as 01/09/2005, which is the date the last equipment was put on operation. Proof that the last equipment was put on operation as on 01/09/2005 not evidenced.		
D. Monitoring Plan The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed.					
D.1. Monitoring Methodology It is assessed whether the project applies an appropriate monitoring methodology.					
D.1.1. Is the selected monitoring methodology in line with the monitoring methodologies provided for the relevant project category?	/2/	DR	The monitoring methodology is in line with project category AMS II.D which is selected for the project activity.		OK
D.1.2. Is the monitoring methodology applicable to the project being considered?	/2/	DR	The project consists of replacement of /retrofits measures to reduce the power consumption and directly and indirectly reducing the emissions .It qualifies under the demand side energy efficiency programme.		OK
D.1.3. Is the application of the monitoring methodology transparent?	/2/ /82/	DR I	Data needs to be monitored and recorded for the replaced installed devices and devices meant for retrofit measures. However as per table D.3 under the column "Measured (M), Calculated (C) or estimated (E) data is shown to be estimated but in the monitoring plan it is shown as measured. The monitoring methodology is found to be inconsistent. Comments column for EGy indicates recording and	CL-5	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			monitoring actual sale of electricity to grid. Document correction required. Last 2 rows of table under D.3. indicates lignite as fuel in stead of coal. Document correction required.		
D.1.4. Will the monitoring methodology give opportunity for real measurements of achieved emission reductions?	/2/	DR	Comments reserved till comments under D.1.3 are resolved.	CL-5	OK
D.2. Monitoring of Project Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.2.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/2/	DR	There is no emission from the project activity as no additional power consumption is envisaged as a result of the project activity. Hence monitoring of project emissions is not required for the project.		OK
D.3. Monitoring of Leakage If applicable, it is assessed whether the monitoring plan provides for reliable and complete leakage data over time.					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/2/		No leakage is considered in the design document as no equipment transfer is envisaged in the project.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D.4. Monitoring of Baseline Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/2/	DR	<p>In the monitoring plan for replaced equipment and retrofits it is indicated that actual electricity consumed will be monitored periodically, but in D.3 it is not evident at what frequency this will be done. If monitored, it is not clear how the same operating conditions will be ensured.</p> <p>In E.1.2.5 of PDD, under monitoring plan it is indicated that the GWh saved will be calculated using the monitored rated capacity and operating hours. The monitoring plan is not clear as to how the total energy savings will be estimated.</p>	CL-5 CL-6	OK
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/2/	DR	Comments reserved till comments under D.4.1 are resolved.	CL-6	OK
D.4.3. Will it be possible to monitor / measure the specified baseline indicators?	/2/	DR	Comments reserved till comments under D.4.1 are resolved.	CL-6	OK
D.4.4. Will the indicators give opportunity for real measurements of baseline emissions?	/2/	DR	Comments reserved till comments under D.4.1 are resolved.	CL-6	OK
D.5. Project Management Planning It is checked that project implementation is properly prepared for and that critical arrangements are addressed.					
D.5.1. Is the authority and responsibility of project	/2/	DR	Yes, The energy cell established in the unit has the		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
management clearly described?			responsibility for project management.		
D.5.2. Is the authority and responsibility for registration monitoring measurement and reporting clearly described?	/2/	DR I	No. This is not clearly described.	CAR-3	OK
D.5.3. Are procedures identified for training of monitoring personnel?	/2/	DR I	The mechanism is mostly retrofit measures in the existing system and the competency and skill of the operating personnel are mapped under the QMS structure of the organisation. The necessary gaps are taken care of in the training need identification plan of the QMS of the organisation.		OK
D.5.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/2/	DR	No emergency scenario is envisaged in the project.		OK
D.5.5. Are procedures identified for calibration of monitoring equipment?	/1/	I	The calibration of the monitoring equipment is covered under the QMS of the organisation.		OK
D.5.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/	I	The maintenance of the equipment which is used for monitoring are adequately covered under the QMS of the organisation.		OK
D.5.7. Are procedures identified for monitoring, measurements and reporting?	/2/	DR I	No procedures evidenced for monitoring, measurements and reporting are evident	CAR-3	OK
D.5.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/2/	I	Clarification is required as to how the data will be handled and stored.	CAR-3	OK
D.5.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/2/	DR I	Clarification is required as to how the adequacy of the data collected under the monitoring plan will be ascertained and the necessary adjustments and uncertainties dealt with	CAR-3	OK

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

Page A-14

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D.5.10. Are procedures identified for internal audits of GHG project compliance with operational requirements as applicable?	/2/	DR I	Clarification is required as to how the internal audits for checking GHG project compliance be carried out.	CAR-3	OK
D.5.11. Are procedures identified for project performance reviews?	/2/	DR I	Clarification is required as to what frequency and at which forum the project performance will be reviewed.	CAR-3	OK
D.5.12. Are procedures identified for corrective actions?	/2/	DR I	Clarification is required as to how the corrective actions will be initiated and who will be responsible for the same.	CAR-3	OK
E. Calculation of GHG emission					
It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.					
E.1. Project GHG Emissions					
The validation of predicted project GHG emissions focuses on transparency and completeness of calculations.					
E.1.1. Are all aspects related to direct and indirect project emissions captured in the project design?	/2/	DR	There are no additional emissions due to the project activity.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E.2. Leakage It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed.					
E.2.1. Are leakage calculation required for the selected project category and if yes, are the relevant leakage effects assessed?	/2/	DR	The system not transparent to clearly evidence that there are no equipments transferred to another activity.	CAR-1	OK
E.2.2. Are potential leakage effects properly accounted for in the calculations (if applicable)?	/2/	DR	Comments reserved till comments under E.2.1 are resolved.	CAR-1	OK
E.2.3. Do the methodologies for calculating leakage comply with existing good practice (if applicable)?	/2/	DR	Comments reserved till comments under E.2.1 are resolved.	CAR-1	OK
E.2.4. Are the calculations documented in a complete and transparent manner and (if applicable)?	/2/	DR	Comments reserved till comments under E.2.1 are resolved.	CAR-1	OK
E.2.5. Have conservative assumptions been used (if applicable)?	/2/	DR	Comments reserved till comments under E.2.1 are resolved.	CAR-1	OK
E.2.6. Are uncertainties in the leakage estimates properly addressed (if applicable)?	/2/	DR	Comments reserved till comments under E.2.1 are resolved.	CAR-1	OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E.3. Baseline GHG Emissions The validation of predicted baseline GHG emissions focuses on transparency and completeness of calculations.					
E.3.1. Are the baseline emission boundaries clearly defined and do they sufficiently cover sources for baseline emissions?	/2/	DR	Yes, the baseline emission covers all the equipments replaced and retrofitted. Both the In-house generation of electricity and import from grid are considered for calculation of baseline emissions.		OK
E.3.2. Are all aspects related to direct and indirect baseline emissions captured in the project design?	/2/	DR	The baseline is the electricity displaced. There are no aspects related to indirect baseline emissions.		OK
E.3.3. Have all relevant greenhouse gases and sources been evaluated?	/2/	DR	Relevant greenhouse gas is only CO ₂ from electricity generation.		OK
E.3.4. Do the methodologies for calculating baseline emissions comply with existing good practice?	/2/	DR	Yes, the methodology for calculation is in line with the Type II D– simplified methodologies for small scale CDM projects.		OK
E.3.5. Are the calculations documented in a complete and transparent manner?	/2/	DR I	The calculation lacks transparency in calculation of actual power saved for equipment - refer column F in the CER calculation worksheet of Encon calculator01.xls. The calculation of emission factor in the worksheet is different from the emission factor given in E.1.2.5. It is not clear whether the emission factor calculation will be calculated on ex post monitored data for computing the emission reductions.	CL-7	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E.3.6. Have conservative assumptions been used?	/2/	DR I	The average technical distribution losses for the grid serving the locations where devices are installed are not considered in the calculations as a conservative assumption. Comments reserved till comments under E.3.5 are resolved.	CL-7	OK
E.3.7. Are uncertainties in the baseline emissions estimates properly addressed?	/2/	DR	Comments reserved till comments under E.3.5 are resolved.	CL-7	OK
E.4. Emission Reductions Validation of baseline GHG emissions will focus on methodology transparency and completeness in emission estimations.					
E.4.1. Will the project result in fewer GHG emissions than the baseline case?	/2/	DR	Since the project involves a set of measures to reduce energy consumption in the baseline scenario, it will result in energy savings of 13.38 GWh annum. The project will result in emission reductions of 21 505 t CO ₂ e per annum		OK
F. Environmental Impacts It is assessed whether environmental impacts of the project are sufficiently addressed.					
F.1.1. Does host country legislation require an analysis of the environmental impacts of the project activity?	/2/	DR, I	An EIA is not required for the project activity as it is a small developmental project in an industrial facility.		OK
F.1.2. Does the project comply with environmental legislation in the host country?	/2/	DR, I	All necessary clearances from statutory/regulatory bodies is available for the unit and is suitably taken care of in the EMS of the organisation		OK
F.1.3. Will the project create any adverse	/2/	DR,	No adverse effects are expected from the project		OK

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

Page A-18

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
environmental effects?		I	activity.		
F.1.4. Have environmental impacts been identified and addressed in the PDD?	/2/	DR	No significant environmental impacts exist for the project activity.		OK
G. Comments by Local Stakeholder Validation of the local stakeholder consultation process.					
G.1.1. Have relevant stakeholders been consulted?	/2/	DR	Yes. Employees, contractual labours, contractors, the Gram Sarpanch (village head), the Mandal Praja Parishad, the APPCB, local community and the villagers have been identified as the stakeholders and have been consulted.		OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/2/	DR	Stakeholders' comments are taken into consideration during the stakeholder consultation meeting in the project unit.		OK
G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/2/	DR	No, this is not required for this project.		OK
G.1.4. Is a summary of the comments received provided?	/2/	DR	Yes the summary of the comments has been provided as enclosure 2 of PDD.		OK
G.1.5. Has due account been taken of any comments received?	/2/	DR I	There are no adverse comments. But clarifications to some concerns are provided during the consultation meeting conducted on July 13, 2005.		OK

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Table 3 Resolution of Corrective Action and Clarification Requests

Draft report corrective action requests and requests for clarification	Ref. to Table 1	Summary of project participants' response	Final conclusion
<p>CAR 1:</p> <ul style="list-style-type: none"> In the enclosure #1 of the PDD, the specification given does not match with the specifications noted during the site visit. E.g. PCC pump under paper machine 3, Capacitor bank at SFT A & B, Specification of old evaporator cooling water pump. Also it is found that equipment given under SL 1 in enclosure 1 is not replaced. In the enclosure #1 of PDD, the specifications of the old equipment or replaced equipment was not available for verification. E.g. Name plates or other proofs of the specification of the old pumps were not available During the site visit it was confirmed by the CDM project Co-ordinators that the replaced equipments will be scrapped and not transferred or sold. But the system was not found to individually trace each unit of the equipment which is replaced. 	A.2.2	<p>Copies of the plant layout drawing for each energy conservation measure depicting the geographical location of the equipment are available in soft copies and submitted as evidence for this corrective action.</p> <p>Revised specification sheet of equipment considered for Encon submitted as evidence for the respective corrective action request.</p> <p>Revised Enclosure #1 – Detail list of energy efficiency measures of the energy conservation/improvement programme in ITC PSPD Bhadrachalam Unit</p> <p>List of equipment which has been scraped has been listed and provided to DoE for verification. For the list refer to – Excel Sheet CAR & CL.</p> <p>Explanation on Traceability –</p> <p>Once equipment is identified as scraped it is provided with a unique tag number for physical identification and scrap voucher in raised at the shop floor level and informed to the Material Department of its status. The Material Department then floats quotation to the outside third party and on receiving satisfactory quote 'with declaration on future use as scrape', the scraped equipment is disposed from the unit.</p>	<p>Accepted. The following have been verified:</p> <ul style="list-style-type: none"> Plant layout drawings. Revised specification sheets Consultant report and scrap vouchers and disposal invoices <p>CAR 1 is closed</p>

Draft report corrective action requests and requests for clarification	Ref. to Table 1	Summary of project participants' response	Final conclusion
These replaced equipment units are not included in the project boundary		<p>Evidence – Scarp Voucher, Disposal Invoices with declaration provided.</p> <p>As there are two cases wherein the old equipments have been proposed for retention for stand by purpose, monitoring plan to calculate leakage has been developed and incorporated in the PDD version2. Unit level SOP has also been developed. Refer to EPM 4.4.6.24 Clean Development Mechanism, Environmental Operation Control Procedure, has been provided to DoE as evidence.</p>	
<p>CAR 2:</p> <p>The project has been put up for host country approval and clarification is sought regarding the status of the same</p>	A.3.3	Letter from the DNA of India has been obtained and provided	<p>Accepted. The letter from the DNA of India has been verified.</p> <p>CAR 2 is closed</p>
<p>CAR 3</p> <p>The authority and responsibility for registration, monitoring, measurement and reporting is not clearly described.</p> <p>Procedures have also not been identified for monitoring, measurements and reporting; data handling; internal audits, performance review and corrective actions.</p>	D.5.2, 5.7, 5.10, 5.11, 5.12, 5.13	<p>Standard Operating Procedure has been adopted under ISO certified Environment Management System of the unit. Procedure delineates roles and responsibility of unit personnel for registration, monitoring, measurement and reporting of the performance of the CDM project at defined interval.</p> <p>Copy of the procedure EPM 4.4.6.24 Clean Development Mechanism, Environmental Operation Control Procedure, has been provided to DoE as evidence.</p>	<p>Procedure established has been verified and accepted.</p> <p>CAR 3 is closed</p>
<p>CL 1:</p> <p>Clarification is sought as why the</p>	B.1.2	The applicable methodology has been changed to AMS IID in the revised PDD	Accepted. Revised PDD has been verified.

Draft report corrective action requests and requests for clarification	Ref. to Table 1	Summary of project participants' response	Final conclusion																
project is applicable for category IIC and not IID which is energy efficiency drive in a single industrial facility.			CL 1 is closed																
<p>CL 2:</p> <ul style="list-style-type: none"> As regards to the investment barrier, it is indicated that the large capital investment was made against low returns; no evidence is presented to substantiate the same In the analysis of barrier due to prevailing practise indicates that the specific energy consumption of the unit in 2002-2003 was already below that of a modern pulp and paper making unit. But the study referred here indicates the benchmark figure is related to paper making units and ITC – PSPD, while the Bhadrachalam unit produces mainly paper boards. Hence, the reference of this study may not be applicable for ITC – PSPD, Bhadrachalam unit. The organisation has regularly been conducting energy conservation programmes. It is not clear how these projects will not come under the normal energy 	B.2.1	<p>The capital investment was against un-attractive returns when the associated risks and priorities are considered.</p> <p>Please see table below</p> <table border="1"> <tr> <th colspan="2">Conclusion</th><th>1998-01 (3 years before the project)</th><th>2002-05 (during project period)</th></tr> <tr> <td>Savings</td><td>Lac kwh</td><td>222.02</td><td>452.56</td></tr> <tr> <td>Investment</td><td>Rs. Lac</td><td>238.9</td><td>667.78</td></tr> <tr> <td>Specific Investment</td><td>Rs/kwh</td><td>1.08</td><td>1.48</td></tr> </table> <p>Thus, Investment to save 1kwh of energy has increased from INR. 1.08 during (1998-01) to INR. 1.48 (2002-05). Resulting 99% increase in investment to save one unit of electricity consumed.</p> <ul style="list-style-type: none"> The comparison arrived at for benchmarking specific energy of Bhadrachalam mill was a European benchmark for a structurally similar paperboard manufacturing mill. ITC's specific energy was within the range provided for such mills. 	Conclusion		1998-01 (3 years before the project)	2002-05 (during project period)	Savings	Lac kwh	222.02	452.56	Investment	Rs. Lac	238.9	667.78	Specific Investment	Rs/kwh	1.08	1.48	<p>Complimentary information provided has been accepted.</p> <p>The calculations have been checked and found to be correct. Investments for the unit for the period 2001~2006 presented and found to illustrate that there was no structured investment in ENCON projects till 2002.</p> <p>Energy consultant's recommendations have been verified.</p> <p>CL 2 is closed.</p>
Conclusion		1998-01 (3 years before the project)	2002-05 (during project period)																
Savings	Lac kwh	222.02	452.56																
Investment	Rs. Lac	238.9	667.78																
Specific Investment	Rs/kwh	1.08	1.48																

Draft report corrective action requests and requests for clarification	Ref. to Table 1	Summary of project participants' response	Final conclusion
<p>conservation programmes in terms of investment and quantity of energy conserved. It is also not evident that the incentive from CDM was considered in the decision to proceed with the project activity</p> <ul style="list-style-type: none"> The criteria of selecting the projects for bundling are not clear. Only some energy saving projects are selected and bundled. As the new and old equipment have different specifications, it is not evident that the replacement is not a process requirement. 		<ul style="list-style-type: none"> Other barriers - With increase number of internal targets it is difficult to achieve energy savings with large investment. This has been proved from above calculation provided in response For evidence - Submitted the energy conservation data since 1993 to 2004. This defines a trend over the energy conservation measures before and after the project initiatives with CDM consideration. It is explicitly evident from the trend line that there has been a jump start in energy conservation and investment on the start of the CDM project implementation (2001 onwards). <p>Only energy savings that are eligible as CDM as per the methodology and simplified modalities have been selected and bundled.</p> <p>Copy of energy conservation consultant recommendations have been submitted which shows that these are generic energy saving schemes and not process requirements</p>	
<p>CL 3:</p> <p>The fact that the year 2002-2003 has been considered the base year as the first initiative under the energy conservation programme is found to be not in line with the project starting date nor the project completion date.</p>	B.2.2	<p>"2002-2003" is a typo and has been corrected as "2001-2002" in the PDD.</p>	<p>Accepted.</p> <p>CL 3 is closed.</p>
<p>CL 4:</p>	C.1.1, 1.2	<p>The first installation of the measure – Replacement of low efficient TG cooling water pump with efficient</p>	<p>Complimentary information provided has been verified and</p>

Draft report corrective action requests and requests for clarification	Ref. to Table 1	Summary of project participants' response	Final conclusion
<p>The Project starting date is not explicit in the PDD. It was informed during the interviews at site that the starting date was 1/11/2000, the date of installation of the very first equipments, the AC drives in place of DC drives. But The proof of the same was not provided. This is not consistent with the statement in the first page of PDD that In 2001, the management of ITC PSPD decided to launch a mill-wide energy conservation programme</p> <p>Proof that the last equipment was put on operation as on 01/09/2005 not evidenced</p>		<p>option - started in Aug 2000 (capex approval). Accordingly the PDD has been corrected.</p> <p>We have considered the starting date of the CDM project activity as implementation of the first measure included in the CDM programme</p> <p>The electronic governor has already been implemented on the said date.</p> <p>As a proof of the date minutes of the meeting of the plant has been provided.</p> <p>However, due to software problem actual savings could not be recorded till date hence considered as under commissioning/ stabilization.</p> <p>The controls are likely to get commissioned by 31st December 2005</p>	<p>accepted.</p> <p>CL 4 is closed.</p>
<p>CL 5:</p> <p>Data needs to be monitored and recorded for the replaced installed devices and devices meant for retrofit measures. However as per table D.3 under the column "Measured (M), Calculated (C) or estimated (E) data is shown to be estimated but in the monitoring plan it is shown as measured. The monitoring methodology is found to be inconsistent.</p> <p>Comments column for EGy indicates recording and monitoring actual sale of</p>	D.1.3	<p>PDD has been corrected with all monitoring requirements as per AMS II D as applicable to the project.</p>	<p>Revised PDD has been verified.</p> <p>CL 5 is closed.</p>

Draft report corrective action requests and requests for clarification	Ref. to Table 1	Summary of project participants' response	Final conclusion
electricity to grid: Document correction required. Last 2 rows of table under D.3. indicates lignite as fuel in stead of Coal. Document correction required.			
CL 6: In E.1.2.5 of PDD, under monitoring plan it is indicated that the GWh saved will be calculated using the monitored rated capacity and operating hours. The monitoring plan is not clear on to how the total energy savings will be estimated.	D.4.1	The monitoring plan of the project and related unit level SOP have been revised according to the requirement of ASM II D.	Accepted. CL 6 is closed.
CL 7: The calculation lacks transparency in calculation of actual power saved for equipment - refer column F in the CER calculation worksheet of Encon calcu ver01.xls. The calculation of emission factor in the worksheet is different from the emission factor given in E.1.2.5. It is not clear whether the emission factor calculation will be calculated on ex post monitored data for computing the emission reductions.	E.3.5	Revised calculations have been provided and equations applied for calculation have been stated explicitly in the PDD version 2. We propose to estimate the grid emission factor only once during the PDD preparation as the electricity imports from the grid as it constitutes only 5% of the total electricity consumed by the unit and it is more likely to reduce with increased in-house capacity in future	Complimentary information provided has been checked. CL 7 is closed.

APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Michael Lehmann

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

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

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Kumaraswamy Chandrashekara

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

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

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Santhosh Jayaram

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

GHG Auditor:	Yes		
CDM Validator:	Yes	JI Validator:	--
CDM Verifier:	--	JI Verifier:	--
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope 4 (cement)		

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director

Astakala Vidyacharan

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

GHG Auditor:	Yes		
CDM Validator:	--	JI Validator:	--
CDM Verifier:	--	JI Verifier:	--
Industry Sector Expert for Sectoral Scope(s):	--		

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Swapan Ghosh

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

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

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director