VOLUNTARY CARBON STANDARD 2007.1

(Renamed as Verified Carbon Standard 2007.1 with effective from 01/03/2011)

VALIDATION REPORT

19 November 2007

Version: 03, 22th March 2011
Project Number: 01 996 9105063620

Name of Verification company:	Date of the issue:
TÜV Rheinland Japan Ltd.	22/03/2011
Report Title:	**Approved by:**
Validation report of the GHG emission reduction project entitled “6.5 MW cogeneration project in Akbarpur, Punjab.”	Dr Manfred Brinkmann
Client:	**Project Title:**
Gillanders Arbuthnot & Co. Ltd.	6.5 MW cogeneration project in Akbarpur, Punjab.

Summary:
The Gillanders Arbuthnot & Co. Ltd. has commissioned the TÜV Rheinland Japan Ltd. to validate the project: “6.5 MW cogeneration project in Akbarpur, Punjab.”, with regard to the relevant requirements of the VCS Guidelines/ VCSA Rules for project activity, as well as criteria for consistent project operations, monitoring and reporting. The purpose of this validation is to have an independent third party assessment of the project design. The proposed project activity is a cogeneration plant, established within the premises of Gillanders Arbuthnot & Co. Ltd. (GACL) in Sangrur district of Punjab. The new unit which became functional since 30th March, 2009 /P07/ and is working in conjunction with the existing plant, supplying steam and power for captive consumption to the textile mill. GACL has undertaken this project activity for reduction in GHG emission at source to the extent of its contribution to displacement of grid electricity by renewable electricity generation. A risk based approach has been followed to perform this validation. The validation is based on the VCS PD /P02/, proof of title /P03/, additional documents related to the baseline and monitoring methodology; subsequent background investigation, follow-up interviews and supporting documents made available to the validation team by the project proponent. As a result of the validation, the validation team confirm that: • The project’s additionality is sufficiently justified in the PD, • The monitoring plan is transparent, adequate and in line with the applied baseline and monitoring methodology, AMS I.C, version 18. • The calculation of the emission reductions is carried out in a transparent and conservative manner and estimated emission reductions of 35,044 tCO2e/ year is most likely to be achieved. No restrictions or uncertainties were identified related to the validation.

Work carried out by:	Number of pages:
Team Leader: Mr Asim Kumar Jana **Team Members:** Mr Sanjay Kumar Agarwalla Mr Dinesh Mane **Technical Reviewer:** Dr. Lixin Li	41

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1 INTRODUCTION

1.1 Objective

The purpose of this validation is to have an independent third party assessment of the project design, in particular, the project's baseline, the additionality, the monitoring plan (MP) and the project's compliance with

- The requirements of VCS 2007.1 program guidelines;
- Requirements of the CDM Approved methodology which is adopted by VCSA;
- To assess the project's compliance with other relevant rules, including the project country (India) legislation; and
- Other relevant rules, of VCS sustainability criteria are validated in order to confirm that the project design as documented is sound and reasonable and meet the stated requirements and identified criteria. Validation is seen as necessary to provide assurance to stakeholders on the quality of the project and its intended generation of Verified emission reductions (VERs/VCUs[1]) without any double counting.

1.2 Scope and Criteria

The validation scope is given as an independent and objective review of the project design, the project's baseline study and monitoring plan (based on approved small scale CDM methodology AMS I.C. /Version 18: "Thermal energy production with or without electricity" which are included in the VCS-PD and other relevant supporting documents.

The items covered in the validation are described below:

- VCS 2007.1 and Project Country Criteria
  - To meet the requirements of VCS 2007.1 guidelines requirements, in particular,
  - Project country requirements / criteria
- VCS Project Description
  - Project design
  - Project boundaries and Predicted VCS project GHG emissions
- Project Baseline

[1] As per VCS, Verified Emission Reductions (VERs) are considered to be VCUs only after successful registration in an approved VCU Registry

  - Baseline methodology
  - Baseline GHG emissions
- Monitoring Plan
  - Monitoring methodology
  - Indicators/data to be monitored and reported
  - Responsibilities
- Project Additionality
- Background investigation and follow up interviews
- Draft validation reporting with CARs, CRs & FARs, if any
- Final validation reporting.

The information included in the PD and the supporting documents were reviewed against the requirements and criteria mentioned above. The TÜV Rheinland Japan Ltd. has employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of VERs. The validation is based on the information made available to TÜV Rheinland Japan Ltd. and on the contract conditions.

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

1.3 VCS project Description

The project site of GACL consists of textile manufacturing facility. The project activity (part of project site) involves installation and operation of a new 6.5 MW renewable biomass (locally available rice husk) based cogeneration unit in Sangrur district of Punjab State in India to meet the captive requirement of power and steam of the textile unit. The project site location in terms of Latitude (31°30’0’’North = 31.5000 degree North) and Longitude (75°22’0’’ East = 75.3666 degree East) was cross-checked from satsig web site /B06/ and is deemed correct.

In the pre project scenario, GACL met the electricity demand for the textile unit from the regional grid (NEWNE) and the process steam requirement by operating a 3 TPH capacity rice husk fired boiler. Due to the expansion of the textile production, the GACL has installed a co-

generation power plant to meet the captive requirement of steam and electricity.

The project was commissioned on 30/03/2009. The co-generation plant involves installation of a 34 TPH capacity AFBC (Atmospheric Fluidised Bed Combustion) boiler to produce steam at 66 kg/cm2 (g) pressure and 495 (+/-5)°C temperature /P15/. The turbine is of 6.5 MW capacity with multistage extraction cum condensing provisions /P15/.

The net electricity generated from the project activity will be used to meet the captive requirement of the textile unit and thereby will displace an equivalent amount of electricity, the plant would have drawn from the NEWNE grid, in absence of the project activity. The project activity will thus reduce Green house gas (GHG) emissions associated with the NEWNE grid, which is connected with mostly fossil fuel based power plants. The project activity claims emission reduction only for the net electricity generated and no emission reductions on account of heat are being claimed. This is in line with the applied methodology AMS I.C, version 18 /B02/. The estimated net electricity figure by the project activity works out as 41,769 MWh per operational year. The project activity will result to an annual average GHG emission reduction of 35,044 tCO2e over the chosen 10 year crediting period.

1.4 Level of assurance

The validation report is based on VCS PD /P02/, supporting documents made available to the validation team and information collected through performing follow up interviews. The validation opinion is assured, provided the credibility of all above.

2 METHODOLOGY

2.1 Review of Documents

The draft PD /P01/ submitted by GACL and supporting background documents related to the project design and baseline were reviewed. Furthermore, the validation team used additional documentation by third parties like project country legislation, technical reports referring to the project design or to the basic conditions and technical data.

The documents that were considered during the validation process are given below. They are listed as follows:

- Documents provided by the project proponent
- Background investigation and assessment documents
- Websites used

Documents provided by the project proponent

Reference	Document	Date of Document (DD/MM/YYYY) in case irrelevant put "--"
/P01/	VCS PD, version 01.	01/03/2011
/P02/	VCS PD [final version], version 02.	07/03/2011
/P03/	Proof for "Right of use": 1) Ownership of land that is proven by land purchase deed	____
	2) Letter of Intent /Purchase Order for Boiler placed on Thermax Limited	21/06/2006
	3) Letter of Intent / Purchase Order for Turbine placed on Triveni Engineering	18/07/2006
/P04/	Validation contract in between TUV Rheinland Japan Ltd. and GACL for this project activity.	17/02/2011
/P05/	Proof of start date of project activity (commercial operation).	30/03/2009
/P06/	Service level contract between the cogen plant unit and the main production (textile) unit (Cp para 6 of AMS I.C, ver 18).	___
/P07/	• Spread sheets for financials analysis (along with sensitivity analysis). • Spread sheet for emission reduction calculation.	---
/P08/	Proof of serious consideration of CDM.	16/12/2005
/P09/	Supporting evidence of the project implementation timeline in parallel with actions to secure CDM status, in particular:	
	1) Board resolution for project approval with CDM consideration	16/12/2005
	2) Joint offer for CDM consultation from IDBI and Mitcon consultancy	12/10/2006
	3) Negotiation with IDBI	07/12/2006
	4) Revised joint offer from MITCON and IDBI	05/01/2007

	5) Revised LOI from IDBI	12/04/2007
	6) Acceptance of LOI by IDBI	04/09/2007
	7) Invitation of stake holders meeting	28/11/2008
	8) Stakeholders meeting	12/12/2008
	9) Start of commercial operation (COD)	30/03/2009
	10) Termination of contract of IDBI/MITCON as CDM advisors from GACL	01/06/2009
	11) LoU with First Climate (India) Pvt. Ltd. for CDM advisory services	19/06/2009
	12) Appointment of DOE for CDM validation	27/11/2009
	13) Date of receiving HCA	12/01/2010
/P10/	Evidences against all Techno-economic input data and assumptions used in financial analysis: 1) EPC Offer by Cheema Boilers Limited	02/12/2005
	2) Quotation for Civil works	09/12/2005
	3) Quotation for O & M by A.V. Power Associates	25/11/2005
	4) Quotation / Invoice for rice husk cost	Oct' 2005
	5) Laboratory test report on the CV of biomass	April 2005
	6) Electricity Bills	Nov 2005
	7) Loan Sanction letter	06/03/2007
	8) Letter of Intent/Purchase Order placed for Boiler to Thermax Limited	21/06/2006
	9) Letter of Intent/Purchase Order placed for Turbine to Triveni Engineering	18/07/2006
	10) TUF (Technology Up gradation Fund) scheme	----
	11) Charterered Accountant certificate for the actual project cost	08/11/2010
/P11/	Spread sheets for calculation of grid emission factor and emission reductions.	----
/P12/	Operational and management structure for implementation and monitoring of project activity	
/P13/	Statuary clearances, in particular: 1) Consent to establish 2) Consent to operate 3) Boiler Operation Certificate 4) EIA summary.	----
/P14/	Proof of the company name as per Indian Company Registration Act.	---
/P15/	Technical specifications for key equipment (including proof for rated capacity of the boiler and turbine).	---
/P16/	Extract of PP's Annual Reports for last three years.	---

/P17/	Lay out drawing of the Project activity.	---
/P18/	Biomass Assessment Study (BAS) report of rice husk by DSCL Energy Services Company Limited within a distance of 50 km from project site.	23/10/2008
/P19/	List of the identified suppliers of fuel within the BAS study area.	----
/P20/	Training plan and records.	---
/P21/	Competence certificates for boiler operators.	---
/P22/	Proof of operation life time of the project activity.	---
/P23/	Specifications of all electricity meters.	---
/P24/	Laboratory test reports for CV of rice husk.	---
/P25/	Operational details for the project since commissioning. Sample copy of Daily and Monthly reports related to cogeneration unit.	---
/P26/	Relevant proofs of stakeholder consultation.	
/P27/	Contract copy with Triveni for O &M of Boiler and TG	27/01/2009
/P28/	Single Line Diagram showing biomass, water, steam and electricity within project boundary.	
/P29/	Host Country Approval (HCA) from DNA of India	12/01/2010
/P30/	Declaration from PP stating that the project will be with drawn from VCS Registry if the project gets registered with UNFCCC CDM program and not claim any credit under VCS Registry from the date of registration with UNFCCC.	---

Background investigation and assessment documents

/B01/	CDM Validation and Verification Manual (Version 01.2)
/B02/	Approved Baseline & Monitoring Methodology: AMS-I.C, version 18; Approved Baseline & Monitoring Methodology: AMS-I.D., version 16.
/B03/	Tool to calculate the emission factor for an electricity system, version 02.
/B04/	• Voluntary Carbon Standard 2007.1. • Voluntary Carbon Standard Program Guidelines 2007.1. • VCS Frequently Asked Questions (FAQ)

/B05/	Relevant CDM requirements (CDM M & P; Simplified CDM M&P and decisions by the CMP and documents released by CDM EB) published on the UNFCCC CDM website in particular the followings: 1. General guidance for SSC-CDM project activities. 2. Attachment A to Appendix B Indicative simplified baseline and monitoring methodologies for selected SSC CDM project activity categories 3. Non-binding best practise examples to demonstrate additionality for SSC project activities - Annex 34 of EB 35 4. Guidelines on assessment of Investment Analysis - Annex 58 of EB 51 5. Tool to determine remaining life time of equipment – Annex 15 of EB 50 6. Guidelines for the reporting and validation of Plant Load Factors – Annex 11 of EB 48 7. General guidance on leakage in biomass project activities, version 03 – Annex 28, EB 47 8. Tool to calculate project or leakage CO2 emissions from fossil fuel combustion, version 02, Annex 11 of EB 41.
/B06/	Web sites referred: 1. http://www.v-c-s.org/ 2. www.cea.nic.in (for referring baseline emission factor) 3. http://envfor.nic.in/(for validating the applicability of EIA notification for the project activity) 4. http://cdm.unfccc.int 5. http://www.satsig.net/maps/lat-long-finder.htm (Lat-Long location finder) 6. http://www.mca.gov.in/Ministry/latestnews/Explanatory_Statement_alongwith_Schedule_XIV_4dec2008.pdf - (for book depreciation rates) 7. http://law.incometaxindia.gov.in/DIT/income-tax-rules.aspx (Please see Appendix I in the last page for IT depreciation rates) 8. http://www.taxmann.net/ (for tax laws for the project activity) 9. http://cdm.unfccc.int/Projects/Validation/DB/PLFP1M4BZSMVARQYVB1HRVG0EJJB57/view.html (Project under validation for CDM)
/B07/	CO2 Baseline Database for Indian Power Sector -User Guide, Version 5 dated November 2009 (covering data vintage 2006-07, 2007-08 and 2008-09).
/B08/	2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book
/B09/	The Greenhouse Gas Protocol, The GHG Protocol for Project Accounting

/B10/	ISO 14064-2; ISO 14064-3, ISO 14065
/B11/	CEA (Installation and Operation of Meters) Regulation 2006
/B12/	Steam Table for calculating steam enthalpy

2.2 Follow-up Interviews

On 4th March 2011, the validation team performed follow-up interview with the project proponent.

The key interviewees are mentioned below.

S.No.	Date (YYYY-MM-DD)	Name	Organization	Topic
/I01/	2011-03-04	Mr. Manoj Kumar Sodhani	Joint President; GACL	Implementation of project activity, Technical detail of project activity, Statutory clearances, sustainability criteria, Local stakeholders meeting process.
		Mr. G Peter	Senior General Manager; GACL	
/I02/	2011-03-04	Mr. Rajib Pramanik	Consultant, FCL	Baseline determination and additionality, Monitoring plan.

2.3 Resolution of any material discrepancy

A few discrepancies were found during the validation and the validation report containing a set of CARs and CRs were submitted to the project proponent. The project design document was revised addressing the CARs and CRs issued by TÜV Rheinland Japan Ltd.

3 VALIDATION FINDINGS

The findings of validation are summarised in table 3-1:

Table 3-1: Summary of CAR, FAR and CR issued

Validation topic (Cp VCS Validation Report Template)	No. of CAR	No. of FAR	No. of CR

Validation topic (Cp VCS Validation Report Template)	No. of CAR	No. of FAR	No. of CR
D- Project Design	02	-	-
B- Baseline and additionality	-	-	-
M- Monitoring plan	01	-	-
C- Calculation of GHG emissions	-	-	-
E- Environmental Impact	-	-	-
L- Local Stakeholder Comments	01	-	-
SUM	**04**	**-**	**-**

For an in depth analysis/evaluation of all CARs and CRs can be referred to the below sections from 3.1 to 3.6.

3.1 Project Design

The project site of GACL consists of textile manufacturing facility. The project activity (part of project site) involves installation and operation of a new 6.5 MW biomass (locally available rice husk) based cogeneration unit in Sangrur district of Punjab State in India to meet the captive requirement of power and steam of the textile unit.

In the pre project scenario, GACL met the electricity demand for the textile unit from the regional grid (NEWNE) and the process steam requirement by operating a 3 TPH capacity rice husk fired boiler.

The net electricity generated by the 6.5 MW rice husk fired cogeneration plant (project activity) is being used to meet the captive requirement of the textile unit (consumer which is within the same premises and owned by GACL) thereby displacing an equivalent amount of electricity, the plant would have drawn from the NEWNE grid, in absence of the project activity. The project activity thus reduces Green house gas (GHG) emissions associated with the NEWNE grid, which is connected with mostly fossil fuel based power plants. The project

activity claims emission reduction only for the net electricity generated and no emission reductions on account of heat are being claimed as in the pre project scenario, the heat requirement of the textile unit was met by a 3 TPH rice husk fired boiler and the electricity demand was met from the NEWNE grid. This is in line with the applied methodology AMS I.C, version 18 /B02/.

The co-generation unit consists of a 34 TPH capacity AFBC (Atmospheric Fluidised Bed Combustion) boiler to produce steam at 66 kg/cm2 (g) pressure and 495 (+/-5)°C temperature /P19/ and one turbine of 6.5 MW capacity with multistage extraction cum condensing provisions /P19/. Other plant & equipment includes fuel conveyors, ash handling system, DM plant, cooling towers etc.

The boiler have been designed and manufactured by Thermax Limited /P10-8/. The turbine for the project activity has been procured from Triveni Engineering and Industries Limited /P10-9/. For boiler operation, trained and certified personnel have been deployed. This has been confirmed from the competence certificates submitted by the project participant /P21/. GACL has given Operation and Maintenance contract for the cogeneration plant to Triveni Engineering and Industries Limited /P27/.

The technology being used in the project activity is indigenously available and is deemed to represent current good practice and state-of-the-art technology. The project capacity was cross checked from the manufacturers' technical specifications of the boiler and turbo generator /P15/. The project activity contributes to the sustainable development criteria of the host country in terms of social, economical, technological and environmental benefits achieved due to the project activity /P29/.

The boiler is capable of firing both coal and rice husk (individually) as fuels. However, coal will only be used in case of exigencies and, if used, project emissions will be accounted for the same. The emission reductions have been estimated based on 100% rice husk usage.

The project activity boiler will fire 100% rice husk, which is considered as "biomass residue" as per "Glossary of CDM Terms" Version 05. Further the rice husk being used in the project activity is called "Renewable biomass" under the definition of Renewable Biomass in the "Glossary of CDM Terms" and Annex 18 of EB 23.

The training for the operation and maintenance of the plant was provided by Triveni Engineering and Industries Limited /P20/.

The estimated net electricity figure by the project activity works out as 41,769 MWh per operational year. The project activity will result to annual average GHG emission reductions of 35,044 tCO2e over the chosen fixed 10 year crediting period.

The project has all the statutory clearances which were also verified by the validation team /P17/.

The validation team was able to conclude that this description provides a clear understanding of the precise nature of the project activity and the technical aspects of its implementation.

The start date of the project plant is March 30, 2009, the day on which the project plant was commissioned, the day when the project began emission reduction. The validation team validated the same by verifying the proof of commissioning date /P05/. This starting date confirms the definition of starting date provided in VCS 2007.1.

The technical life lime of the project is considered as 25 years. This is deemed to be appropriate for boiler and steam turbine /B05-5/. The PP has chosen a crediting period of ten years starting from the day when the real emission reduction happened i.e., 30/03/2009. The PP, Gillanders Arbuthnot & Co. Ltd. has the ownership of the proposed project and the same was verified from the ownership of land and Purchase Orders placed for boiler and turbine /P03/.

During the follow-up interviews with the representatives of the project proponent as well as consultant, it was understood that the project participant has taken initiatives to register the project under CDM. In order to avoid double counting, the validation team asked a declaration from PP /P30/ in which the project participant has confirmed that "In the event of project getting registered with UNFCCC CDM GHG program, the project proponent will transparently declare the same to VCS Registry and withdraw the project from VCS program and not claim any credit under VCS Registry from the date of registration with UNFCCC CDM." /P30/. The validation team confirms that at the time of submission of this report, the project activity was still under the

validation phase for CDM (http://cdm.unfccc.int/Projects/Validation/DB/PLFP1M4BZSMVARQYVB1HRVG0EJJB57/view.html) /B06-9/ and has not been rejected by the UNFCCC or by any other GHG program.

Nevertheless, in concerns to the requirements of VCS PD following 2 CARs are raised and closed after appropriate corrections in VCS PD.

CAR/CL/FAR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR D1 The start date as mentioned in section 1.6 of the VCS PD is not in line with the definition of VCS project start date mentioned in VCS 2007.1.	PD	The start date is now corrected to 30th March 2007 i.e. commissioning date of turbine.	Section 1.6 of PD	The start date is now in line with the VCS requirements. Hence, this CAR is closed.

CAR/CL/FAR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR D2 The Project proponent roles and responsibilities are not provided in section 1.15 of VCS PD (Cp VCD PD completing guidelines).	PD	The roles and responsibilities of the project proponent are provided in revised PD.	Section 1.15 of PD	Revision in the PD is found to be appropriate. CAR is closed.

3.2 Baseline

The project applies the CDM approved baseline methodology AMS I.C. (version 18) - "Thermal energy production with or without electricity" /B02/. It falls under Type I, Renewable Energy projects, as per Appendix B to the

simplified modalities and procedures for small-scale CDM project activities. The project satisfies all criteria of the applied methodology. Hence the application of baseline methodology is assessed as correct. There is no methodology deviation or revision. Along with the approved methodology AMS I.C., version 18, the project activity applies approved baseline methodology AMS I.D., version 16 – "Grid connected renewable electricity generation" and "Tool to calculate the emission factor for an electricity system", version 02 /B03/, which is used to determine the baseline grid emission factor.

Project boundary:

As per paragraph 12 of AMS I.C, version 18, project boundary is defined as "*The physical, geographical site of the project equipment producing the renewable energy delineates the project boundary. The boundary also extends to the industrial, commercial or residential facility, or facilities, consuming energy generated by the system and the processes or equipment that is affected by the project activity*".

The energy generation unit consists of boiler and turbine, electrical and instrumentation systems, water treatment plant and fuel feeding system and auxiliary equipment for the plant operation. The project boundary encompasses the textile mill where the generated steam and power is consumed.

Assessment of applicability of the selected baseline methodology to the project activity:

The validation team confirms that the selected methodology AMS I.C., version 18 is applicable to the project activity. A detailed explanation of the same is given below.

Applicability criteria as per methodology /B02/	**Means of Validation**
1. This category comprises renewable energy technologies that supply users with thermal energy that displaces fossil fuel use. These units include technologies such as	This paragraph is not applicable to the project activity as because thermal energy derived from the renewable biomass does not displace fossil fuel /P02/.

solar thermal water heaters and dryers, solar cookers, energy derived from renewable biomass and other technologies that provide thermal energy that displaces fossil fuel.	
2. Biomass-based co-generating systems consisting of steam generator(s) and steam turbine(s)are included in this category. For the purpose of this methodology "Cogeneration" shall mean the simultaneous generation of thermal energy and electrical Project activities that produce heat and power in separate element processes (for example, heat from a boiler and electricity from biogas engine) do not fit under the definition of cogeneration project.	Applicable as the project activity involves the installation of a biomass based cogeneration system supplying heat and electricity to the textile unit /P02/, /P15/.
3.Emission reductions from a biomass cogeneration system can accrue from one of the following activities: *(a) Electricity to a grid;* *(b) Electricity and/or thermal*	Applicable – Emission reductions for this project activity accrue from the electricity generation for on-site captive consumption /P02/.

energy (steam or heat) for on-site consumption or for consumption by other facilities; *(c) Combination of (a) and (b)*	
4. The total installed/rated thermal energy generation capacity of the project equipment is equal to or less than 45 MW	The total installed thermal energy generation capacity of the project boiler is 27.92 MW which is less than 45MWth /P02/. Hence this paragraph is satisfied.
5. For co-fired systems, the total installed thermal energy generation capacity of the project equipment, when using both fossil and renewable fuel shall not exceed 45 MW thermal.	The boiler is designed to fire 100% biomass or 100% coal. But PP intends to fire only biomass (rice husk). The project boiler may fire coal in case of exigencies only. The thermal capacity of the unit is demonstrated based on output steam conditions irrespective of the input fuel. Thus the installed capacity of the unit would hold good for co-firing of biomass and coal as well which will be same as mentioned above i.e. 27.92 MW which is less than 45MWth /P15/.
6. The following capacity limits apply for biomass cogeneration units: *(a) If the project activity includes emission reductions from both the thermal and electrical energy components, the total installed energy generation capacity (thermal and electrical) of the project equipment shall not exceed 45 MW thermal.* *(b) If the emission reductions of the cogeneration project activity are solely*	Emission reduction are being claimed solely on account of the electricity and the total installed electrical energy generation capacity of the project equipment of the cogeneration unit is 6.5 MW which is less than 15 MW /P02/, /P15/. Hence criterion (c) is applicable and satisfied.

on account of thermal energy production (i.e., no emission reductions accrue from electricity component), the total installed thermal energy production capacity of the project equipment of the cogeneration unit shall not exceed 45 MW thermal; *(c) If the emission reductions of the cogeneration project activity are solely on account of electrical energy production (i.e., no emission reductions accrue from thermal energy component), the total installed electrical energy generation capacity of the project equipment of the cogeneration unit shall not exceed 15 MW.*	
7. In case electricity and/or steam/heat produced by the project activity is delivered to another facility or facilities within the project boundary, a contract between the supplier and consumer(s) of the energy will have to be entered into specifying that only the facility generating the energy can	Service level contract has been made in between the supplier and consumer (i.e. the power genenration unit and the textile unit) specifying that only the facility generating the energy will claim emission reductions from the energy displaced /P06/.

claim emission reductions from the energy displaced.	
8. Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category	The project activity is not a retrofit case.
9. The capacity limits specified in the above paragraphs apply to both new facilities and retrofit projects. In the case of project activities that involve the addition of renewable energy units at an existing renewable energy facility, the total capacity of the units added by the project should comply with capacity limits in paragraphs 4 to 6 and should be physically distinct from the existing units.	The project activity is a new facility which involves installation of a 34 TPH biomass fired boiler and a 6.5 MW steam turbine. The thermal output capacity of the new boiler is 27.92 MWth. The existing 3 TPH biomass fired boiler in the pre project scenario is replaced by the new cogeneration plant. The existing 3 TPH boiler will not be operated as the steam requirement will be met by the new cogeneration unit. Thus the project activity is not the addition of renewable energy unit at an existing renewable energy facility and is physically distinct from the existing unit. Thus project activity is a new facility and is neither a retrofit project nor involves addition of renewable energy units at an existing facility and the capacity limits as specified in paragraphs 4 to 6 are satisfied.
10. Charcoal based biomass energy generation project activities are eligible to apply the methodology only if the charcoal is produced from renewable biomass sources5 provided: (a) Charcoal is produced in kilns equipped with	The project activity is not a charcoal based project.

methane recovery and destruction facility; or (b) If charcoal is produced in kilns not equipped with a methane recovery and destruction facility, methane emissions from the production of charcoal shall be considered. These emissions shall be calculated as per the procedures defined in the approved methodology AMS-III.K. Alternatively, conservative emission factor values from peer reviewed literature or from a registered CDM project activity can be used, provided that it can be demonstrated that the parameters from these are comparable e.g. source of biomass, characteristics of biomass such as moisture, carbon content, type of kiln, operating conditions such as ambient temperature.	
11. If solid biomass fuel (e.g. briquette) is used, it shall be demonstrated that it has been produced using solely renewable biomass and all project or leakage emissions	The project does not use solid biomass fuel.

associated with its production shall be taken into account in emissions reduction calculation.	

In the pre-project scenario, the project was using biomass for generating heat and importing power from the grid. Thus as per paragraph 15 (e) of AMS I.C, version 18, the baseline scenario for the project activity is "*Electricity is imported from the grid and/or produced in an on-site captive power plant using fossil fuels (with a possibility of export to the grid); steam/heat is produced from biomass*".

As the project activity displaces grid electricity import and the baseline is the grid itself, so the baseline emission factor for the project activity is calculated following paragraph 21 of the methodology AMS-I.C. Version 18 which states that "*For project activities that do not displace captive electricity generated by existing plant but displace grid electricity import and/or supply electricity to grid, the emission factor of the grid shall be calculated as per the procedures detailed in AMS-I.D.*"

As steam was already being generated by biomass in the baseline scenario, as per paragraph 28 of AMS-I.C., version 18, emission reductions for thermal generation is not eligible. Thus the baseline emissions is calculated only for the corresponding net electricity generation by the project activity which would have been supplied by other power plants connected to the grid in the absence of the project activity.

Further as per paragraph 11 of approved methodology AMS-I.D. version 16, the Baseline Emission is calculated as follows:

$$BE_y = EG_{BL,y} * EF_{CO2,grid,y}$$

Where:

BE_y = Baseline Emissions in year y; tCO_2e

$EG_{BL,y}$ = Quantity of net electricity supplied to the process plant as a result of the implementation of the project activity in year "y" (MWh)

$EF_{CO2,grid,y}$ = CO2 emission factor of the NEWNE grid in year "y" -(tCO_2e/MWh)

The Emission Factor for the regional grid is calculated as per paragraph 12 of AMS.I.D, version 16 using combined margin approach.

Paragraph 12 of AMS I.D, version 16 gives two options for the calculation of emission factor. Out of the two options for the calculatin of emissin factor, PP has used Option (a) which states *"A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the 'Tool to calculate the Emission Factor for an electricity system"*.

The project proponent has calculated the Simple Operating Margin (OM) based on the latest three years' statistics data (year of 2006-07, 2007-08, 2008-09) as per Central Electricity Authority guidelines version 5.0 November 2009 and the Operating Margin Emission Factor is 1.004 tCO2/MWh, which is average of the three year data. The value for Build Margin (BM) for 2008-2009 is directly used, i.e., 0.675 tCO2/ MWh and a weightage factor of 50% & 50% is used for OM and BM to arrive at the Combined Margin value of 0.839 tCO2/MWh.

The Combined Margin (weighted average of Simple Operating Margin and Build Margin) is estimated based on three years averages (2006-07, 2007-08, 2008-09) of Simple Operating Margin and Build Margin which are in line with steps of "Tool to calculate the emission factor for an electricity system" allows the usage of the default weights which are as follows:

w_{OM} = 0.50 and w_{BM} = 0.50. Using the above values the combined margin emission factor is valued at 0.839 tCO2/MWh. Both the values of Simple Operating Margin and Build Margin are selected under ex-ante approach. The grid boundary w.r.t the connected state grid is in NEWNE Grid of India. The calculation of EFy is current and publicly available and published by the Central Electricity Authority on its website /B06/. The validation team is convinced of the result of the emission coefficient calculation. It is deemed to be adequate, transparent and conservative.

Assessment and demonstration of additionality

The project is a small scale project. Therefore, in accordance with § 28 of the simplified modalities and procedures for small-scale CDM project activities,

Project Proponent (PP) has demonstrated the additionality of the project activity using Attachment A to Appendix B /B05-2/ as elaborated through Annex 34 of EB 35 /B05-3/ and Guidance given vide Annex 58 of EB 51 /B05-4/. This also meets VCSA requirements related to additionality and the guidance provided in VCS FAQ /B04//.

There is no mandatory law or regulation, which enforced project proponent to develop biomass based cogeneration unit. The project has received the statutory clearances from the regulatory authorities to run the plant /P13/.

PP informed to the Validation Team that they were aware of the CDM benefits at the time of taking investment decision from the newspaper reports and discussion with financial institutions. It was also pointed out by the Project developer that the very fact that the Board Resolutions mentions about the CDM benefits vouches for the prior knowledge of CDM benefits on the part of the project developer. To prove that the CDM benefits were the decisive factor in deciding to go ahead with the investment in the project, PP has submitted a copy of the Board Resolution dated 16th December 2005 /P08/, which states, ""*.....As a part of the expansion, setting up a biomass based cogeneration power plant tor captive consumption in place of continuation of grid power import, is also being considered. The Board after going through the biomass based co-generation system observed that it is not a preferred option in view of the low rate of return. However, as the biomass based cogeneration projects qualify as a clean Development mechanism (CDM) project under Kyoto Protocol and results in lower emissions, the Board was of the opinion that the carbon revenues generated therein would make the project financially viable*". The Board resolution proves that the project was financially unattractive and therefore CDM benefits were decisive factor in the decision to proceed with the project. The 16th December 2005 /P08/ is considered as the time of investment decision for taking into account the input data, assumptions and publicly available official information, official statistics / expert judgment, etc. in accordance with the CDM EB published "Guidelines on assessment of Investment Analysis" /B05-4/ which is co-applicable for additionality demonstration and assessment of this project.

Project developer had submitted the chronology the GHG project activity which has been presented in section 7 of the PD. The validation team verified the chronology with

the documents submitted by the PP /P09/ and found to be appropriate.

Investment Analysis

Appropriateness of the financial indicator and investment analysis: Project developer had chosen investment barrier and to demonstrate the investment barrier had selected benchmark analysis and project IRR as financial indicator. Having regard to the fact that the project is funded by debt, and equity, project IRR is considered as appropriate financial indicator to demonstrate the additionality as it takes into account the return on both debt and equity. Moreover, project IRR is invariably used by the banks and investors alike to gauge the investment-worthiness of the project. Since in this instant case, as subsequent section would reveal, baseline is outside the direct control of the project developer (grid connected power) and hence, the choice of the project developer is restricted to "*invest or not to invest*", the benchmark approach is most suited as per Guidance 16 of Annex 58 of EB 51 /B05-4/.

In the above background Validation Team concludes that the additionality justification given by the project developer is in accordance with the requirements derived from the approved CDM methodology and the methodological tools referred therein.

Evaluation of Additionality: Validation team assessed the claim of the project developer that the project is not economically feasible without carbon revenue benefits through the following steps:

a) Suitability of financial indicator and benchmark: The project developer has chosen project IRR to demonstrate the additionality of the project. Additionality Tool (Ver. 05.2, which is the latest) [2] permits the use of project IRR as financial indicator for demonstrating the additionality using benchmark analysis. Moreover, the appropriateness of the selected financial indicator has already been explained in the previous paragraph. As such, the selection of project IRR as financial indicator is appropriate and is in conformity with the Annex 58, EB 51 /B05-4/.

Project developer has selected commercial lending rate as the benchmark. Guidance 12 of Annex 58, EB 51 /B05-4/

[2] Since both Attachment A to Appendix B and Annex 34 of EB 35 are silent on the financial indicators, guidance has been drawn from Additionality Tool for the justification of financial indicator selected.

permits the use of commercial lending rate as the benchmark where project IRR is used as financial indicator. Therefore, the selection of commercial lending rate is in conformity with guidance 12 of Annex 58, EB 51 /B05-4/. The commercial lending rate has been sourced from the Weekly Statistical Supplement of Reserve Bank of India. The commercial lending rate at the time of decision making was ranging from 10.25% to 10.75% [3]. Project developer had selected 10.75% as the benchmark. Since the benchmark is publicly available and can be verified and validated by DOE, it conforms to guidance 13 of Annex 58, EB 51 /B05-4/.

Therefore, the Validation Team concludes that the benchmark selected by the project developer is appropriate and conforms to the Guidance on Investment Analysis /B05-4/.

b) Parameters and assumptions used: The three important parameters, which determine the project IRR of the project, are project cost, financing pattern, and profitability estimates.

The project cost includes land cost, civil construction cost, equipment cost, and IDC. The project cost is estimated at INR 258.57 million. Validation Team sought documentary evidence and the project developer had submitted the quotation from EPC contractor for the plant and machinery /P10-1/ and Architect's estimates on land cost [4] and civil works /P10-2/. As this was the cost available to PP at the time of decision making, it is supported by documentary evidence and the actual cost incurred is much higher than INR 258.57 million, Validation Team accepted this cost [5].

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[3] The data has been sourced from the Weekly Statistical Supplement dated 09/12/2005, the issue that would have been available at the time of decision making. This can be accessed at http://rbidocs.rbi.org.in/rdocs/Wss/PDFs/67614.pdf. This data pertains to the week ended November 25, 2005. Validation team checked the PLR for the week ended December 16, 2005 also and observed that the rate remained unchanged. Please see http://rbidocs.rbi.org.in/rdocs/Wss/PDFs/67974.pdf

[4] Though this is an existing project, the project developer had to purchase additional land for storing biomass. Project developer has submitted a copy of land purchase deed to prove that the land has indeed been purchased. Since the land has been purchased post decision making date, validation team accepted the cost

[5] PP has submitted that the project cost has gone up since the decision making and a total investment of INR 360.1 million has been made in contrast to the cost of INR 258.57 million considered in the financial indicator calculation. To evidence this claim, PP has submitted a certificate from Chartered Accountant /P10-11/. However, Validation Team decided not to accept this cost as it is not in conformity with guidance 6 of Annex 58 of EB 51. Consideration of latest cost would render the project all the more additional.

The project was envisaged to be financed by term loan of INR 181 million, equity share capital of INR 77.57 million. The loan constitutes 70% of the total project cost, while the equity and unsecured loan for the balance 30%. In India, infrastructure projects are financed to the extent of upto 70% by loan. Though Punjab Electricity Regulatory Commission (ERC) has not issued any tariff order containing the assumptions for the tariff determined, CERC and other State ERCs have recommended a debt equity ratio of 70:30 for renewable energy projects under which this project falls. Therefore the financing pattern is in conformity with accepted gearing for such projects.

The profitability estimates of the project, which forms the basis for project IRR calculation is based on installed capacity, PLF, power tariff, O&M cost, interest, depreciation, taxation. Major input parameters used in the additionality demonstration, basis thereof and the appropriateness of the value used are given in the following table:

Parameter	Value applied	Sources of Information and comments thereon
Project life (Years)	25	The *technical life* of the project is based on the default life time as Annex 15 of EB 50 /B05-5/. The value considered by PP is correct and appropriate for the project. However, financial projections have been done for a period of 20 years in accordance with Guidance 3 of Annex 58 of EB 51 /B05-4/, which states, "In general a minimum period of 10 years and a maximum of 20 years will be appropriate".
Installed Capacity (MW)	6.50	The value is based on the EPC quotation, which in turn is based on the turbine capacity /P10-1/, /P15/. Hence, the value is correct and appropriate for the project.
Project cost (INR in million)	258.57	The value is based on the EPC offer letters /P10-1/ and estimates given by Architect /P10-2/. The cost works out to INR.39.78 million / MW. Validation team compared the cost with other projects set up in the same state (Punjab) and observed that JCT Phagwara (Reg. No.2998) had estimated the cost at INR 37 million / MW. Validation team also observed that this project did not

		take into consideration the land cost. If the land cost is eliminated from the project cost, the comparable cost would be INR 36.71 milllion / MW which is in line with the cost of JCT Phagwara. Validation team also checked the cost recommended by various SERCs. It observed that there is no uniformity or consistency and the cost differs. For example, Maharashtra (2005) and Andhra Pradesh (2004) ERCs have recommended a cost of INR 40 million / MW; while Gujarat (2007) ERC has recommended a cost of only INR 35 million / MW, though the order is dated later than that of MERC and APERC. Since the actual investment is more than the cost considered in financial indicator calculation (as evidenced by Chartered Accountant's certificate /P10-11), the cost is accepted. Validation team had checked the document and found value to be correct and appropriate.
Debt : Equity Ratio	70:30	The debt equity ratio is in conformity with that normally accepted by banks for renewable energy projects.
Interest rate (percent)	12.75	Interest rate is based on the sanction letter received from IDBI Bank /P10-7/. This is in conformity with guidance 11 of Annex 58, EB 51 /B05-4/, which states, "In cases where a post-tax benchmark is applied the DOE shall ensure that actual interest payable is taken into account in the calculation of income tax". Since the interest rate as per IDBI sanction letter represents the actual interest payable, the consideration of 12.75% is in conformity with Annex 58, EB 51. Since the company is in the textile sector, it is entitled to an interest subsidy of 5%, which has been reckoned while computing the interest. Validation team had checked the sanction letter, interest subsidy notification and found the value to be correct and appropriate. IRR would be lower in case the then prevailing interest rate of 10.75% (less interest subsidy of 5%) is taken into account. Hence, the interest rate assumed is conservative from the additionality point of view.
Repayment (quarters)	28	Repayment period is based on the sanction letter issued by IDBI /P10-7/.

		As stated above, since guidance 11 of Annex 58, EB 51 requires the project developer to take into consideration the actual interest payable while computing the income tax, the repayment terms should also be in conformity with sanction letter. The repayment period is also in conformity with loan sanction letter. Validation team had checked the letter and found the value to be correct and appropriate. This is also in conformity with the normal repayment period given for the loans sanctioned to renewable energy projects.
Moratorium (months)	12	Moratorium period is based on the sanction letter issued by IDBI. As stated above, since guidance 11 of Annex 58, EB 51 requires the project developer to take into consideration the actual interest payable while computing the income tax, the moratorium period should also be in conformity with sanction letter. The moratorium period is also in conformity with loan sanction letter /P10-7/. Validation team had checked the letter and found the value to be correct and appropriate. This is also in conformity with normal moratorium period given for loans sanctioned to renewable energy projects.
PLF (percent)	85	PLF assumed is based on EPC contractor's quotation /P10-1/. Since the PLF has been estimated by EPC contractor (third party engineering company engaged by the project developer), it conforms to Annex 11 of EB 48 /B05-6/. Validation team checked the orders of SERCs and observed that they have recommended PLF of 70% in the first year of operation and 80% from the second year onwards with 330 working days. The project developer has considered 350 working days and 85% PLF throughout. Hence, the PLF assumed is in conformity with Annex 11, EB 48 and is also conservative.
Auxiliary consumption (percent)	10.00	Auxiliary consumption is based on EPC contractor's quotation /P10-1/. Validation team checked the orders of SERCs and observed that they have also recommended around 10% for auxiliary consumption. The value is therefore

		considered correct and appropriate.
Biomass cost (INR/MT)	2000	The cost is based on the Quotation /Invoices received from the rice husk suppliers based on which the investment decision was made /P10-4/. Validation Team verified the ruling cost of husk was more than INR 3000 per MT. In the above background, Validation Team considers the biomass cost to be correct, appropriate and also conservative for the project activity. Biomass cost has been subjected to escalation at 5% per annum in line with the inflation rate and frozen from 11th year on-wards.
O&M cost (INR n.)	12.00	O&M cost is based on the quotation received for O&M services /P10-3/. It works out to INR 1 million per month, which is marginally less compared to the O&M agreement the company has already signed /P27/. Project developer has furnished the offer letter as well as the O&M agreement signed with M/s Triveni Engineering and Industries Ltd. Validation team checked the documents and found the value to be correct. Validation team also observed that while some SERCs have recommended O&M cost at 4% of capital cost, some have recommended 7% of capital cost. The O&M cost in this instant case works out to 4.6%, which is within the range on the lower side. The value is therefore considered correct, conservative and appropriate. O&M cost has been subjected to 5% escalation every year, which is in conformity with the general inflation in the country, which ranges between 4 to 5% on an average. O&M cost has been subjected to 5% escalation every year for the first 10 years (whereafter it is frozen at that level), which is in conformity with the general inflation in the country, which ranges between 4 to 5% on an average.
Power tariff (INR/kWh)	4.00	Since the entire power generated will be used for captive consumption, the power tariff paid by the company at the time of decision making has been

		considered for power cost saved. This is appropriate as in the absence of the power project, the power would have been imported from the grid. Project developer has submitted the electricity bill /P10-6/ and the input value is found to be correct. The tariff has also been escalated at INR 0.09 per annum (upto 11th year whereafter it is frozen at that level) based on the escalation in the tariff in the last 3 years. The value is therefore correct and appropriate for the project activity.
Book Depreciation (percent) -Civil works - Plant & machinery	3.34 5.28	The book depreciation is on conformity with the rates prescribed by Schedule XIV of Companies Act, 1956 /B06-6/. The values have been checked with the schedule and are found to be correct. The value is correct and appropriate for the project activity.
IT Depreciation (percent) - Civil works - Plant & machinery	10 80	The rates are based on Appendix I of Income Tax Rules /B06-7/. The values have been checked with the Appendix and found to be correct. The value is therefore correct and appropriate for the project activity.
Income Tax (percent)	33.66	The Income Tax is based on the rates prevailing at the time of taking decision. These rates are based on the Finance Act 2005-06 /B06-8/. The values have been checked and found to be correct. The value is therefore correct and appropriate for the project activity.

As could be observed all the input values were applicable at the time of decision making and are based on documents that were available to the PP at the time of decision making. All input values have been escalated upto 10th year and thereafter frozen at that level as it is difficult to estimate the cost thereafter with any degree of certainty. All the documents based on which input values have been taken in the profitability estimation have been furnished to the Validation Team. These documents and the input values considered in the profitability projections have been checked by the Validation Team and the values used have been found to be correct and appropriate.

In this context one issue that assumes importance is the power tariff. Project developer envisages using the entire power generated for captive consumption. Hence, the power cost saved is equal to the power tariff that the company would have paid in the absence of the project activity. Therefore, the power tariff has been sourced from the electricity bill at the time of decision making /P10-6/. Power tariff, though not appropriate[6], has been subjected to escalation also based on the power tariff increase in the last three years.

c) Cross checking parameters: Investment cost, financing pattern, terms of loan, O&M cost, interest, depreciation and tax rate have been cross checked with the documentary evidence furnished by the project developer and publicly available documents like, Companies Act, Income Tax Act and SERCs Order. Input parameters were found to be in agreement or better than SERCs recommendations. The cross checking of the key financial parameters have been mentioned against each of the parameters in the table above. In the above background, the Validation Team has concluded that the input parameters assumed in the calculations are conservative, appropriate and acceptable.

d) Assessment of correctness of computation: The assessment involved checking the data input taken from quotation/documents, adoption of correct accounting principle and arithmetical accuracy. Validation Team checked the quotation/ documents and ensured that right input has been taken in the project cost and projections. The accounting principles adopted with respect computation of interest, block of assets and tax computation were found to be in order. The arithmetical accuracy was also found to be correct.

As stated in above, the project activity under consideration is intended to meet the captive electricity and steam requirements of the textile unit of GACL, which otherwise would have been met from the regional grid and the rice husk based boiler respectively. As biomass is already being used to generate heat/steam, the investment analysis has been carried out considering the fact that under the baseline scenario, the existing 3 TPH boiler would continue to operate and meet internal steam requirements. In doing so, neither the revenue from steam/heat nor the cost of generating steam/heat (which

[6] It is not appropriate because once the project is set up and commissioned, the movement in power tariff would not affect the project and the saving would be reflected only by the power bill paid in the year before which the project was set up and the power bill after the project was set up.

is assumed to be the fuel cost required to generate the steam) has been considered in the investment analysis. The project IRR is calculated considering only the cost of the rice husk that would be required for the generation of electricity. The steam requirement for 6.5 MW turbine (when running at fully condensing mode to generate only power) is based on the turbine specification /P15/.

The project IRR has been computed for a period of 20 years of operation, which is in conformity with guidance 3 of Annex 58 of EB 51 /B05-4/. As required by Annex 58 of EB 51 the expected realisation on the sale of assets at the end of the operating life has been taken as *salvage value* in the terminal year. In computing the project IRR, the project developer has taken into account profit after tax, depreciation and interest on term loan and salvage value (in the terminal year). The principle adopted conforms to the accepted accounting and taxation principles.

Based on the above, the project IRR (without VCU revenue) works out to 7.99% in contrast to the benchmark of 10.75%. In the above background, the Validation Team is convinced that the project is additional and not a business-as-usual scenario.

Sensitivity analysis

The Guidance on Assessment of Investment Analysis /B05-4/ requires the robustness of the conclusion arrived at to be proved through a sensitivity analysis by varying the critical assumptions to reasonable variations. The three parameters have been identified as critical, namely, Biomass Cost, Plant Load Factor and the project cost. Guidance 18 of Annex 58 of EB 51 states that sensitivity analysis should be conducted to cover a range of +10% and −10%. The results of sensitivity analysis are given in the following table:

Variable parameters	**Variation**		
	-10%	0%	10%
Project Cost	9.39%	7.99%	6.77%
CUF	4.95%	7.99%	11.00%
O & M Cost	9.18%	7.99%	6.72%
Fuel Cost	17.29%	7.99%	Negative

A cursory glance at the data given above would reveal that the project becomes non-additional if the biomass cost comes down by 10% or if the PLF goes up by 10%. Barring variation in biomass cost and CUF, the project remains additional when other parameters are subjected to 10% variation. The ruling price of biomass is more that INR 3000 /MT in contrast to which, a cost of INR 2000/MT has been considered in the calculation. Hence, the cost coming down is highly hypothetical. Since the PLF has been assumed at 85% with 350 days operation, increase in the PLF by 10% would result in achieving a PLF of 93.5% for 350 days in year on consistent basis for 20 year, which no biomass power plant is known to have achieved. Hence, both the conditions are unrealistic.

Further, it could be observed from the above table that the tariff has not been subjected to variation. This is for two reasons. In the first place, since the PLF has been subjected to variation, a separate analysis for tariff is not required in as much as in the ultimate analysis what is subjected to variation is only the revenue, which is nothing but a product of tariff and generation. It makes no difference whether the PLF (and hence generation) is varied or the tariff is varied. Secondly, the project is intended for captive consumption and the power cost saved is decided based on the power bill paid by the company (and the power cost saving is based on the electricity bill) before the project activity commenced generation and after the project activity commenced generation. Subsequent to the commencement of project activity, the project gets insulated from any increase or decrease in grid power tariff. Hence, subjecting power tariff to variation has no relevance for this project activity.

Summary

In the above background, Validation Team concludes that the project is not a business-as-usual scenario and is additional. The carbon revenue benefits would enable the project to become financially attractive in as much as the project IRR with VCU benefits (11.09%) would cross the benchmark (10.75%) and hence carbon revenue benefits would enable the project developer to overcome the barrier.

3.3 Monitoring Plan

The project activity has correctly applied the Approved Monitoring Methodology AMS I.C., version 18 titled "Thermal energy production with or without electricity". The monitoring plan provides detailed information related to the collection and archiving of all relevant data needed to:

- Estimate or measure emissions occurring from GHG sources, sinks and reservoirs
- Determine the baseline emissions

The monitoring plan as per AMS I.C, version 18 has been clearly described in section 3.3 and 3.4 of the VCS PD. It covers all the monitoring parameters required to monitor the net electricity generation and emission reductions due to the project activity accurately. In order to determine baseline emissions, the net quantity of electricity generation as a result of the project activity will be monitored. The net electricity supplied by the power plant (which is located within the premises of GACL unit) is calculated as the difference of gross electricity generated and auxiliary electricity consumption. As the power plant and the textile unit are located within the same premises of GACL and the distance between the two units is less than 100 m, the transmission losses are negligible. As the emission reduction are claimed for the net electricity supplied to the textile unit and not the gross electricity generated by the power plant, the approach is deemed to be conservative. The monitoring plan/ procedure followed to measure the emission reductions is applied accurately and with a conservative approach.

However, the "Explanation of the methodology choice" is not correctly provided in section 3.1 of the VCS PD. In this context, following CAR is raised and closed after corrective action has been taken.

CAR/CL/FAR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR M1 The "Explanation of the methodology choice" provided	PD	The section 3.1 of PD is	Section 3.1 of PD	The "Explanation of the

CAR/CL/FAR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
in section 3.1 of the VCS PD states the choice of the baseline methodology and not the monitoring choice of the methodology (Cp VCD PD completing guidelines).		modified appropriately.		methodology choice" is corrected. Hence, this CAR is closed.

Fossil fuel (sub bituminous coal) will be used in the project activity only in case of any exigencies. If any the fossil fuel is used, then the corresponding project emissions due to use of fossil fuel will be deducted from the total emission reduction Project emissions will be calculated from the monitored quantity of fossil fuel and its NCV as explained in section 3.4 below.

Parameters Determined ex-ante

The following parameters are determined ex-ante and mentioned in section 3.3 of the PD:

- Surplus availability of biomass
- SEC of rice husk
- SEC of coal

The combined margin emission factor for NEWNE grid of India has been calculated to be 0.839 tCO2e / MWh and fixed ex-ante for the whole crediting period.

Parameters Monitored ex-post

Monitoring of the project activity involves all the parameters necessary for calculation of GHG emission reduction by the proposed project activity. These parameters are mentioned in section 3.3 of the PD. The parameters, which are to be monitored include:

- Gross electricity generated by the project activity "$EG_{gross,y}$"

- Auxiliary electricity consumption by the project activity "$EG_{aux,y}$"
- Amount of net electricity generated "$EG_{BL,y}$" (=$EG_{gross,y}$ - $EG_{aux,y}$)
- Quantity of rice husk consumed, "$FC_{rice\ husk,y}$"
- NCV of rice husk, $NCV_{rice\ husk,y}$
- Quantity of coal fired in the boiler, "$FC_{coal,y}$"
- NCV of coal used, $NCV_{coal,y}$
- Emission factor of coal, $EF_{CO2\ coal,y}$
- Moisture content of biomass, $M_{biomass,y}$

Detailed responsibilities and authorities for project management, monitoring procedures, calibration procedures and QA/QC procedures have been presented and were verified during follow up interviews. The gross electricity generation meter and the auxiliary meter are under sealed conditions by the meter suppliers. As the calibration frequency of the monitoring equipments (electricity meters) have not been specified by the respective manufacturers, as per para 17 (c) of the General guidelines to SSC CDM methodologies, the calibration will be done once in three years which is deemed appropriate by the validation team. The detailed monitoring practice is considered appropriate and the implementation of these will enable subsequent verification of the project's emission reductions.

3.4 Calculation of GHG emissions

The GHG emissions reduction calculations are transparently documented and appropriate assumptions regarding the expected amount of electricity generated have been used to forecast emission reductions.

According to the applied formulae in the PD, the emission reductions (ER_y) by the project activity during the crediting period is calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

Leakage is considered as zero as per paragraph 45 and 46 of AMS I.C, version 18 /B02/ and "General guidance on leakage in biomass project activities", version 03 /B05-7/.

The project emissions i.e. CO2 emissions from on-site consumption of fossil fuels due to the project activity during crediting period will be calculated by using

latest version of "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" /B05-8/.

Thus emission reductions due to the project activity are equal to the difference of baseline emissions and project emissions. According to the applied meth, the baseline emissions and project emissions are demonstrated in section 4.1 of PD and are calculated as follows:

$$BE_y = EG_{BL,y} * EF_{CO2}$$

Where:

BE_y = Baseline emissions in year y (tCO_2e/yr);

EG_{BLy} = Net quantity of electricity generated by the project activity in year y (MWh/yr);

EF_{co2} = Combined margin CO_2 emissions factor for grid connected power generation in year y.

And the project emissions are calculated as follows:

$$PE_{FC,y} = \sum_i FC_{i,y} \times COEF_{i,y}$$

Where:

$PE_{FC, y\ CO2}$ = emissions from fossil fuel combustion during the year *y* (tCO_2 / yr);

$FC_{coal\ ,\ y}$ = Quantity of fossil fuel (coal) combusted during the year y (tons/yr);

$COEF_{i\ ,\ y}$ = CO_2 emission coefficient of coal in year y (tCO_2 / ton);

However, for ex-ante estimation of emission reductions, 100% usage of rice husk has been considered. The project activity is expected to generate on an average of 41,769 MWh of electricity (gross) per year.

The emissions reductions due to the project activity were estimated ex-ante to be 35,044 tCO_2e per year in the PD and calculated /P07/ as follows:

As at this stage of estimation of project emissions it is assumed as zero.

$EG_{BL,y}$ = Capacity of the project plant * days of operation per annum * hours of operation per day*(1-%Auxiliary consumption) * CUF%

= 6.5 MWh*350days/year*24hrs/day*(1-10%)*85%

= 41,769 MWh/year

$ER_y = BE_y = BE_y = EG_{BL,y} * EF_{CO2}$

= 41,769 * 0.839

= **35,044** tCO2/year.

3.5 Environmental Impact

EIA study has been conducted for this project activity /P13-4/. No significant environmental impact is envisaged. Validation team has validated the clearances obtained from PPCB and other local bodies /P13/ and they are found to be in order.

3.6 Comments by stakeholders

Stakeholders have been directly asked to comment on the project through an open meeting among local stakeholders, project proponent and local authorities on 12th December 2008 at the project site.

GACL had invited stakeholders like own employees, local populace, statutory bodies and vendors to provide their general feedback on the project activity including its effect on the environment and its socio-economic effect. The invitation was given by issuing a letter to all the major sections of stakeholders.

The attendees have signed the attendance register and the same was checked by the validation team and found to be appropriate.

A summary of the comments received are included in VCS PD. All comments are positive in nature. No adverse comments were received and this is addressed in the PD. This was validated from the minutes of the meeting and can be evidenced from the document /P26/.

Nevertheless, due to the response of stakeholders comments not provided in PD following CAR is raised and closed after provision f response in revised PD.

CAR/CL/FAR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR L1 The response of		The response	Section 6 of PD	The response

CAR/CL/FAR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
stakeholders comments is not provided in section 6 of VCS PD.	PD	of stakeholders comments is provided in section 6 of revised PD.		of stakeholders comments is provided. Hence, this CAR is closed.

4 VALIDATION CONCLUSION

Gillanders Arbuthnot & Co. Ltd. has commissioned the TÜV Rheinland Japan Ltd. to validate the project: "6.5 MW cogeneration project in Akbarpur, Punjab.", with regard to the relevant requirements of the VCS Guidelines/ VCSA Rules for project activities, as well as criteria for consistent project operations, monitoring and reporting.

As a result of validation, the validation team confirms that the project fulfils criteria of VCS 2007.1 provided.

- The project additionality is sufficiently justified in the PD;
- The monitoring plan is transparent, adequate and inline with applied baseline and monitoring methodology of AMS I.C, version 18;
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of **35,044** t CO_2e per annum is most likely to be achieved during the 10 years renewable crediting period.

No restrictions or uncertainties are faced related to the validation of the project.

Annex 1: Abbreviation

AFBC	Atmospheric Fluidized Bed Combustion Boiler
BAS	Biomass Assessment Study
BE	Baseline Emissions
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CERC	Central Electricity Regulatory Commission
CM	Combined Margin
CR	Clarification Request
CUF	Capacity Utilization Factor
DNA	Designated National Authority
DOE	Designated Operational Entity
DR	Document Review
EB	CDM Executive Board
EF	Emission Factor
EIA	Environment Impact Assessment
ER	Emission Reduction
ERC	Electricity Regulatory commission
FAR	Forward Action Request
GACL	Gillanders Arbuthnot & Co. Ltd.
GHG	Greenhouse Gases
IDC	Interest During Consutruction
IETA	International Emissions Trading Association
INR	Indian Rupees
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
kg	Kilogram
kJ	Kilo Joule
kW	Kilo Watt
kWh	Kilo Watt Hour
L	Leakage
MNES	Ministry of Non Conventional Energy Sources-Govt. of India
MoEF	Ministry of Environment and Forest, Government of India
MoV	Means of Verification
MVP	Monitoring and Verification Plan
MW	Mega Watt
MWh	Mega Watt hour
NEWNE	Northern, Eastern, Western and North-Eastern
NGO	Non Government Organisation
NOC	No Objection Certificate
OM	Operating Margin
O & M	Operation and Maintenance
PD	Project Description
PE	Project Emissions
PLF	Plant Load Factor
PO	Purchase Order
PP	Project Proponent
PPCB	Punjab Pollution Control Board
PSEB	Punjab State Electricity Board
SERC	State Electricity Regulatory Commission
SSC	Small scale
tCO2	Tonnes of Carbon dioxide
TG	Turbo Generator
TPH	Tons per hour
UNFCCC	United Nations Framework Convention on Climate Change
VCU	Verified Carbon Unit
VVM	Validation and Verification Manual