



## VOLUNTARY CARBON STANDARD 2007.1

### Validation Report

18<sup>th</sup> November 2009

Version: 04

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| Name of Verification company:  | Date of the issue:  |
| TÜV Rheinland Japan Ltd.   | 18 November 2009  |
| Report Title:  | Approved by:  |
| Validation report of the GHG emission reduction project entitled "16.0 MW bagasse based cogeneration project at Ahmadnagar, Maharashtra by M/s Mula Sahakari Sakhar Karkhana Ltd." | <b>Dr. Manfred Brinkmann</b>  |
| Client:  | Project Title:  |
| M/s Mula Sahakari Sakhar Karkhana Ltd.   | 16.0 MW bagasse based cogeneration project at Ahmadnagar, Maharashtra by M/s Mula Sahakari Sakhar Karkhana Ltd. |

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| <b>Summary:</b> |  |
|-----------------|--|

The M/s Mula Sahakari Sakhar Karkhana Ltd. has commissioned the TÜV Rheinland Japan Ltd. to validate (along with 1<sup>st</sup> verification) the project: "16.0 MW bagasse based cogeneration project at Ahmadnagar, Maharashtra by M/s Mula Sahakari Sakhar Karkhana Ltd.", 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.

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 M/s Mula Sahakari Sakhar Karkhana Ltd. (MULA) in Ahmednagar district of Maharashtra. The new unit which became functional since 11<sup>th</sup> December, 2006 and is working in conjunction with the existing plant and is supplying committed quantities of steam and power to the sugar mill, during both crushing and non-crushing season. Surplus power is being sold to the NEWNE grid.

- ACM0006/Version 9: "Consolidated methodology for electricity generation from biomass residues" an approved methodology of UNFCCC CDM program is applied.
- There are no restrictions or uncertainties faced related to the validation of the project.
- In the course of the validation, 22 Corrective Action Requests (CARs) and 05 Clarification were raised and successfully closed. One (01) Forward Action Request (FAR) is raised, which will be verified during the next verification.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner and estimated emission reductions of 33,452 t CO<sub>2</sub>e/ year is most likely to be achieved.

|  |                         |
|--|-------------------------|
| <b>Work carried out by:</b>                                | <b>Number of pages:</b> |
| Mr Asim Kumar Jana<br>Mr Srinivasan S<br>Mr Raj Kumar Deka | 85                      |

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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<sup>1</sup>) 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 ACM0006/Version 9: "Consolidated methodology for electricity generation from biomass residues" 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
  - Baseline methodology
  - Baseline GHG emissions
- Monitoring Plan

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

- 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 activity "16.0 MW bagasse based cogeneration project at Ahmadnagar, Maharashtra by M/s Mula Sahakari Sakhar Karkhana Ltd." is a power capacity expansion grid connected cogeneration project. It is proposed by M/s Mula Sahakari Sakhar Karkhana Ltd and involves the installation of a new power plant adjacent to an existing power plant, at the premises of their sugar factory in Sonai village in Ahmadnagar District, Maharashtra, India.

The project was commissioned in December 2006. The project utilises bagasse generated in the sugar mill. The project uses a double extraction cum condensing type turbo generator coupled with a travelling grate technology high pressure boiler. The boiler has a steam generation capacity of 80 tones per hour at a pressure of 67 kg/cm<sup>2</sup> and a temperature of 485°C.

The steam requirement for the sugar mill is met from the extracted steam from the turbine of the co-generation plant. The sugar mill has a cane crushing capacity of 3500 TPD, with a total of 195 operative days (180 days of season and 15 days of off season). It will export approximately 54,864 MWh during the season and 4968 MWh during the off-season to the Maharashtra State Electricity Board (MSEB) grid. All the bagasse (biomass residue) generated in the

sugar plant will be utilized. The technology used in the project activity is indigenous.

The main objective of the project is to reduce anthropogenic GHG emissions by displacing fossil fuel based power generation in the NEWNE regional grid. The project thereby helps in reducing the power deficit in the Maharashtra state, and contributes towards sustainable development.

Total estimated GHG emissions due to the project activity are expected to be on an average 33,452 tonnes of CO<sub>2</sub> per year during ten years of chosen crediting period.

#### **1.4 Level of assurance**

The validation report is based on VCS PD / P01.2/, supporting documents made available to the validation team and information collected through performing interviews and during the on-site assessment. The validation opinion is assured provided the credibility of all above.

## **2 METHODOLOGY**

### **2.1 Review of Documents**

The draft PD /P01.1/ submitted by the M/s Mula and supporting background documents related to the project design and baseline were reviewed over a period between December 2008 to September 2009. 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                              | Name of Document   |
|--|--|
| /P01.1/                                | 16 MW Bagasse based cogeneration Project, Draft VCS PD, dt. February 02, 2009  |
| /P01.2/                                | 16 MW Bagasse based cogeneration Project, Draft VCS PD, dt. July 30, 2009  |
| /P02/                                  | Spreadsheet calculations for Bagasse Balance for reference plant and project plant   |
| /P03/                                  | Spreadsheet calculations for Voluntary Carbon Units (VCU)  |
| /P04/                                  | Assessment records during site visit by the validation team  |
| <b>Project Design (PD)</b>             |  |
| /PD01/                                 | Agreement contract between MSSKL & M/s Walchandnagar Industries Ltd. for supply, erection & commissioning of 80 TPH and 67 kg/cm <sup>2</sup> boiler, dated April 02, 2001   |
| /PD02/                                 | Joint meter reading by MSEDCL and MSSKL, mentioning the first date of commissioning, Dated December 31, 2006   |
| /PD03/                                 | Milind Sangwkar and Associates, Chartered Engineer, Certification for residual life of existing equipments -2 x 25 TPH and 1 x 35 TPH and TGs - 1.5 MW and 2.5 MW - of MSSKL, Letter No. MSA/CE/MSSK/2007/45, dated July 02, 2007.                                   |
| /PD05/                                 | Letter from T D Power Systems Pvt. Ltd for Life expectancy of a steam Turbine Generator Set - Ref/: TDPS/BMB/STG/ORD/MSSK/Gen dated 28.08.2009   |
| /PD06/                                 | Letter from the boiler manufacturer, M/s Walchandnagar Industries Limited for life expectancy of the new 80 TPH boiler dated 2 <sup>nd</sup> September 2009.   |
| /PD07/                                 | Energy Purchase Agreement between Maharashtra State Electricity Board & M/s Mula Sahakari Sakhar Karkhana Limited, Sonai, Tal-Newasa, Dist-Ahmednagar based on MERC order dated 15/07/2002, Letter No. TD/CP/CO-GEN/BAGASSE/Mula SSKL/1551/835 dated August 08, 2003 |
| /PD08/                                 | Certification of Chartered Engineer for the efficiency of electricity generation and thermal efficiency for Project plant and reference plant.   |
| <b>Baseline and Additionality (PA)</b> |  |
| /PA01/                                 | Agreement contract between MSSKL & M/s Walchandnagar Industries Ltd (WIL) for supply, erection & commissioning of 55 TPH and 45 kg/cm <sup>2</sup> boiler, dated April 10, 2000  |
| /PA02/                                 | Cancellation of PO for 55 TPH boiler, Letter REF NO/ Engg/ 4748/2000, Date December 24, 2000   |

- 
- /PA03/ Certificate by Registered Chartered Engineer for Project cost of the Project activity and the reference plant.
- /PA04/ Detailed Project Report for 16 MW Cogeneration power plant prepared by MITCON for substantiating project cost and the means of finance.
- /PA05/ Annual report of the Karkhana for substantiating equity reserve for 2000-01
- /PA06/ Annual report of the Karkhana for the year 2006-07 for substantiating borrrwal of equity for the project plant, from member farmers.
- /PA07/ Final manufacturing report in the form R.T.8 CC for the season 2003-04, 2004-05,2005-06, 2007-08 and 2008-09.
- /PA08/ MERC Order of August 16th 2002  
<http://www.mercindia.org.in/pdf/16082002.pdf> (Page No 8)
- /PA09/ <http://www.mercindia.org.in/orders.htm>, Speaking Tariff Order (1999-2000), Dated May 05, 2000, Page No. 145.
- /PA10/ Energy conservation and co-generation in sugar manufacture by D.P Kulkarni & R.K.Sirdeshmukh
- /PA11/ Technology manufacturer information of the boilers for substantiating operating parameter requirements as evidenced from the Boiler purchase agreement for 45 kg/cm<sup>2</sup> and 67 kg/cm<sup>2</sup>
- /PA12/ Cooperative Sugar Directory & Year book published in the year 2000 by National Sugar Federation of cooperative sugar factories Ltd., New Delhi
- /PA13/ Letter from walchandnagar Industries limited for operating fuel in the new boiler dt. 8th September 2009.
- /PA14/ Vasantdada Sugar Institute, Status of 67 Kg /cm<sup>2</sup> pressure boiler operating in Maharashtra in year 2001,Letter No. VSI/SE/ANG6/2322/2007-08 , dated July 16, 2007.
- /PA15/ Agrienergy Quarterly report march 2005 , July 2005  
[http://agrinergergy.com/gof\\_1st%20quarter%20report\\_%20mar%202005.pdf](http://agrinergergy.com/gof_1st%20quarter%20report_%20mar%202005.pdf)
- /PA16/ The Letter of certification from the Ahemednagar District Co-operative bank for the demonstration of Investment barrier dt 10 Nov 2009
- /PA17/ Copy of Certified true copy of resolution 15 for the determination of baseline.

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**Monitoring plan (PM)**



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- /PM01/ System of Technical control for cane sugar factories in India", page No.17 and 50
  - /PM02/ Letter from M/s Walchandngar Industries Ltd for non-usage of wood logs in the boiler.

**Calculation of GHG Emissions (PE)**

- /PE01/ Quarterly report of electricity generation to The Electricity duty Inspector, I.E & L. Department for the years 2003, 2004, 2005 and 2006: Source of data for EG<sub>historic,3 yr.</sub> and EG<sub>total,y.</sub>
- /PE02/ Chartered Engineer's certificate for expert judgment for supporting the value of average net efficiency of electricity for reference plant. Ref-: CER/PMD/2008-09/07 dt 18/11/2009.
- /PE03/ Energy Audit Report, Prepared by Mitcon Consultancy Services Limited, dated September 2007
- /PE04/ Performance Test Report Prepared by Mitcon Consultancy Services Limited
- /PE05/ Thermax report for the value of NCV of Bone dry biomass residue, page No 29.

**Statutory Clearances and Environmental Impacts (PL)**

- /PL01/ MPCB, Consent for Establishment & expansion of plant from MPCB, Letter No. Consent No. BO/RONK/A'NAGAR-71/E/312-02/CC-150, dated May 07, 2003
- /PL02/ Environment Clearance from ENVIROMENT DEPARTMENT of Maharastra to permit expansion from 2500 TPD to 3500 TPD dated 22/03/2004
- /PL03/ MEDA, Consent to establish for project activity, Letter No. BCP-044/2003-2004/5428 dated October 20, 2003

**Stakeholder comments (PS)**

- /PS01/ Invitation letter for stakeholder consultation meeting dated Nov 14 2005
  - /PS02/ Attendance sheet for stakeholder consultation meeting dated 29 November 2005
  - /PS03/ Minutes of meeting for stakeholder consultation meeting dated 29 November 2005
-

### Background investigation and assessment documents

| Reference | Name of the Document   |
|-----------|--|
| /B01/     | ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable  |
| /B02/     | Consolidated methodology for electricity generation from biomass residues (Version 09)   |
| /B03/     | CO2 Baseline Database for Indian Power Sector -User Guide, Ver 4 dated September 2008 published by CEA.  |
| /B04/     | Combined tool to identify the baseline scenario and demonstrate additionality, Version 02.2  |
| /B05/     | Voluntary Carbon Standard Project Description Template UNFCCC: Guidelines for Completing the Project Design Document (CDM- -PDD)                         |
| /B06/     | The Greenhouse Gas Protocol, The GHG Protocol for Project Accounting   |
| /B07/     | 1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book<br>2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book |
| /B08/     | Kyoto Protocol (1997)  |
| /B09/     | Decision 17/CP.7 (Marrakesh - Accords)   |
| /B10/     | "Tool to calculate the emission factor for an electricity system" version 1.1  |
| /B11/     | IETA, PCF Validation and Verification Manual   |

### Web sites used:

|       |  |
|-------|--|
| /W01/ | Website of UNFCCC, <a href="http://unfccc.int/">http://unfccc.int/</a>   |
| /W02/ | Website of Ministry of Environment and Forest, Government of India <a href="http://envfor.nic.in/">http://envfor.nic.in/</a>             |
| /W03/ | Website of Ministry of Non Conventional Energy Sources (MNES), Government of India <a href="http://mnes.nic.in/">http://mnes.nic.in/</a> |

|       |   |
|-------|---|
| /W04/ | Website of Central Electric Authority of India<br><a href="http://www.cea.nic.in/">http://www.cea.nic.in/</a>   |
| /W05/ | Website of Maharashtra Electricity Regulatory Commission<br><a href="http://www.mercindia.org.in/">http://www.mercindia.org.in/</a>   |
| /W06/ | Maharashtra State Co-Operative Sugar Factories Federation Ltd.<br><a href="http://www.mahasugarfed.org/diary_page16.htm">http://www.mahasugarfed.org/diary_page16.htm</a>   |
| /W07/ | ISO 14064-2; ISO 14064-3, ISO 14065   |
| /W08/ | <a href="http://www.v-c-s.org/">http://www.v-c-s.org/</a>   |
| /W09/ | <a href="http://www.gorissen.info/Pierre/maps/googleMapLocation.php?lat=19.394341&amp;lon=74.816360&amp;setLatLon=Set">http://www.gorissen.info/Pierre/maps/googleMapLocation.php?lat=19.394341&amp;lon=74.816360&amp;setLatLon=Set</a> |

## 2.2 Follow-up Interviews

On 28th and 29th August 2009, the validation team performed validation visit with the project proponent at M/s MULA.

During this visit, as well as, before and after the visit, interviews were carried out with the project proponent, the consultant, project stakeholders and with local authorities to confirm selected information and to resolve issues identified in the document review.

The key interviewees are mentioned below.

| S.No  | Date (YYYY-MM-DD) | Name              | Organization    | Topic   |
|-------|-------------------|-------------------|-----------------|---|
| /I01/ | 2009-08-29        | Mr. D.B.Kadam     | Farmer          | Quality of supply electricity   |
| /I02/ | 2009-08-29        | Mr. D.N.Darandale | Farmer          | Quality of supply electricity & Environmental impact due to project activity. |
| /I03/ | 2009-08-28        | Mr. D.T.Gadakh    | Finance Manager | Project Additionality   |
| /I04/ | 2009-08-28        | Mr.M.P.Bhork      | Work -          | Project   |

| S.No      | Date (YYYY-MM-DD) | Name             | Organization             | Topic   |
|-----------|-------------------|------------------|--------------------------|---|
| 5/        |                   | ade              | Manager                  | Additionality and the Training Record                               |
| /I0<br>6/ | 2009-08-28        | Mr. R.V. Nesari  | Technical Expert, MITCON | Emission reduction calculation                                      |
| /I0<br>7/ | 2009-08-28        | Mr. Vikash Singh | Consultant, MITCON       | VCS-PD, Baseline, Additionality and Emission reduction calculations |
| /I0<br>8/ | 2009-08-28        | Mrs. Pooja verma | Consultant, MITCON       | VCS-PD, Baseline, Additionality and Emission reduction calculations |

### 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 CL |
|--|------------|------------|-----------|
| D- Project Design                                    | 02         |            | 1         |
| B- Baseline and additionality                        | 09         | -          | 2         |
| M- Monitoring plan                                   | 06         | 01         | 2         |
| C- Calculation of GHG emissions                      | 05         | -          | -         |
| E- Environmental Impact                              | -          | -          | -         |
| L- Local Stakeholder Comments                        | -          | -          | -         |
| <b>SUM</b>   | <b>22</b>  | <b>01</b>  | <b>5</b>  |

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 activity is a new bagasse based co-generation power plant with a rated capacity of 16 MW (with 80 TPH boiler at 67 kg/cm<sup>2</sup>) and will be operated next to the existing equipments to fulfil the steam and power requirement of the sugar mill and the surplus power will be exported to the regional, NEWNE grid.

The above description of the project plant is provided in section 1.4 and 1.9 of the VCS PD. The validation team has cross verified the details presented during the site visit and by reviewing the boiler purchase (80 TPH) agreement /PD01/ and detailed project report prepared for the project plant /PA04/.

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 PP has described the project activity by means of drawings and specifications of the major equipments such as boiler and turbine. These were verified from the purchase orders and the boiler agreement /PD01/and the validation team found that they are correct.

Before the project implementation, two TG sets of rated capacities - 1.5 MW and 2.5 MW and 4 boilers of rated capacities - 2 x 25 TPH and 1 x 35 TPH and 21 kg/cm<sup>2</sup> pressure were operating to cater the steam and power requirement of the sugar factory. The details are provided in section 1.7 of VCS PD. The validation team has verified the configurations of equipments that were operating in pre-project scenario during the site visit by checking at the name plate details.

All the existing equipments have a residual life of 12 to 18 years and are mentioned in the VCS PD in section 1.7. This was cross verified from the /PD03/. These equipments will continue to operate. The validation team validated the same during the site visit and found that the details provided are correct.

The project plant has an efficiency of electricity generation and thermal efficiency of 20 % and 69 % compared to 6 % and 68 % respectively for the reference plant technology/PD08/. With these data, the validation team was able to conclude that the project plant technology results in significantly greater performance than any technology that are commonly used at the time of conceptualisation of the project in India. The common technologies

that were available at the time of conceptualisation of the project are validated in section 3.2 of this report. The PP has provided calculation sheets for these efficiencies and are attached as /P03/. The reference plant configurations - Boilers (55 TPH and 25 TPH) and Turbine (3 MW and 1.5 MW) were verified from the corresponding purchase orders /PA01/ and the certified true copy of the resolution of the Annual meeting of board of directors dt 04/10/1999 /PA17/. All the sources for the input parameters for these calculations were checked and found to be appropriate. The validation of these calculation sheets is presented in section 3.4 of this report. Hence the validation team was able to conclude that the project activity reflects current good practices, and result in a significantly better performance, than any commonly used technologies in the host country.

The start date of the project plant is December 11, 2006, the day on which the commissioning of the project plant, the day when the real emission reduction happened. The validation team validated the same by verifying the dates mentioned in the commissioning certificate for the project plant /PD02/. This starting date confirms the definition of starting date provided in VCS 2007.1.

The project duration is taken as 25 years. The validation team validated the same from the letters provided by the manufacturers of boilers and turbine/PD05/ and /PD06/. The life time of the existing equipments are provided in the VCS PD and are validated from the Chartered Engineers certificate/PD03/.

The PP has chosen a crediting period of Ten years starting from the day when the real emission reduction happened i.e., 2006/12/11.

The PP, M/s MULA has the ownership of the proposed project. It was verified from the power purchase agreement signed with the state utility /PD07/.

The emission reduction has not been double counted and the project is not registered under any other mechanism and hence there is no rejection history.

In order to validate the above, the validation team checked various approved international registries for GHG emissions reporting and transactions on 24th September, 2009, which are summarized below.

1. California Climate Action Registry  
(<https://www.climateregistry.org/CARROT/public/reports.aspx>)
2. The Gold Standard Registry  
(<http://goldstandard.apx.com/resources/AccessReports.asp>)

3. The VCS Registry System (custodial system for Voluntary Carbon Units (VCUs))  
(<http://www.vcsprojectdatabase.org/resources/AccessReports.asp>)

4. CDM project database

(<http://cdm.unfccc.int/Projects/projsearch.html>)

The project was validated for registration in UNFCCC by the same DOE. However, the request for registration did not happen since the project do not confirm to the requirements of EB 49, ANNEX 22 for seriousness of CDM consideration.

From the above analysis, the validation team is able to verify and conclude that the PP has not created any other form of environmental credit for the monitoring period, claimed in this validation.

However, CAR 1.1, CAR 1.2 and CL 1.3 were raised. The validation team's findings and conclusion of the same are presented in the Table 1 and Table 2 of the validation protocol.

## **3.2 Baseline**

### **3.2.1 Approval of the baseline methodology**

The project applies the approved consolidated baseline methodology ACM0006 (version 9) -"Consolidated baseline methodology for grid-connected electricity generation from biomass residues" /B02/ in combination with ACM0002, (version 09), "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" /B01/.

Baseline scenario selection and additionality determination has been proved by using "Combined tool to identify the baseline scenario and demonstrate additionality" Version 02.2 /B04/.

### **3.2.2 Correct application and justification of selected baseline methodology**

This methodology is applicable to the 16.0 MW bagasse based cogeneration project at Ahmadnagar, Maharashtra by M/s Mula Sahakari Sakhar Karkhana Ltd. as this project consists of a renewable energy generation plant for supplying electricity to the NEWNE grid. The project meets the applicability conditions of ACM0006 version 09 as

i) only biomass residues i.e., bagasse which is an agricultural residue produced as a by-product in the sugar mill is used in the cogeneration plant to generate thermal as well as electrical energy;

ii) it has been justified that there shall not be any increase in the production because of the project;

iii) only the necessary amount of biomass to keep the plant running during off-season are stored (always less than one year) and

iv) biomass residues do not require any preparation before being used as fuel in the project.

Project activity boundary is identified as physical boundary of the project activity and the NEWNE grid to which the project activity is physically connected. The boundary covers all the activities related to the project and will be sufficiently covering the GHG emission from the project activity. This was verified from the site visit and document review.

|                    | <b>Source/GHGs involved</b>  | <b>Justification/Explanation</b>  |
|--------------------|--|---|
| Baseline emissions | CO2 emission from Grid electricity generation<br>All other GHGs are neglected.   | The power plant in the selected boundary is mainly dominated by fossil fuel based power generation technology. This is the main source of emission. The justification is adequate and acceptable to the validation team.  |
| Project Activity   | CO2 emission from on -site fossil fuel and electricity consumption due to the project activity (stationary or mobile)<br>All other GHGs are neglected. | The CO2 emission is considered in case fossil fuels or electricity is used due to project activity.<br>CO2 emission is not considered for Off-site transportation of biomass residues, as the entire biomass fuel requirement is met by in-house biomass waste generation. There is no import of fuel from out side boundary for the project activity. The justification is adequate and acceptable to the validation team. |
| Leakage            | No leakage is considered   | The project activity has selected scenario 13 as the most likely baseline scenario for the use of the biomass residues for energy generation. The diversion of biomass  |



|  |  |   |
|--|--|---|
|  |  | residues to the project activity is already considered in the calculation of baseline reductions. In this case, leakage effects do not need to be addressed. The justification is adequate and acceptable to the validation team. |
|--|--|---|

### 3.2.3 Appropriate setting of baseline scenario

The project is in accordance with scenario 13 of ACM0006, i.e. the project activity is a power capacity expansion project and consists of the installation of a new biomass power generation unit which will be operated next to an existing power generation capacity and both of these will use the same type of biomass, namely bagasse. In the absence of the project activity, a new biomass power plant namely "the reference plant" would be installed instead of the project plant at the same site and with the same thermal firing capacity but with a lower thermal efficiency as the project plant (e.g. by using a low-pressure boiler instead of a high-pressure boiler).

The alternatives considered for determination of the baseline scenario in the context of the project activity include alternatives for Power, heat and biomass as following -

#### **Power**

P4: The generation of power in the grid.

P5: The installation of a new biomass residue fired power plant that is fired with the same type and with the same annual amount of biomass residues as the project activity, but with a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the project plant and therefore with a lower power output than in the project case.

#### **Heat**

H2: The proposed project activity (installation of a cogeneration power plant), fired with the same type of biomass residues but with a different efficiency of heat generation (eg. an efficiency that is common practice in the relevant industry sector)

#### **Biomass**

B4: The biomass residues are used for heat and/or electricity generation at the project site

The baseline options considered do not include those options that:

- Do not comply with legal and regulatory requirements; or
- Depend on key resources such as fuels, materials or technology that are not available at the project site.

In view of the options - P4, P5, H2 and B4 being the probable alternatives for baseline, Scenario 13 as per ACM 0006 / Version 9, is the plausible alternative, which fits the present project activity. The PP has provided a distinction from the scenario 18 in the VCS PD. The justification for the selection of scenario is acceptable to the validation team.

The PP has provided certified true copy of annual meeting of board of directors dt. 4/10/1999 /PA17/ which states the intention of the PP to go for 55 TPH and 25 TPH boilers with 45 kg/cm<sup>2</sup> and 3 MW and 1.5 MW TG. Hence the selection of baseline is deemed correct.

However, the validation team noted that MSSKL had released the purchase order only for part of the reference plant i.e., 45 kg/cm<sup>2</sup>, 55 TPH boiler and 3 MW turbine. Purchase orders for remaining additional equipments were not placed since after the consideration of Carbon benefits, the earlier purchase order for medium steam pressure technology (55 TPH boiler(45 kg/cm<sup>2</sup>)and 3 MW turbine) was cancelled and purchase order for equipments of high pressure steam technology were placed. This includes 67 kg/cm<sup>2</sup>, 80 TPH and 16 MW cogen plant. Hence the validation team concluded that the most appropriate baseline is the reference plant i.e., 55 TPH + 25 TPH boilers (45 kg/cm<sup>2</sup>) and 3 MW + 1.5 MW TG. They were validated as per documents /PA01/, /PA02/, /PD01/ and /PA17/.

#### **3.2.4 Assessment and demonstration of additionality**

In accordance with ACM0006, the additionality of the project is demonstrated through the "Combined tool to identify the baseline scenario and demonstrate additionality" version 2.1/B04/.

The VCS PD has identified barriers to prove additionality of the project activity. The validation team considered all the arguments presented in the VCS PD. Consideration of these arguments is presented in the following paragraphs and it is concluded that the proposed project activity faced barriers due to investment barrier, prevailing practice barrier and policy related barrier.

The validation of step 1 of the tool is presented in the section 3.2.3 of this report.

**Step 2: Barrier analysis:****Step 2a: Identify barriers that would prevent the implementation of alternative scenarios:**

The validation team considered all the arguments presented in the VCS PD /P01.2/. Consideration of these arguments is presented in the following paragraphs and it is concluded that the proposed project activity faced the investment barrier, prevailing practice barrier and Regulatory Barriers.

**A. Investment Barrier:**

The PP has made claim for investment barrier by demonstrating that the financing of the project was assured only due to the benefits of the carbon credits as per the para 6 of EB 50, Annex 13.

For this, it has been demonstrated that the loan approval by the lead consortium of the banks (lender) has taken explicitly the revenues from the carbon credits into account. For this the bank has provided a letter certifying that the loan was sanctioned only after taking explicitly the carbon benefits into account/PA16/

Hence the validation team concluded that the project activity faced investment barrier, which the baseline scenario did not face for its implementation since the debt was already sanctioned.

**B. Technological Barrier:**

The PP faces the technological barrier due to "the particular technology used in the proposed project activity is only marginally available in the relevant region". The para 6 of EB 50, Annex 13, states that "The existence of a technological barrier for high pressure steam technology is confirmed by showing evidence that the use of this technology in the considered sector is marginal e.g. below 10%". The PP has provided a letter from "Vasantdada Sugar Institute, Pune, India" (which maintains the register of the status of all sugar industries in the state of Maharashtra) /PA14/ which states "in the year 2001 when MULA conceived their cogeneration project, there was no sugar mills in Maharashtra with boilers at the pressure of 67 kg/cm<sup>2</sup>. Subsequently in the year 2006, when the MULA commissioned their cogeneration plant, they became second in Maharashtra to have gone for this configuration". One mill out of 128 mills (refer pg No 9 of the foot note 42; only cogen mills are considered as the ownership of the cogen mills differs from other mills, which is validated in the demonstration of investment barrier, presented above) proves that the technology has less than 1 % penetration in the relevant region. The project technology category has been taken as solid biomass combustion in high pressure (> 60 bar). The assessment of the project technology category

confirms to Annex 1 of Annex 10 in the 34th Meeting report of CDM-Meth Panel: Note on the barrier "first of its kind".

From this the validation team is able to conclude that the project activity faces technological barrier, which prevented its implementation and which does not prevent the implementation of the alternative.

**Step 2b: Eliminate alternative scenarios which are prevented by the identified barriers:**

The PP has argued that the alternative which is prevented by the identified barriers is the implementation of project without VCS benefits. The arguments are sufficiently supported by evidences, wherever necessary and hence the validation team accepts the outcome of step 2b and hence the only alternative is the implementation of the reference plant.

**Step 3:** This step is not adopted in the VCS PD. The additionality of the project was demonstrated by barrier analysis. Hence investment analysis was neglected. The validation team assessed the arguments presented and found that the barriers presented do not have a clear impact on the financial viability of the project activity and the exclusion of step 3 is accepted.

**Step 4: Common practice analysis:**

The step 2 was further complemented with the common practice analysis with an extent to which the project plant has already diffused in the state of Maharashtra. The PP has presented that at the time of conceptualization of the project in the year 2001, it was the first high pressure (67 kg/ cm<sup>2</sup>) cogeneration power plant that was proposed to be implemented in a co-operative sugar mill in Maharashtra. The validation team verified the same with the letter of Vasantdada Sugar Institute, Pune, India (which maintains the register of the status of all sugar industries in the state of Maharashtra) /PA14/, which clearly states the same.

In order to validate the same, the validation team raised a CAR 2.6 requesting the PP to clarify why the analysis was restricted to the state of Maharashtra and co-operative mills and support the same with documentary evidences. The PP has submitted that in view of vast difference in regulatory frameworks between each state and between co-operative mills and the private mills, the common practice analysis was restricted to the state of Maharashtra and the co-operative mills. The PP has also provided documented evidence to support the differences in the regulatory framework for sugar plants in each state in India and the framework of co-operative mills /PA15/, /Annex 4 of VCS PD/ and a web link of Ministry of power, Government of India ([http://www.powermin.nic.in/indian\\_electricity\\_scenario/s\\_e\\_regulato](http://www.powermin.nic.in/indian_electricity_scenario/s_e_regulato)

ry\_commission.htm). From the data, the validation team noted and concluded that the regulatory framework in other states is completely different. Also the validation team noted from the note on co-operative industries provided as Annex 4 in VCS PD, that there are inherent problems associated only with the co-operative industries and not with the private industries. This is supported by written documentation of independent expert judgment from an educational institution / Foot note 65 in Annex 4 of VCS PD/.

In this connection CAR 2.4 is also raised. The validation team findings and conclusion of CAR 2.4 is provided in the protocol.

Hence the validation team concludes that the project technology has not diffused and is not common practice in the relevant geographical area.

### 3.3 Monitoring Plan

The project activity has correctly applied the Approved Monitoring Methodology ACM 0006 (Version 9) titled "Consolidated Methodology for electricity generation from biomass residues". Applicability criteria of the monitoring methodology to the project activity are met as noted in section 2.2 of VCS PD. The project also applies ACM0002 version "Consolidated methodology for grid-connected electricity generation from renewable sources " for calculation of the northern grid emission factor.

The revised monitoring plan /P01.2/ 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
- ◆ Estimate changes in emissions from the site

The monitoring plan as per ACM0006, version 09 has been clearly described in section 3.3 and 3.4 of the VCS PD. It covers all the monitoring parameters required to measure the electricity generation and emission reductions due to the project activity accurately. The monitoring methodology indicates the electricity generated will be continuously monitored and hourly/daily (depending on the parameter) measurement will be recorded manually by the shift operator in logbooks. Both total generations and auxiliary<sup>2</sup> consumption will be monitored for the project activity. The logbooks will be checked by shift in-charge and daily and then monthly report will be prepared.

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<sup>2</sup> Presently no energy meters are installed for the auxiliary equipment of the old existing power plants. The connected load (Motor rating of the auxiliary equipment in operation) will be considered to estimate the auxiliary energy consumption. The rated capacity of the motor was verified during site visit and photographic evidences.

The monthly report will be verified by the managing director and will be used to generate monthly emission reduction reports. In order to determine baseline emissions, the net quantity of increased electricity generation as a result of the project activity (incremental to baseline generation i.e.  $EG_y^3$ ) will be monitored. However, the fixed baseline grid emission factor of 0.8 tCO<sub>2</sub>/MWh for the entire crediting period will be applied. Emission reductions due to displacement of electricity during the year y ( $ER_{\text{electricity},y}$ ) will be calculated by multiplying ex-ante baseline emission factor and  $EG_y$ . The VCUs will be estimated as per equation no. 1 of ACM0006, ver 9.

The assessment team visited the project activity on 28/08/2009 to 29/08/2009 and verified the monitoring plan/ procedure followed to measure the emission reductions accurately and with a conservative approach. The monitoring plan, as mentioned in section 3.3 and 3.4 of the VCS PD comply with the requirement of the baseline and monitoring methodology, ACM0006, version 09 for this project activity.

Fossil fuel will not be used in the project activity, however in case of any emergency if fossil fuel is used, then the quality of fossil fuel and the weighted average mass fraction of carbon in the fuel will be monitored. The corresponding emission from fossil fuel will be deducted from the total emission reduction.

The monitoring procedure involves the calculation of the emission reductions through this project activity. The net emission reductions of the project activity is based on the incremental electricity generated due to installation of the bagasse based cogeneration plant. The main parameters monitored for the calculation of the emission reductions are:

### 3.3.1 Parameters Determined ex-ante

1. Average net efficiency of electricity generation in the project plant prior to project implementation,  $\epsilon_{\text{el,Reference}} = 0.06$  MWh<sub>el</sub>/MWh Biomass (calculated value).  
This was validated from the calculation spread sheet provided by the PP. The calculation was correctly done and all the input parameters were adequately justified.
2. Steam to fuel ratio for the
  - a. Boiler No 1 (MR13323), 67 kg/cm<sup>2</sup>, S/F = 2.32 as per performance test report.
  - b. Boiler No 2 (MR10359), 21 kg/cm<sup>2</sup>, S/F = 2.07 as per Energy Audit report.

<sup>3</sup>  $EG_y$  will be calculated as the equation no. 15(b) of ACM0006, ver 9.

- c. Boiler No 3 (MR10360), 21 kg/cm<sup>2</sup>, S/F = 2.14 as per Energy Audit report.
- d. Boiler No 4 (MR11165), 21 kg/cm<sup>2</sup>, S/F = 2.10 as per Energy Audit report.

This was validated from the document /PE03/

- 3. Combined margin emission factor,  $EF_{CM} = 0.80$  tCO<sub>2</sub>/ MWh has been calculated taking source data from CEA baseline CO<sub>2</sub> emission database (Version 4.0). The validation team has checked the calculations presented in Annex 1 of VCS PD and found it appropriate in line with the "Tool to calculate emission factor of an electricity system, version 01.1".
- 4. Gross Calorific Value of differ fossil fuels used in a year y, for the calculation of emission factor, Kcal/kg

|         |        |
|---------|--------|
| Coal    | 3,755  |
| Gas     | 8,800  |
| Oil     | 10100  |
| Diesel  | 10500  |
| Naphtha | 11,300 |

These data was validated from Central electricity authority database (version 4.0)

### 3.3.2 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. The parameters, which are to be monitored, are:

1. The net quantity of electricity generation as a result of the project activity during the year y ' $EG_{\text{project plant},y}$ ', MWh
2. Net quantity of electricity generated in all power plants at the project site, generated from firing the same type(s) of biomass residues as in the project plant, including the new power plant installed as part of the project activity and any previously existing plants, during the year y ' $EG_{\text{Total},y}$ ', MWh
3. Net quantity of electricity generated during the most recent three years in all power plants at the project site, generated from firing the same type(s) of biomass residues as in the project plant  $EG_{\text{historic},3\text{yr}}$ , MWh
4. Quantity of biomass residue type k combusted in the project plant during the year y ' $BF_{k,y}$ ', tons
5. Quantity of biomass residue type k combusted in all power plants at the project site during the year y ' $BF_{\text{all power plants},k,y}$ ', tons
6. Net calorific value of biomass residue type k ' $NCV_k$ ', kJ/kg
7. Net calorific value of fossil fuel (coal) type i ' $NCV_k$ ', GJ/kg
8. Moisture content of each biomass residue type k, %
9. Total quantity of heat that is generated in the project plant during the year y,  $Q_{\text{Tot,proj},y}$ , GJ

10. Quantity of fossil fuel combusted at the project activity during the year  $y$ ,  $FF_{\text{project site},i,y}$ , Ton
11. CO<sub>2</sub> emission factor for fossil fuel (coal) type  $i$ , in year  $y$ , ' $EFCO_2,FF,i$ ' tCO<sub>2</sub>/GJ
12. Total weight of sugar-cane crushed in a year, Ton/year
13. Weight of water (imbibition water) added to bagasse in the mills, Ton/year
14. Weight of mix juice coming out of mills, Ton/year
15. Quantity of saved bagasse in a year Ton/year

Implementation of this monitoring plan may be checked during next stage of verification and certification

The validation team has checked the details of the specific instruments used to monitor the key parameters. These specifications confirm that the instruments are capable of measuring indicators of GHG emission reduction with satisfactory certainty.

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 detailed monitoring practice is considered appropriate and the implementation of these will enable subsequent verification of the project's emission reductions. However, CAR 3.1 to CAR 3.5 and FAR 01 have been raised. The validation team findings and conclusion of these CARs are provided in the protocol.

### 3.4 Calculation of GHG emissions

The calculation of the GHG emissions has been done as per ACM 0006, Ver 09. The emission reduction  $ER_y$  by the project activity during a given year  $y$  will be calculated as per equation 1 of the applied methodology. All the aspects related to the direct and indirect GHG emissions have been addressed and the calculations are presented in a transparent manner. The details of the various Green House Gases considered within the boundary are provided in section 2.3 of VCS PD and the validation of the same is provided in section 3.2.2 of this report.

Calculation of GHG emission is based on following main parameters:

1. The net quantity of increased electricity generation as a result of the project activity (incremental to baseline generation i.e.  $EG_y$  for scenario 13 of ACM 0006, ver 09).  $EG_y$  will be estimated as per equation 15(b) of the applicer methodology. All the required monitoring for estimation of  $EG_y$  is given in section 3.4 of the VCS PD. Average net energy efficiency of electricity generation in the reference power plant that would use the biomass residues



- fired in the project plant in the absence of the project activity (MWh<sub>el</sub>/MWh<sub>biomass</sub>),  $\epsilon_{el, \text{referencer plant}}$ , determined ex-ante has been verified from the declaration of Chartered Engineer /PE02/. DOE has also independently estimated the value of  $\epsilon_{el, \text{referencer plant}}$  (i.e. 0.06) from the data / parameter provided by PP with credible evidence and found the value (i.e. 0.06) certified by the Chartered Engineer is correct.
2. The baseline grid emission factor of 0.8 tCO<sub>2</sub>/MWh, determined ex-ante, has been applied. The emission factor for project activity is as per guidance of ACM 0006 / version 09, in line with the requirements of ACM 0002 / Version 07 where combined margin of build margin and operating margin are used. MSSKL has calculated emission factor for NEWNE (North East West Northeast) grid of India taking source data from "CO<sub>2</sub> Baseline Database for Indian Power Sector (Version 4.0) "published by Central Electricity Authority and the results are provided in Annex 1 of VCS-PD. The validation team has checked the correctness of the calculations presented and found appropriate.
  3. The baseline emissions arising from the natural decay of biomass are not claimed and are deemed to be conservative.
  4. Project emission by the use of fossil fuel -
    - a. The PP has not intended to use fossil fuel and hence the project emissions due to use of fossil fuel is considered to be zero. However in case on any emergency situation the Project activity use fossil fuel, the emission for same will be estimated (as per "Tools to calculate project or leakage CO<sub>2</sub> emission from fossil fuel combustion", ver 02) and deducted from the total emission reduction. The necessary parameters for the estimation of emission from fossil fuel will be monitored. The details of the parameters are given in section 3.4 of the PD.
    - b. There is no biomass transportation involved (as the bagasse is supplied by the in-house sugar mill and transported by conveyors). This was verified during site visit.
    - c. There is no electrical consumption for preparation of biomass. This was verified during site visit.
    - d. Methane emission from the waste water treatment is considered zero as the project activity does not call for the treatment of bagasse. This was verified during site visit.
  5. Scenario 13 of ACM 0006, ver. 09 does not call for determination of leakages.

The baseline grid emission factor of 0.8 tCO<sub>2</sub>/MWh will remain fixed for the entire crediting period of the project.

Moreover, DOE is able to verify that the thermal efficiency of the project plant (69%) is higher than the thermal efficiency of the

reference plant (68%) considered for baseline scenario. Therefore, as per the applied methodology (page 41, under section "Emission reductions or increases due to displacement of heat") the baseline emissions on account of displacement of heat are not considered (i.e.  $ER_{\text{heat},y}=0$ ). The thermal efficiency of the project plant and the reference plant are validated as per the certificate from the Chartered Engineer /PD08/.

However, the validation team, during its site visit found that presently no energy meters are installed for the auxiliary equipment of the old existing power plants. As per section 5.1 and 5.3 of Voluntary Carbon Standard 2007.1, PP has adopted the most conservative approach to estimate the auxiliary consumption, which will lead to the conservative estimation of GHG emission reduction. The connected load (Motor rating of the auxiliary equipment in operation) has been considered to estimate the auxiliary energy consumption. The rated capacity of the motor was verified during site visit and by photographic evidences. It was understood that energy meters will be installed for 2nd verification. In this regard DOE has raised a FAR 01 and the same has to be verified during future verification.

Based on above assumptions, it is validated that the expected average annual emission reductions of 33,452 tonnes of CO<sub>2</sub> equivalents (tCO<sub>2</sub>e) (based on 195 operating days) has been determined conservatively and transparently.

### **3.5 Environmental Impact**

According to Ministry of Environment and Forests, Government of India, Impact Assessment Notification S.O.60 (E), dated January 27, 1994 a new project which does not appear in schedule 1 of the notification is not required to carry out an Environment Impact Assessment (EIA) ([http://www.envfor.nic.in/legis/eia/so-60\(e\).doc](http://www.envfor.nic.in/legis/eia/so-60(e).doc)). As cogeneration projects in sugar industries is not included in this schedule and thus are exempted from conducting environmental impact assessment prior to their installation.

Validation team has validated the clearances obtained from MPCB and other local bodies and they are as per document number /PL01/, /PL02/ and /PL03/ in section 3.1 of this validation report.

### **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 November 29th 2005 at the project site.

MSSKL had invited stakeholders like office bearers of neighbouring village bodies, panchayat people, Customers, MPCB 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. This was validated by verifying the letter of invitation which was sent by the managing director of MSSKL to the stakeholders; Ref. 3817, Dated November 14, 2005 /PS01/.

The attendees have signed the attendance register and the same was checked by the validation team and found to be appropriate. The attendance register can be evidenced as document /PS02/. During the meeting, the project was presented to the stakeholders in an unbiased manner. It was validated by interviewing some of the attendees of the meeting, during the site visit conducted by the validation team to the project site. Considerations of the above comments are taken into account by MSSKL.

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 /PS03/.

As a part of the validation process, an interview with some local stakeholders was conducted.

- Interview was conducted with:
- Assistant Engineer (MSSKL)
- Cogeneration in-charge
- Sarpanch (Head of the Village), Gram Panchayat

The details are presented in the validation team assessment report /P04/.

#### 4 VALIDATION CONCLUSION

The M/s Mula Sahakari Sakhar Karkhana Ltd. has commissioned the TÜV Rheinland Japan Ltd. to validate (along with 1<sup>st</sup> verification) the project: "16.0 MW bagasse based cogeneration project at Ahmadnagar, Maharashtra by M/s Mula Sahakari Sakhar Karkhana Ltd.", 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.

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 M/s Mula Sahakari Sakhar Karkhana Ltd. (MULA) in Ahmednagar district of Maharashtra. The new unit which became functional since 11<sup>th</sup> December, 2006 and is working in conjunction with the existing plant and is supplying committed quantities of steam and power to the sugar mill, during both crushing and non-crushing season. Surplus power is being sold to the NEWNE grid.

The review of the VCS PD and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and review of comments by parties, stakeholders have provided the validation team with sufficient evidence to validate the fulfillment of the stated criteria. In the course of the validation, 22 Corrective Action Requests (CAR) and 05 Clarifications were raised and successfully closed out. Furthermore, 1 FAR has been raised which will be addressed during the course of verification of this project activity.

The validation is based on the VCS PD, proof of title, additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and supporting documents made available to the validators by project proponent.

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 ACM0006, version 09.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of **33,452** t CO<sub>2</sub>e 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:**  
**Abbreviations**

| Abbreviation     | Full Form   |
|------------------|---|
| CAR              | Corrective Action Request   |
| CDM              | Clean Development Mechanism                                       |
| CEA              | Central Electricity Authority                                     |
| CERC             | Central Electricity Regulatory Commission                         |
| CL               | Clarification Request   |
| DNA              | Designated National Authority                                     |
| DOE              | Designated Operational Entity                                     |
| DR               | Document Review   |
| EF               | Emission Factor   |
| EIA              | Environment Impact Assessment                                     |
| GHG              | Greenhouse Gases  |
| GOI              | Government of India   |
| IETA             | International Emissions Trading Association                       |
| INR              | Indian Rupees   |
| IRR              | Internal Rate of Return   |
| Kg               | Kilogram  |
| kJ               | Kilo Joule  |
| kW               | Kilo Watt   |
| Kcal/kg          | Kilo calorie per kilogram   |
| kWh              | Kilo Watt Hour  |
| MEDA             | Maharashtra Energy Development Agency                             |
| MERC             | Maharashtra Electricity Regulatory Commission                     |
| MNES             | Ministry of Non Conventional Energy Sources - Government of India |
| MoEF             | Ministry of Environment and Forest, Government of India           |
| MoV              | Means of Verification   |
| MPCB             | Maharashtra Pollution Control Board                               |
| MSEDCL           | Maharashtra State Electrical Distribution Company Ltd             |
| MSSKL            | Mula Sahakari Sakhar Karkhana Ltd                                 |
| MVP              | Monitoring and Verification Plan                                  |
| MW               | Mega Watt   |
| MWh              | Mega Watt hour  |
| NGO              | Non Government Organisation                                       |
| NOC              | No Objection Certificate  |
| ODA              | Official Development Assistance                                   |
| PDD              | Project Design Document   |
| PLF              | Plant Load Factor   |
| PO               | Purchase Order  |
| PP               | Project Proponent   |
| PWD              | Public Works Department   |
| tCO <sub>2</sub> | Tonnes Carbon dioxide   |
| TG               | Turbo Generator   |
| TPH              | Tons per hour   |
| SV               | Site Visit  |
| UNFCCC           | United Nations Framework Convention on Climate Change             |

## Appendix A

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### VCS VALIDATION PROTOCOL

**" 16.0 MW bagasse based cogeneration project at Ahmadnagar,  
Maharashtra by M/s Mula Sahakari Sakhar Karkhana Ltd"**

**REPORT No. 01 996 9105039097**

**Table 1: Validation requirements**

(Based on VCS 2007.1, VCS 2007.1 Program Guidance and § 37 of the CDM Modalities and Procedures and on CDM Validation and Verification Manual, Annex 3 of EB44)

| Checklist question  | Ref.        | MoV <sup>4</sup> | Findings, comments, references, data sources   | Draft conclusion | Final conclusion |
|---|-------------|------------------|--|------------------|------------------|
| <b>1. VCS Project Description Document</b>  |             |                  |  |                  |                  |
| 1.1. Is the VCS PD presented for validation based on the latest template available at the VCS website?<br><i>Indicate Yes / No answer and describe all inconsistencies in the Tables 2 and 3 accordingly.</i> | VCS PD      | DR               | Yes, the VCS PD presented for validation is based on the template (dt. 19 Nov 2007). This is the latest available template. The validation team has checked this in the VCS website and found to be correct. | OK               | OK               |
| 1.2. Has the VCS PD been established in accordance with the VCS requirements for completing VCS PD issued by the VCS Association?   | VCS website | DR               | Yes, VCS PD has been established in accordance with the VCS requirements for completing VCS PD issued by the VCS Association.  | OK               | OK               |
| <b>2. Project Description</b>   |             |                  |  |                  |                  |

<sup>4</sup> MoV = Means of Verification, DR = Document Review, I = Interview, www = internet search.

|  |        |    |   |                    |               |
|--|--------|----|---|--------------------|---------------|
| <p>2.1. Does the VCS PD contain a description, which provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation?</p> | VCS PD | DR | <p>The project activity is a new bagasse based co-generation power plant with a rated capacity of 16 MW (with 80 TPH boiler at 67 kg/cm<sup>2</sup>) and will be operated next to the existing equipments to fulfil the steam and power requirement of the sugar mill and the surplus power will be exported to the NEWNE grid.</p> <p>The above description of the project plant is provided in section 1.4 and 1.9 of the VCS PD. The validation team has cross verified the details presented during the site visit and by reviewing the purchase order of turbine of the project plant and also the boiler purchase (80 TPH) agreement /PD01/ and detailed project report prepared for the project plant /PA/. 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. However, CAR 1.1 is raised.</p> | <del>CAR 1.1</del> | Closed.<br>OK |
| <p>2.2. In the case of green-field project activity, is the project design described sufficiently by means of specifications, drawings and manuals?</p>  | VCS PD | DR | <p>The PP has described the project activity by means of drawings and specifications of the major equipments such as boiler and turbine. These were verified from the purchase orders and the boiler agreement /PD01/and the validation team found that they are correct.</p>   | OK                 | OK            |



|   |        |    |   |    |    |
|---|--------|----|---|----|----|
| <p>2.3. Does the project activity reflect current good practices, uses state of the art technology or would the technology result in a significantly better performance, than any commonly used technologies in the host country?</p> | VCS PD | DR | <p>The project plant has an efficiency of electricity generation and thermal efficiency of 20 % and 69 % compared to 6 % and 68 % for the reference plant technology. With these data, the validation team was able to conclude that the project plant technology reflect current good practice and results in significantly greater performance than any technology that are commonly used at the time of conceptualisation of the project in India.</p> | OK | OK |
| <p>2.4. In cases where the project activity involves the alteration of an existing installation or process, does the VCS PD provide a clear description of the differences between the project and the pre-project scenario?</p>      | VCS PD | DR | <p>Yes, the VCS PD provides a description of the difference between the project, the pre-project and reference scenario with the help of diagrams in section 1.7 and section 1.9. It is clear and satisfactory.</p>   | OK | OK |

|  |   |   |  |   |   |
|--|---|---|--|---|---|
| 2.5. Does the project grouping apply for the proposed project? If yes, does the VCS PD include a description of one central GHG information system and controls associated with the project and monitoring?                            | - | - | No, the project grouping is not applicable for the project activity. | - | - |
| 2.6. Does the central GHG information system and controls include items identified in ISO14064-3:2006, clause 4.5?   | - | - | Refer to question 2.5  | - | - |
| 2.7. How has the sampling been determined? Have any of the sub groups and associated activities within each sub group been considered? Does the sampling meet the requirement set out under IAF Guide to ISO/IEC 66/1999 at a minimum? | - | - | Refer to question 2.5  | - | - |
| 3. Project Start Date and Crediting Period   |   |   |  |   |   |

|   |                   |    |   |    |    |
|---|-------------------|----|---|----|----|
| <p>3.1. Are the project's start date clearly defined and evidenced? Does the project start date meet the requirements as stated in VCS 2007.1 clause 5.2.1? If project grouping is applied, each grouped project shall meet the requirement of VCS 2007.1 clause 5.2.1.</p> | VCS               | DR | <p>The project start date is December 11, 2006, the day of commissioning of the project plant. This is clearly defined and evidenced as per document /PD02/. The project is a non-AFOLU project and validated under VCS 2007.1. Validation was contracted before 19 November 2008.</p> <p>It meets the requirements as stated in VCS 2007.1 clause 5.2.1.</p> <p>The project grouping is not applied.</p> | OK | OK |
| <p>3.2. Is the start of the crediting period clearly defined and reasonable?</p>  | VCS               | DR | <p>The start of the crediting period is December 11, 2006, the day of commissioning of the project plant and the day when the real emission reduction happened. It is clearly defined in section 1.6 of VCS PD and it is found to be reasonable.</p>  | OK | OK |
| <b>4. Baseline and Monitoring methodology</b>   |                   |    |   |    |    |
| <b>4.1. General requirements</b>  |                   |    |   |    |    |
| <p>4.1.1 Is the methodology used in the project activity an approved VCS Program methodology or a methodology from a VCS-approved GHG program? Is the selected methodology version still valid?</p>   | VCS PD<br>ACM0006 | DR | <p>Yes, the methodology used in the project activity is ACM 0006 and is from a VCS-approved GHG program, CDM. The selected methodology version is Version 09 is valid from 31 Jul 09 onwards /B02/.</p>   | OK | OK |
| <b>4.2. Applicability of the selected methodology</b>   |                   |    |   |    |    |

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| <p>4.2.1 Are all applicability conditions of the selected baseline and monitoring methodology and all tools involved satisfied by the project activity?<br/><i>Please indicate Yes/No answer. In case of positive conclusion provide details of the validation measures. Otherwise amend the Tables 2 and 3 accordingly.</i></p> | VCS PD<br>ACM0006 | DR | <p>Yes, the project activity meets all the applicability conditions of selected baseline and monitoring methodology ACM0006 version 09 as</p> <p>i) only biomass residues i.e., bagasse which is an agricultural residue produced as a by-product in the sugar mill is used in the cogeneration plant to generate thermal as well as electrical energy;</p> <p>ii) it has been justified that there shall not be any increase in the production of biomass (Crushing capacity) because of the project;</p> <p>iii) only the necessary amount of biomass to keep the plant running during off-season are stored (always less than one year) and</p> <p>iv) biomass residues do not require any preparation before being used as fuel in the project. This applicability condition is not adequately addressed in the VCS PD. Hence CAR 2.1 and CAR 2.2 was raised.</p> | <del>CAR 2.1</del><br><del>CAR 2.2</del> | Closed.<br>OK |
| <p>4.2.2 Is the selection of the applied baseline and monitoring methodology justified?</p>  | VCS PD<br>ACM0006 | DR | <p>Yes, the selection of the applied baseline and monitoring methodology is justified in section 2.2 of VCS PD and it is found to be appropriate.</p>   | OK                                       | OK            |
| <p>4.2.3 Is the selected methodology correctly quoted in all related documents?</p>  | VCS PD<br>ACM0006 | DR | <p>Yes, the selected methodology is correctly quoted in all related documents such as VCS PD, the emission reduction calculation sheets.</p>  | OK                                       | OK            |

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| <p>4.2.4 Does the VCS PD sufficiently describe all the GHG emission sources or sinks occurring as a result of project activity, which have not been accounted for under the selected methodology and are expected to contribute more than 1% of the overall expected average annual emission reductions?</p> <p><i>Provide Yes/No answer. Indicate the sources or sinks of GHG, which were proved to be negligible. Otherwise amend the Tables 2 and 3 accordingly.</i></p> | VCS PD<br>ACM0006 | DR | <p>Yes the VCS PD sufficiently describes all the GHG emission sources or sinks occurring as a result of project activity in section 2.3. The GHGs, CO2 due to heat generation and uncontrolled burning of biomass is neglected. The validation team has checked the correctness of the selection of GHG emission source and sinks and found to be correct.</p> | OK | OK |
| <b>4.3 Project boundary</b>   |                   |    |  |    |    |
| <p>4.3.1 Does the VCS PD correctly describe the project boundary?</p> <p><i>Provide Yes/No answer. And amend the Tables 2 and 3 if needed.</i></p>  | VCS PD<br>ACM0006 | DR | <p>Yes, the VCS PD correctly describes the project boundary in section 2.3. Project boundary assumed for calculating emission reduction includes Cogeneration power project, the metering equipment and substation, and the part of grid which is used for the transmission of generated electricity. This is found to be correct.</p>                         | OK | OK |

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|---|-------------------|----|--|--|------------|
| 4.3.2 Does the VCS PD correctly indicate and describe the emission sources and sinks of GHG gases that are included in the project boundary?  | VCS PD<br>ACM0006 | DR | Yes, the VCS PD correctly indicates and describes the emission sources and sinks of GHG gases that are included in the project boundary in the form of a Table in section 2.3.   | OK                                       | OK         |
| 4.3.3 In cases where the methodology allows project participants to choose whether a source or gas is to be included in the project boundary, is the choice explained and justified by PPs? | VCS PD<br>ACM0006 | DR | CH4 due to uncontrolled burning or decay of surplus biomass residues is excluded since the biomass prior to the project activity was being used in the existing boilers. It was not burnt or left to decay naturally. And also, the CH4 due to Combustion of biomass residues for electricity generation and/or heat generation is excluded.<br><br>In both the cases, the reason is explained and justified. This is found to be appropriate. | OK                                       | OK         |
| <b>4.4 Baseline identification</b>  |                   |    |  |  |            |
| 4.4.1 Has the procedure contained in the selected methodology to identify the most reasonable baseline scenario been applied correctly and documented in the VCS PD?                        | VCS PD<br>/B04/   | DR | Yes, Baseline scenario selection and additionality determination has been proved by using "Combined tool to identify the baseline scenario and demonstrate additionality" Version 02.2. It is applied correctly and documented in the VCS PD in section 2.4.   | OK                                       | OK         |
| 4.4.1.1 Is the identified baseline scenario plausible?  | VCS PD<br>/B04/   | DR | To validate this, the validation team has raised CAR 2. 9 and CL 2.11.   | <del>CAR 2.9</del><br><del>CL 2.11</del> | Closed. OK |

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| 4.4.1.2 Are all assumptions stated in a transparent and conservative manner?                                 | VCS PD<br>/B04/          | DR | To validate this, the validation has raised CAR 2.9.  | <del>CAR 2.9</del>                | Closed. OK    |
| 4.4.2 Does the selected methodology require the use of tools <u>and</u> does VCS PD reflects that correctly? | VCS PD<br>/B04/          | DR | <p>The project applies the approved consolidated baseline methodology ACM0006 (version 9) -"Consolidated baseline methodology for grid-connected electricity generation from biomass residues" in combination with ACM0002, (version 09), "Consolidated baseline methodology for grid-connected electricity generation from renewable sources".</p> <p>The selected methodology require Baseline scenario selection and additionality determination to be proved by using "Combined tool to identify the baseline scenario and demonstrate additionality" Version 02.2. The VCS PD reflects them correctly.</p> | OK                                | OK            |
| 4.4.2.1 Were all the tools applied correctly?  | VCS PD<br>/B04/<br>/B10/ | DR | In this regard, CAR 2.3 to CAR 2.8 are raised.  | <del>CAR 2.3 to<br/>CAR 2.8</del> | Closed.<br>OK |

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| 4.4.3 In case the methodology requires several alternative scenarios to be considered in the identification of the most reasonable baseline scenario, have all scenarios been considered and have no reasonable alternative scenario been excluded? | VCS PD<br>/B04/ | DR | All the plausible alternative scenarios for the proposed project activity under the heads - power generation, heat generation and biomass are listed in section 2.4 of the VCS PD. Justifications have been adequately provided for inclusion and exclusion of alternative scenarios in each case. This was validated and found to be satisfactory. | OK                 | OK |
| 4.4.3.1 Has the choice of the baseline scenario been done using conservative assumptions?   | VCS PD<br>/B04/ | DR | In this regard, CL 2.12 is raised.  | <del>CL 2.12</del> | OK |
| 4.4.4 Is the identified baseline scenario reasonable according to the assumptions, calculations and rationales used in the VCS PD and other reference sources?  | VCS PD<br>/B04/ | DR | In this regard, CL 2.12 is raised.  | <del>CL 2.12</del> | OK |
| 4.4.5 Does the VCS PD describe how the national and sectoral policies relevant to the baseline scenario have been identified and considered in the VCS PD?  | VCS PD<br>/B04/ | DR | Yes, the VCS PD describe how the national and sectoral policies relevant to the baseline scenario have been identified and considered in the VCS PD in section 2.4.   | OK                 | OK |



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| 4.4.6 Does the VCS PD provide a verifiable description of the identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the project activity? | VCS PD<br>/B04/   | DR | The VCS PD provide a verifiable description of the identified baseline scenario, including a description of the reference plant technology that would have been employed in the absence of the project activity in section 2.4. In this connection, CAR 2.3 and CAR 2.8 were raised. | <del>CAR 2.3 to</del><br><del>CAR 2.8</del> | Closed.<br>OK |
| <b>Algorithm and/or formulae used to determine emission reductions</b>   |                   |    |  |   |               |
| 4.5.1 Are all calculations applied and documented according to the selected methodology and in a complete and transparent manner?  | VCS PD<br>ACM0006 | DR | The calculation of the GHG emissions has been done as per ACM 0006, Ver 09. The emission reduction $ER_y$ by the project activity during a given year $y$ will be calculated as per equation 1 of the applied methodology. However CL 4.5 is raised.                                 | <del>CL 4.5</del>                           | Closed.<br>OK |

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| <p>4.5.2 In case the methodology allows a selection between different options for equations or parameters, has adequate justification been given and have the correct equations and parameters been used, in accordance with the methodology selected?</p> | <p>VCS PD<br/>ACM0006</p> | <p>DR</p> | <p>The net quantity of increased electricity generation as a result of the project activity (incremental to baseline generation i.e. EGy for scenario 13 of ACM 0006, ver 09). EGy will be estimated as per equation 15(b) of the applier methodology. All the required monitoring for estimation of EGy is given in section 3.4 of of the VCS PD. Average net energy efficiency of electricity generation in the reference power plant that would use the biomass residues fired in the project plant in the absence of the project activity (MWhel/MWhbiomass), <math>\epsilon_{el,reference}</math> plant, determined ex-ante has been verified from the declaration of Chartered Engineer /PE02/. DOE has also independently estimated the value of <math>\epsilon_{el,reference}</math> plant (i.e. 0.06) from the data / parameter provided by PP with credible evidence and found the value (i.e. 0.06) certified by the Chartered Engineer is correct.</p> <p>Thus, the validation team was able to validate that adequate justification has been given and the correct equations and parameters have been used, in accordance with the methodology selected.</p> | <p>OK</p> | <p>OK</p> |
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| <p>4.5.3 In case some data and parameters will not be monitored throughout the crediting period, but have already been determined and fixed, are all data sources, assumptions and calculations correct, applicable to the proposed VCS project activity and conservative?</p> | <p>VCS PD<br/>ACM0006</p> | <p>DR</p> | <p>The baseline grid emission factor of 0.8 tCO<sub>2</sub>/MWh, determined ex-ante, has been applied. The emission factor for project activity is as per guidance of ACM 0006 / version 09, in line with the requirements of ACM 0002 / Version 07 where combined margin of build margin and operating margin are used. MSSKL has calculated emission factor for NEWNE (North East West Northeast) grid of India from "CO<sub>2</sub> Baseline Database for Indian Power Sector (Version 4.0) "published by Central Electricity Authority.</p> <p>Similarly for all other parameters, all data sources, assumptions and calculations have been determined correctly and conservatively.</p> | <p>OK</p> | <p>OK</p> |
|--|---------------------------|-----------|--|-----------|-----------|

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| <p>4.5.4 In case data and parameters will be monitored on implementation and hence become available only after validation of the project activity, are the estimates provided in the VCS PD for these data and parameters reasonable?</p> | <p>VCS PD<br/>ACM0006</p> | <p>DR</p> | <p>The validation team, during its site visit found that presently no energy meters are installed for the auxiliary equipment of the old existing power plants. As per section 5.1 and 5.3 of Voluntary Carbon Standard 2007.1, PP has adopted the most conservative approach to estimate the auxiliary consumption, which will lead to the conservative estimation of GHG emission reduction. The connected load (Motor rating of the auxiliary equipment in operation) has been considered to estimate the auxiliary energy consumption. The rated capacity of the motor was verified during site visit and by photographic evidences. It was understood that energy meters will be installed for 2nd verification. In this regard DOE has raised a FAR 01 and the same has to be verified during future verification.</p> <p>For all other parameters, the estimates provided in the VCS PD are reasonable.</p> | <p>FAR 01</p>  | <p>This FAR 01 will be verified and closed during verification.</p> |
| <p>4.5.5 Have the major risks and uncertainties, which can influence the emission reduction estimates, been identified and addressed in the VCS PD?</p>   | <p>VCS PD</p>             | <p>DR</p> | <p>Yes, they are identified and are presented in section 1.11. In this connection CAR 1.2 is raised.</p>   | <p>CAR 1.2</p> | <p>Closed.<br/>OK</p>   |
| <p><b>4.5 Leakage</b></p>   |                           |           |  |                |   |

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| 4.6.1 Has the leakage been identified and calculated according to the approved methodology?   | VCS PD<br>ACM0006 | DR | The identified Scenario 13 of ACM 0006, ver 09 does not call for determination of leakages. (Ref Pg 52 of Meth)  | -  | -  |
| 4.6.2 Have the leakage been addressed in complete, conservative and substantiated manner?   | -                 | -  | Refer question 4.6.1   | -  | -  |
| 4.6.3 Are uncertainties in the leakage emission estimates properly addressed?   | -                 | -  | Refer question 4.6.1   | -  | -  |
| <b>5. Additionality</b>   |                   |    |  |    |    |
| <b>5.1 Identification of alternatives</b>   |                   |    |  |    |    |
| 5.1.1 What additionality tool has been selected in the VCS PD? Does it comply with the requirement of VCS 2007.1 clause 5.8 and the latest FAQs at VCS website? ( <a href="http://www.v-c-s.org/faq.html">http://www.v-c-s.org/faq.html</a> ) | VCS PD<br>/B04/   | DR | Additionality of the project has been demonstrated by using "Combined tool to identify the baseline scenario and demonstrate additionality". This complies with the requirement of VCS 2007.1 clause 5.8 and the latest FAQs at VCS website. | OK | OK |

|  |                         |           |  |           |           |
|--|-------------------------|-----------|--|-----------|-----------|
| <p>5.1.2 Does the VCS PD identify and list credible alternatives to the VCS project activity in order to determine the most realistic baseline scenario, unless selected approved methodology prescribes/identifies the baseline scenario and no further analysis is required?</p> | <p>VCS PD<br/>/B04/</p> | <p>DR</p> | <p>Yes, all the plausible alternative scenarios for the proposed project activity under the heads - power generation, heat generation and biomass are listed in section 2.4 of the VCS PD.</p> | <p>OK</p> | <p>OK</p> |
| <p>5.1.3 Does the list of alternatives include as one of the options that the project activity is undertaken without being registered as a VCS project activity?</p>   | <p>VCS PD<br/>/B04/</p> | <p>DR</p> | <p>Yes, the list of alternatives include as one of the options that the project activity is undertaken without being registered as a VCS project activity.</p>                                 | <p>OK</p> | <p>OK</p> |

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| <p>5.1.4 Does the list contain all realistic/credible alternatives that the DOE, on the basis of its local and sectoral knowledge, considers to be viable means of supplying the outputs or services that are to be supplied by the project activity?</p> <p><i>Note: All alternatives listed in the selected methodology should be included, as well as those not covered by the methodology.</i></p> | VCS PD<br>/B04/ | DR | <p>Yes, all the plausible alternative scenarios for the proposed project activity under the heads - power generation, heat generation and biomass are listed in section 2.4 of the VCS PD. The DOE considers all are realistic/credible alternatives on the basis of its local and sectoral knowledge. The validation of the same is presented in section 3.2 of this report.</p> | OK | OK |
| <p>5.1.5 Is the exclusion of the alternatives for legal reasons justified?</p> <p><i>Note: Some alternatives might be illegal, according to the local regulations, but still widely practiced due to lack of enforcement. It should be verified.</i></p>   | VCS PD<br>/B04/ | DR | <p>All alternatives identified from step 1a of the combined tool are legal and passes step 1b requirements.</p>   | OK | OK |
| <b>5.2 Investment Analysis</b>   |                 |    |   |    |    |

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|---|-----------------|----|---|---|---|
| 5.2.1 Are all sources of revenues (including savings) have been considered in the VCS PD and all calculations?  | VCS PD<br>/B04/ | DR | The Investment analysis is not done. This was clearly explained and justified in section 2.5. The validation team concluded that justification provided is appropriate. | - | - |
| 5.2.2 Is the type of investment analysis selected correctly in the VCS PD?  | -               | -  | Refer to the question 5.2.1   | - | - |
| 5.2.3 Is the selected financial indicator chosen and applied correctly?   | -               | -  | Refer to the question 5.2.1   | - | - |
| 5.2.4 Is the guidance on IRR calculation and assessment correctly applied?<br><i>Note: Means of validation should be recorded.</i>  | -               | -  | Refer to the question 5.2.1   | - | - |
| 5.2.5 In case project participants use values from Feasibility Study Reports (FSR) is it possible to verify that the period between the FSR date and investment decision was reasonably short and FSR values did not change materially? | -               | -  | Refer to the question 5.2.1   | - | - |



|   |   |   |                             |   |   |
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| 5.2.6 Are all the values consistent between FSR and VCS PD <u>and</u> are inconsistencies properly justified?   | - | - | Refer to the question 5.2.1 | - | - |
| 5.2.7 Were all the values from FSR applicable and valid at the time of the investment decision?   | - | - | Refer to the question 5.2.1 | - | - |
| 5.2.8 Is it reasonable to assume that no investment would be made at a rate of return lower than the benchmark by, for example, assessing previous investment decisions by the project participants or some verifiable circumstances that have lead to a change in the benchmark? | - | - | Refer to the question 5.2.1 | - | - |
| 5.2.9 Is the Investment Analysis prepared in compliance with the latest version of the "Guidance on the Assessment of Investment Analysis" as provided by the CDM EB?   | - | - | Refer to the question 5.2.1 | - | - |
| <b>5.3 Barrier analysis</b>   |   |   |                             |   |   |

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|---|-----------------|----|---|---|---------------|
| <p>5.3.1 Are there any issues addressed in the barrier analysis that have a clear impact on the financial viability of the project activity and that shall be assessed by an investment analysis?</p>   | VCS PD<br>/B04/ | DR | <p>No, the barrier analysis is demonstrated by Investment and technological barrier. The validation team assessed the arguments presented and found that the barriers presented do not have a clear impact on the financial viability of the project activity.</p>  | OK  | OK            |
| <p>5.3.2 Do the listed barriers exist <u>and</u> is their existence substantiated?<br/>Note:<br/>(a) by independent sources of data such as relevant national legislation, surveys of local conditions and national or international statistics and/or<br/>(b) by interviews with relevant individuals:<br/>including members of industry associations, government officials or local experts if necessary?</p> | VCS PD<br>/B04/ | DR | <p>The barrier analysis is demonstrated by Investment and technological barrier. The listed barriers do exist and they are adequately substantiated by independent sources, national statistics and interviews with local experts wherever necessary. The findings of the validation team and conclusion are presented in section 3.2 of this report. In this connection CAR 2.3 to CAR 2.8 was raised.</p> | <del>CAR 2.3 to</del><br><del>CAR 2.8</del> | Closed.<br>OK |

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| 5.3.3 Would any of the identified barriers prevent the implementation of the project activity but not equally prevent the implementation of the possible alternatives, in particular the implementation of the identified baseline scenario? | VCS PD<br>/B04/ | DR | The identified barriers prevent the implementation of the project activity but not equally prevent the implementation of the alternative, the reference plant. The PP has demonstrated the same by provided a comparison table in Section 2.5 of VCS PD. The arguments presented are found to be adequately justified and substantiated. In this connection CAR 2.3 to CAR 2.8 was raised. | <del>CAR 2.3 to</del><br><del>CAR 2.8</del> | Closed.<br>OK |
| <b>5.4 Common practice analysis</b>  |                 |    |  |   |               |
| 5.4.1 Does the additionality tool require common practice analysis for the project?  | VCS PD<br>/B04/ | DR | Additionality of the project has been demonstrated by using "Combined tool to identify the baseline scenario and demonstrate additionality". It requires common practice analysis to be done for the project.  | OK  | OK            |
| 5.4.2 If the PPs claim in the VCS PD that VCS project activity is the "first of its kind", is it justified?  | VCS PD<br>/B04/ | DR | The PP does NOT claim that the VCS project activity is the "first of its kind"   | OK  | OK            |
| 5.4.3 Are the geographical scope of the project activity identified correctly?   | VCS PD<br>/B04/ | DR | The PP has identified the state of Maharashtra in the host country India as the geographical scope. To validate the same, the validation team has raised CAR 2.7. The validation findings and outcome is presented in section 3.2 of this report.  | <del>CAR 2.7</del>                          | Closed.<br>OK |

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| <p>5.4.4 Does the VCS PD provide an explanation why this region was selected and deemed more appropriate and is this explanation traceable and reliable?</p>  | <p>VCS PD<br/>/B04/</p> | <p>DR</p> | <p>Refer to the question 5.4.3.</p> | <p><del>CAR 2.7</del></p> | <p>Closed.<br/>OK</p> |
| <p>5.4.5 Are there similar operational project activities, other than VCS activities, "widely observed and commonly carried out" in the defined region?<br/><i>Note: Use official sources and local and industry expertise.</i></p>   | <p>VCS PD<br/>/B04/</p> | <p>DR</p> | <p>Refer to the question 5.4.3.</p> | <p><del>CAR 2.7</del></p> | <p>Closed.<br/>OK</p> |
| <p>5.4.6 In case there are similar commercially operated project activities, other than VCS activities, already "widely observed and commonly carried out" in the defined region, are there essential distinctions between the VCS project activity and the other similar activities?</p> | <p>VCS PD<br/>/B04/</p> | <p>DR</p> | <p>Refer to the question 5.4.3.</p> | <p><del>CAR 2.7</del></p> | <p>Closed.<br/>OK</p> |

| 6. Monitoring plan  |         |          |   |  |               |
|---|---------|----------|---|--|---------------|
| 6.1 Are all parameters required by the selected approved methodology or tool identified <u>and</u> listed in the VCS PD?                    | VCS PD. | DR       | No, all the parameters required by the selected approved methodology or tool identified are not listed in the VCS PD. Hence CAR 3.1 and CAR 3.4 is raised.  | <del>CAR 3.1</del><br>and <del>CAR 3.4</del> | Closed.<br>OK |
| 6.2 Is the measurement method clearly stated for each value to be monitored and deemed appropriate?   | VCS PD  | DR,<br>I | Yes, the measurement method is clearly stated for each value to be monitored. The conservative approach of the measuring method and its appropriateness was verified by the DOE as per various references /PM01/ and /PM02/. However CAR 3.1 was raised for better clarification.         | <del>CAR 3.1</del>                           | Closed<br>OK  |
| 6.3 Are values of the ex-ante parameters / monitoring parameters selected correctly and conservative in accordance to methodology or tools? | VCS PD  | DR, I    | Yes, all values of the ex-ante parameters / monitoring parameters are selected correctly and conservative in accordance to ACM0006, ver 09 and applicable tools. However CAR 3.2 is raised to ensure conservative approach of the auxiliary consumption of the old existing power plants. | <del>CAR 3.2</del>                           | Closed<br>OK  |
| 6.4 Is the measurement equipment for each parameter described and deemed appropriate?   | VCS PD  | DR, I    | Yes, all the measurement equipment for each parameter as described in the PD is deemed appropriate. The same has been verified by equipment specification provided by the PP and also during the site visit.  | OK   | OK            |
| 6.5 Is the measurement accuracy addressed and deemed appropriate?   | VCS PD  | DR       | The measurement accuracy of all the instruments for the project activity was verified by equipment specification provided by the PP and found appropriate.  | OK   | OK            |

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| 6.6 Are procedures in place on how to deal with erroneous measurements <u>and</u> are the corrective actions identified? | VCS PD | DR | All main meters will be provided with a check meter and simultaneous reading will be taken for both the meters (main and check). In case one meter fails, the reading of the other meter will be considered for GHG emission reduction calculation. The details are given in the monitoring procedure (section 3.4) of the PD, which was verified by the DOE and found correct. | OK                 | OK           |
| 6.7 Is the frequency of measurement identified and deemed appropriate?   | VCS PD | DR | Yes the frequency of measurement identified correctly and deemed appropriate  | OK                 | OK           |
| 6.8 Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?    | VCS PD | DR | Yes, the monitoring plan documented in the PD is according to the approved methodology and is found complete. All the parameters are transparently described and lead to correct and conservative estimation of GHG emission reduction.   | OK                 | OK           |
| 6.9 Are the sampling, measurement methods and procedures defined?  | VCS PD | DR | Yes the sampling, measurement method and procedure is defined in the PD. However CAR 3.1 was raised with respect to the indirect measurement of moisture content of bagasse, quantity of bagasse used in each boiler and NCV of bagasse.  | <del>CAR 3.1</del> | Closed<br>OK |
| 6.10 Are procedures identified for maintenance of monitoring equipment and installations?                                | VCS PD | DR | Yes the maintenance procedures for the monitoring equipment along with the roles and responsibilities are clearly defined in section 3.4 of the PD.   | OK                 | OK           |

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| 6.11 Are the equipment calibration intervals identified and justified?   | VCS PD | DR | The calibration of the equipment will be done in annual basis as mentioned in section 3.3 and 3.4 of the PD. The details are justified.  | OK | OK |
| 6.12 Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)?   | VCS PD | DR | Yes the procedures are identified for day-to-day records handling and clearly mentioned in section 3.4 of the PD and is found correct.   | OK | OK |
| 6.13 Are the monitoring arrangements described in the monitoring plan feasible within the project design?  | VCS PD | DR | Yes the monitoring arrangements described in the monitoring plan (section 3.4) is feasible within the project design   | Ok | OK |
| 6.14 Are the means of implementation of the monitoring plan, including the data management and quality assurance and quality control procedures, sufficient to ensure that the emission reductions achieved by / resulting from the project activity can be reported ex post and verified? | VCS PD | DR | Yes the PP has clearly identified data / parameters for monitoring, described the measurement procedure, recording method, quality assurance and quality control procedures, which enable to estimate the GHG emission reduction and can be reported ex post and verified. | OK | OK |

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| 6.15 Do the PPs make provisions for personnel training needs?   | VCS PD | DR,<br>I | Training of the personals, those who will be related in the estimation of GHG emission has already been carried out by the PP. This was verified by the training reports provided by the PP. Also PP has clear agenda for training the responsible employees.  | OK | OK |
| 6.16 Is the authority and responsibility of overall project management clearly described?                             | VCS PD | DR       | Yes, PP has provided a responsibility chart of the management representative, which enables the PP to clearly estimate the emission reduction.   | OK | OK |
| 6.17 Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions? | VCS PD | DR       | The project activity does not foresee any emergencies due to unintended emissions. However, if fossil fuel is used in the project plant the emission due to the use of fossil fuel will be monitored and will be deducted from the net emission reduction. The monitoring of GHG emission due to use of fossil fuel is clearly described in section 3.3 and 3.4 of the PD. | OK | OK |
| 6.18 Are procedures identified for review of reported results/data?   | VCS PD | DR       | Yes the procedures are clearly identified for review of reported results/data. The roles and responsibility of the management representative is described in the PD. According to the monitoring plan, monthly reports are generated by the cogen manager. The report will be sent to the managing director for his review.  | OK | OK |



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| <p>6.19 Is the data archiving period for this project activity stated in the VCS PD and appropriate?</p> <p><i>Note: All archived monitoring data, required for verification and issuance, should be kept for at least two years after the end of the crediting period or the last issuance of CER.</i></p> | VCS PD            | DR | Yes PP has mentioned the data archiving period for the project activity in section 3.4 of the PD and is found appropriate.                              | OK | OK |
| <b>7. Monitoring of the leakage</b>   |                   |    |   |    |    |
| 7.1 Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?   | VCS PD<br>ACM0006 | DR | For the selected scenario, and as per methodology, leakage effects do not need to be addressed. Hence there is no requirement of monitoring of leakage. | OK | OK |

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| <p>7.2 Is the choice of project leakage indicators made according to selected methodology in a reasonable and conservative manner?<br/><i>Note: local knowledge and sectoral expertise shall also be considered.</i></p> | VCS PD<br>ACM0006 | DR | MSSKL need not to consider project leakage indicators                       | OK | OK |
| <p>7.3 Is the measurement method clearly stated and deemed appropriate for each leakage value?</p>   | VCS PD<br>ACM0006 | DR | The proposed project does not lead to any leakage. Hence not applicable.    | OK | OK |
| <b>8. Sustainable development</b>  |                   |    |   |    |    |
| <p>8.1 If VCS PD indicates any additional environmental benefits of the project, other than GHG emission reductions, were those benefits properly substantiated?</p>   | VCS PD            | DR | The additional environmental benefits are addressed in section 6 of VCS PD. | OK | OK |
| <b>9. Stakeholders' consultation and comments</b>  |                   |    |   |    |    |

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| 9.1 Were the stakeholders identified in appropriate and complete manner?              | VCS PD                               | DR, I | The PP have utilised appropriate media to invite these stakeholders. The PP had invited the stakeholders through inviting letter in the Local Language, to provide their general feedback on the project activity including its effect on the environment and it's socio-economic effect. The validation team have verified the related documents and found acceptable.   | OK | OK |
| 9.2 Are the identified stakeholders plausible?  | VCS PD<br>/PS01/<br>/PS02/<br>/PS03/ | DR, I | <p>The PP has provided the list of attendees of the meeting. The following stakeholders were consulted as part of stakeholder consultation process:</p> <ul style="list-style-type: none"> <li>- Office bearers of neighbouring villages local bodies</li> <li>- Local villagers</li> <li>- MSEDCL</li> <li>- Licensing &amp; regulatory authorities like MPCB.</li> </ul> <p>These are relevant stakeholders and plausible</p> | OK | OK |
| 9.3 Does VCS PD describe the means being used to invite local stakeholder's comments? | VCS PD                               | DR, I | MSSKL has invited local stakeholders through letters in local languages. This is described in the VCS PD.   | OK | OK |
| 9.4 Were those means appropriate?   | VCS PD                               | DR, I | Yes, the means of inviting is appropriate.  | OK | OK |

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| 9.5 Was the project presented to the stakeholders in unbiased manner?  | VCS PD                     | DR, I | Yes, the project was presented in an unbiased manner. This was validated by checking the minutes of the stakeholder consultation meeting and subsequent interview with the attendees.                                 | OK | OK |
| 9.6 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? | VCS PD                     | DR, I | The stakeholder consultation process is not required by regulations/laws in the host country for this type of project activity.   | OK | OK |
| 9.7 Is a summary of the stakeholder comments provided in the VCS PD?   | VCS PD                     | DR, I | The summary of the stakeholder comments is provided in the VCS PD.  | OK | OK |
| 9.8 Has due account of any stakeholder comments been taken by PPs and reflected in the VCS PD?   | VCS PD                     | DR, I | Yes, due accounts of all stakeholder comments have been taken into account by PP  | OK | OK |
| <b>10. Environmental impacts</b>   |                            |       |   |    |    |
| 10.1 Is the documentation supplied by the PPs regarding environmental impacts relevant and accurately reflected in the VCS PD?   | VCS PD<br>/PL01/<br>/PL02/ | DR    | The PP has submitted Rapid Environmental Impact Assessment (R EIA) report, Consent for Establishment & expansion of plant from Pollution control board. They are relevant and are accurately reflected in the VCS PD. | OK | OK |

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| <p>10.2 Is an environmental impact assessment (EIA) required for the VCS project activity?</p> <p><i>Note: determine by using a review of relevant legislation and local expertise.</i></p> | VCS PD | DR | <p>Project participant does not require the analysis of Environmental Impact Assessment as per EIA notification S.O.60 (E), dated January 27, 1994<br/> <a href="http://www.envfor.nic.in/legis/eia/so-60(e).doc">http://www.envfor.nic.in/legis/eia/so-60(e).doc</a></p> <p>However, the PP has done Rapid Environmental Impact Assessment and all the environmental aspects and impacts have been adequately addressed in the report.</p> | OK | OK |
| <p>10.3 In case an EIA is required, has the EIA has been approved by local authorities and is the outcome accurately reflected in the VCS PD?</p>   | VCS PD | DR | <p>No, EIA is not required. However, Rapid Environmental Impact Assessment report is prepared. The outcome is accurately reflected in the VCS PD.</p>   | OK | OK |
| <p>10.4 Does the VCS PD include a brief description of the environmental effects of the project, including transboundary?</p>   | VCS PD | DR | <p>Yes, the VCS PD includes a brief description of the environmental effects of the project including transboundary.</p>  | OK | OK |
| <p>10.5 Are those effects properly addressed in the design of the project activity?</p>   | VCS PD | DR | <p>Project proponent has addressed the identified environmental impacts in the project design</p>   | OK | OK |
| <p>10.6 Does the project comply with environmental legislation in the host country?</p>   | VCS PD | DR | <p>The project complies with environmental legislation in the host country</p>  | OK | OK |

**Table 2: List of Requests for Corrective Action (CAR) and Clarification**

| Observation (CAR/CL)  | Reference             | Summary of project owner response   | Validation team conclusion   |
|---|-----------------------|---|--|
| <p>CAR 1.1: It must be explained more clearly how the capacity of the new turbine - 16 MW was chosen.</p> | <p>2.1 of Table 1</p> | <p>The selection of 16 MW turbine was based on the DPR<sup>5</sup> prepared by Mitcon Consultancy Services Limited with a detailed discussion with the management of the factory. The basis of 16 MW TG was to full-fill the in-house requirement and to export the surplus power to the grid. The benefits from the carbon credit was one of the decisive factor in the decision making context( from low pressure reference plant to high pressure plant).</p> <p>All the evidences pertaining to this justification has been submitted to the DOE.</p> | <p>The DOE has reviewed the DPR dt. January 2001 /PA04/ and found that the PP has done a detailed study for expansion of the sugar plant from 2500 TCD to 3500 TCD. As part of this expansion, the project plant configuration of 16 MW was planned with the consideration of carbon credit benefits against earlier planned reference plant of 55 TPH +25 TPH boilers (45 kg/cm<sup>2</sup>) and 3 MW +1.5 MW TG. The PP has cancelled the purchase orders placed for part of the reference plant. This was verified from the cancellation of the 55 TPH boiler and 3 MW turbine ordered for reference plant from the documents /PA01/ and /PA02/.</p> <p>This has been clearly presented in section 2.4 of VCS PD.</p> |

<sup>5</sup> Detailed Project Report dated January 2001

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|   |                  |   | Hence the CAR 1.1 was closed.   |
| CAR 1.2: It has not been explained in the section 1.11 of the VCS PD how the fluctuations of cane availability will affect the project GHG emission reductions or removal enhancements. | 4.5.5 of Table 1 | The present project is a bagasse based co-generation project. Bagasse generated from the sugar industry is being utilized to run the co-generation plant. As bagasse is an agricultural crop residue, any fluctuations in the availability of sugar cane will directly affect the availability of bagasse and so the present project activity. The Indian cane production is subject to cyclic <sup>6</sup> forces, a typical cycle consisting of two good years followed by two bad years and then an average year. This cycle repeats every five years. Same has been included in section 1.11 of the PD. | The same is provided in the VCS PD now and is acceptable to the the validation team. Hence the CAR 1.2 is closed.   |
| CL 1.3<br><br>It is totally unclear:<br><br>1) Why the generation capacity in the project activity is indicated as 14.2MW and 15.2MW, while according to the                            | 2.1              | The project activity is installation of 80 TPH, 67 kg/cm <sup>2</sup> boiler and 16 MW turbine (this is inline with the applicability condition of ACM 0006, ver 09, page 3). This is   | The generation capacity for the project activity is taken form the DPR. The values has been crosschecked with the DPR. The capacity of the project activity is 16 MW as per the agreement |

<sup>6</sup> [www.dwarikesh.com/downloads/dsil\\_presentation.ppt](http://www.dwarikesh.com/downloads/dsil_presentation.ppt)

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| <p>project description total capacity shall be 2.5 MW + 16 MW = 18.5 MW.</p> <p>2) why the generation capacity is changing during the off-season?</p> |  | <p>mentioned in section 1.4 of the PD. Fig 6, which represents the project activity has been revised for more clarity. The revised figure shows the project activity and the existing plants which operate next to the project plant.</p> <ol style="list-style-type: none"> <li>1. The generation capacity i.e. 14.2 MW during season and 15.2 MW during off-season, which is sourced from the Detailed Project Report (DPR) corresponds to the project activity (i.e. 80 TPH boiler &amp; 16 MW TG). The DPR was made by engineering consultancy company (3rd party).</li> <li>2. The Steam Turbine for the project activity is a double extraction cum condensing turbine. The turbine have two extractions at 7.5 Kg/cm<sup>2</sup> and 1.5 Kg/cm<sup>2</sup> (as per agreement for STG page no. 25). During crushing season steam from these two extractions is utilized</li> </ol> | <p>with the manufacturer. The figure and the description in the PD has been revised accordingly.</p> <p>Hence CL 1.3 is closed.</p> |
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|   |                                 | <p>in the sugar plant, therefore during season the equivalent amount of power can not be generated due to the steam required in the process from these two extractions. However, during off-season the sugar plant is not operated. Hence equivalent amount of steam which was previously utilized in the process during season is available for power generation during off-season. Therefore the corresponding power generation as per DPR during season is 14.2 MW and during of-season is 15.2 MW.</p> |  |
| <p>CAR 2.1: The applicability condition "No significant... to prepare the biomass residues....combustion" of ACM0006 is not properly addressed.</p> | <p>4.2.1<br/>of<br/>Table 1</p> | <p>No energy is required for the preparation of biomass residue. In season the bagasse generated by the sugar plant manufacturing process directly fired into the boiler. Only for off-season operation, the saved bagasse during seasonal operation will be used.</p> <p>Same has been included in justification of the last applicability criteria.</p>  | <p>This applicability condition is properly addressed in the VCS PD and hence the CAR 2.1 is closed.</p> |

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| <p>CAR 2.2: "The thermal firing capacity at the site before and after the project activity should be clearly stated. On this basis it should be transparently justified how the requirement of scenario 13 of the approved methodology that the project should "...would be installed instead of the project activity at the same site and with the same thermal firing capacity..."</p> | <p>4.2.1<br/>of<br/>Table 1</p> | <p>The thermal firing capacity for post- project scenario is 143733 MT/Year whereas for baseline scenario MSSKL would have fired 141840 MT/year. The electrical efficiency of the project plant (20%) is higher than that of reference plant (6%). Hence, it can be safely concluded that the present case meets the requirements of scenario 13 of the methodology which states "in the absence of the project activity, a new biomass residue fired power plant (in the following referred to as "reference plant") would be installed instead of the project activity at the same site and with the same thermal firing capacity but with a lower efficiency of electricity generation as the project plant (e.g. by using of a low-pressure boiler instead of a high-pressure boiler)"</p> | <p>The calculation sheets provided to support the same has been checked and found to be correct. The difference in thermal firing capacity is insignificant and hence the full requirement of scenario 13 is met.</p> <p>Hence CAR 2.2 is closed.</p> |
| <p>CAR 2.3: The explanation presented under 'Investment barrier' in section 2.5 of the VCS PD appears to be more of 'Institutional barrier' since the</p>  | <p>4.4..2.<br/>1<br/>5.3.2</p>  | <p>According to "Combined tool to identify the baseline scenario and demonstrate</p>   | <p>The explanation provided is acceptable to the validation team. Though the barrier of equity crunch is because of</p>   |

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| <p>project is not facing capital or investment return constraints that can be overcome by the additional revenues associated with the generation of VCSSs. However, in this case, the project is facing financial barrier. Hence, correction is required.</p>  | <p>5.3.3</p>                             | <p>additionality”, Investment barrier are the barriers other than insufficient financial returns as analyzed in Step 3(i.e. Investment analysis). Higher capital cost and equity crunch can be classified under this barrier and same has been discussed in the section 2.5 of the PD.</p>  | <p>Institutional set up of the co-operative industries, here in this case, the PP faced barrier due to access to finance and high capital cost. They are supported with evidences. Refer to CAR 2.5 and CAR 2.6 for the closure of this CAR 2.3.</p>   |
| <p>CAR 2.4: High pressure cogeneration configuration is well developed &amp; proven technology in present scenario. Hence, the explanation made under technological barrier and common practice in the VCS PD is not decisive to the assessment team. Further, given that the proofs provided to support the arguments are much older than the project activity (project start date: December 11, 2006) and if few cooperative sugar factories can go for high pressure (67 kg/cm<sup>2</sup>) pressure double extraction cum condensing turbine in as late as 2004, the PP needs to explain how it can be considered as common practice barrier to go for a high pressure 67 Kg/cm<sup>2</sup> boiler in the year 2006.</p> | <p>4.4..2.<br/>1<br/>5.3.2<br/>5.3.3</p> | <p>As per section 7.4.2 of the GHG protocol, for project accounting, common practice refers to “the predominant technologies or practices in a given market, as determined to the degree to which those technologies or practices have penetrated the market.”</p> <p>With this background the PP wants to bring to DOE’s notice the fact that decision for the project activity was taken way back in 2001. At that point of time none of the Sugar mills in Maharashtra had installed high pressure co-gen system.- However, departing from the conventional practice</p> | <p>The PP has presented that at the time of conceptualization of the project in the year 2001, it was the first high pressure (67 kg/ cm<sup>2</sup>) cogeneration power plant that was proposed to be implemented in a co-operative sugar mill in Maharashtra. The validation team verified the same with the letter of Vasantdada Sugar Institute, Pune, India (which maintains the register of the status of all sugar industries in the state of Maharashtra) /PA14/, which clearly states the same.</p> <p>The common practice analysis has been performed according to the requirements of the</p> |

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|  |  | <p>at that time when high pressure (67 kg/cm<sup>2</sup>) boilers were being used for bagasse based co-generation by only a few cooperative sugar mills in the country, MSSKL decided to proceed with this high pressure technology, and became the second mill in Maharashtra in the co-operative sector (as per data from Vasantdada Sugar Institute, Pune, India) to have opted for and commissioned this high-pressure co-generation technology.</p> <p>When MSSKL commissioned its high pressure co-gen system in the year 2006, there was only one other mill working with such high pressure technology. One mill out of 202 co-operative mills in Maharashtra is certainly not common practice.</p> | <p>step 2 of combined tool /B04/</p> <p>Hence CAR2.4 is closed.</p>  |
| <p>CAR 2.5: The PP needs to explain and substantiate how the reference plant was planned to be financed and why the stated barriers for the project activity did not prohibit the reference plant since "The PP has decided for a dept-equity ratio of 75:25...", having available only 40 Mil out of necessary 120, all arguments of equity</p> | <p>4.4..2.<br/>1<br/>5.3.2<br/>5.3.3</p> | <p>The implementation of project activity faces Investment barrier in particular access to finance (debt from the FIs). Due to the implementation of the</p>  | <p>The barrier due to equity crunch is removed. However the PP has made claim for investment barrier by demonstrating that the financing of the project was assured only due to the benefits of the carbon</p> |

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| <p>crunch became irrelevant. If such decision has been taken, it means that necessary source of finance (borrowing from farmers, in this case) was secured and it could not prevent the project from implementation.</p> | <p>project plant, MSSKL had to invest substantial incremental cost to the tune of Rs. 349.7 Million. The break up the project cost and the reference plant is presented in the subsequent section. As per the debt: Equity ratio (75:25) decided by the board for the implementation of the project activity, the additional debt component was in the tune of Rs. 266.34 million. For this the PP has applied for taking a loan from the bank. This loan was sanctioned by the bank only after considering the revenues from carbon credit, whereas the loan for the reference plant was already in place. The certification by the bank mentioning that the loan appraisal process for the project activity took account explicitly of the revenues from carbon credit has been submitted to the DOE. Hence it is concluded that the project activity faces investment barrier which does not prohibit the</p> | <p>credits as per the para 6 of EB 50, Annex 13.</p> <p>For this, it has been demonstrated that the loan approval by the lead consortium of the banks (lender) has taken explicitly the revenues from the carbon credits into account. For this the bank has provided a letter certifying that the loan was sanctioned only after taking explicitly the carbon benefits into account /PA16/.</p> <p>Hence the validation team concluded that the project activity faced investment barrier, which the baseline scenario did not face for its implementation.</p> <p>Hence CAR 2.5 was closed.</p> |
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|   |                                | implementation of the reference plant.   |  |
| CAR 2.6: The argument on higher investment cost can not be considered as meaningful, simply because more expensive plant in this case brings additional revenue and Simple Cost approach is absolutely not applicable. This cannot be treated as a barrier. |                                | It has been removed in the VCS-PD now.   | O.K. Accepted.   |
| CAR 2.7: Common practice analysis does not follow the additionality tool with respect to the definition of the geographical scope (why only Maharashtra?) and identification of similar project implementation.   | 4.4..2.<br>1<br>5.3.2<br>5.3.3 | There are only six to seven sugar producing states in India namely Uttar Pradesh, Tamil Nadu, Karnataka, Andhra Pradesh and Maharashtra. All these states has its own polices and tariff orders for biomass residue based co-generation projects. Hence comparison with different states( having different policy framework) is not appropriate. | The PP has submitted that in view of vast difference in regulatory frameworks between each state and between co-operative mills and the private mills, the common practice analysis was restricted to the state of Maharashtra and the co-operative mills. The PP has also provided documented evidence to support the differences in the regulatory framework for sugar plants in each state in India and the framework of co-operative mills /PA15/ and /Annex 4 of VCS PD/. However the data is available only for the current year and the regulatory framework does not exist for all states (including Maharashtra) at the time of conceptualization of the project i.e., the year 2001. |

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|   |  |   | <p>The same has been presented as a barrier in the Barrier analysis. Hence the validation team has accepted the data of the current year to substantiate the difference in regulatory framework between each state in India. From the data, the validation team noted and concluded that the regulatory framework in other states is completely different. Also the validation team noted from the note on co-operative industries provided as Annex 5 in VCS PD, that there are inherent problems associated only with the co-operative industries and not with the private industries. This is supported by written documentation of independent expert judgment from an educational institution /Annex 4 of VCS PD/. Hence CAR 2.7 is closed.</p> |
| <p>CL 2.8: Argument on the "lack of skilled personal" can not be rendered as preventive barrier, as the low pressure boiler operators would just need to receive a proper training to be able to operate high pressure cogeneration plant</p> | <p>4.4..2.<br/>1<br/>5.3.2<br/>5.3.3</p> | <p>The present project activity consists installation of 67 Kg/cm<sup>2</sup> boiler implemented in the sugar factory. According to a report<sup>7</sup> of</p> | <p>This barrier due to "lack of skilled personal" and operational risk and higher operating cost has been removed.</p>   |

<sup>7</sup> <http://cdm.unfccc.int/Projects/DB/SGS-UKL1200599187.35/ReviewInitialComments/QGYACESPRFWRNUIHHLOXCK63U00UUS>

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| <p>(PD, p38. "The desired manpower (trained) can be easily employed when additional revenues will be generated at the same time day to day expenses related to these technological barriers and risks can be overcome.") Further, the operational risks related to the project activity, like "de-mineralization", "strict chemical dosing", as it is indicated in PD, p.30, "would lead to higher operating costs". While "corrosion and deposition may cost the sugar plant lakhs of rupees in repairs and lost availability". All these risks should be clearly addressed in IRR analysis, and can not be deemed a preventive barrier without proper quantification.</p> | <p>M/s Avant Garde Engineers and consultants Pvt. Ltd "High pressure boilers (operating above 60 kg/cm<sup>2</sup>) are normally designed close to the limiting conditions of the heat transfer, tube metal temperature, circulation etc to make the units compact and economical. The principal problem in modern high pressure boilers is the control of corrosion and steam quality. Internal corrosion and deposition may cost the sugar plants lakhs of rupees in repairs and lost availability. Modern steam turbines rated for high capacities call for stringent steam quality to avoid damages. Without strict control of impurities in steam, deposits will be formed over turbine blades and nozzles and output will be reduced. Thus the successful operation of high pressure boiler / turbine units require a thorough understanding of the aspects of water treatment."</p> <p>However, the above stated</p> | <p>However, the PP faces the technological barrier due to "the particular technology used in the proposed project activity is only marginally available in the relevant region". The para 6 of EB 50, Annex 13, states that "The existence of a technological barrier for high pressure steam technology is confirmed by showing evidence that the use of this technology in the considered sector is marginal e.g. below 10%". The PP has provided a letter from "Vasantdada Sugar Institute, Pune, India" (which maintains the register of the status of all sugar industries in the state of Maharashtra) /PA14/ which states "in the year 2001 when MULA conceived their cogeneration project, there was no sugar mills in Maharashtra with boilers at the pressure of 67 kg/cm<sup>2</sup>. Subsequently in the year 2006, when the MULA commissioned their cogeneration plant, they became second in Maharashtra to have gone for this configuration". One mill out of 128 mills (refer pg No 9</p> |
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|   |  | <p>barrier has been removed since it can be overcome by additional expenses.</p> <p>The PP faces technological barrier due to the marginal availability of the high pressure steam technology in the relevant geographical area and the sector. The same has been discussed in section 2.5 of the VCS-PD, which fulfills the stipulation under EB 50, Annex 13, para 6.</p> | <p>of the foot note 42; only cogen mills are considered as the ownership of the cogen mills differs from other mills, which is validated in the demonstration of investment barrier, presented above) proves that the technology has less than 1 % penetration in the relevant region. The project technology category has been taken as solid biomass combustion in high pressure (&gt; 60 bar). The assessment of the project technology category confirms to Annex 1 of Annex 10 in the 34th Meeting report of CDM-Meth Panel: Note on the barrier "first of its kind".</p> <p>From this the validation team is able to conclude that the project activity faces technological barrier, which prevented its implementation and which does not prevent the implementation of the alternative.</p> <p>Hence CL 2.8 is closed.</p> |
| <p>CAR 2.9: Regulatory barrier would only be preventive, if the local power</p> |  | <p>This barrier has been removed now in the VCS-PD.</p>   | <p>O.K. Accepted. CAR closed.</p>  |

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| <p>authorities would officially refuse to accept the electricity from IPP. In which case the VCU would not help to resolve the problem, because they would not be issued, since no electricity would be replaced.</p> <p>However, presented evidence made an impression that main dispute with MSEB was about the price, rather than acceptance or refusal of electricity supplies.</p> |                                     |   |  |
| <p>CL 2.10: Why would implementation under co-operative framework constitute a risk different from other circumstances?</p>   | <p>4.4..2.1<br/>5.3.2<br/>5.3.3</p> | <p>A note on framework of co-operative structure is included in the annex 5 of the VCS PD, which clearly distinguish the differences between the co-operative framework from other circumstances.</p>   | <p>The validation team reviewed the description and found that the industries in co-operative framework face risks different from private industries in the same sugar sector. The explanation has been justified and supported suitably by written documentation of an expert. Hence CL 2.10 is closed.</p> |
| <p>CAR 2.11: In section 2.4 of VCS PD, it is not jutified how the resulting baseline is applicable to the project in question, including a distinction from Scenario 18.</p>  | <p>4.4.1.2<br/>Of<br/>Table 1</p>   | <p>Applicability of baseline scenario 13 has been detailed in section 2.4 of the VCS PD.</p> <p>Scenario 13- The existing plant(s) are only fired with biomass residues and continue to operate after the installation of the new power plant</p> <p>Scenario 18- The project activity involves the</p> | <p>It has now been included in the VCS /P01.2/. Hence the CAR 2.11 is closed.</p>  |

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|  |                            | <p>replacement of an existing biomass residue fired power plant by a new biomass residue fired power plant.</p> <p>In scenario 18, the existing plant is completely replaced by the PA, whereas in 13 it continues to serve as the standby plant; which is the case here.</p>   |   |
| <p>CL 2.12</p> <p>“The project is in accordance with scenario 13 of ACM0006...”.</p> <p>The presented scenario does not correspond directly to any of the alternative scenarios under current revision of the ACM0006, which puts into question applicability of the methodology.</p> <p>The current project scenario shows that previous set-up was altered and part of the equipment is no longer functioning, and the new equipment has been installed. Section 3.2.1 should address the issue.</p> | <p>4.4.1.1<br/>4.4.1.2</p> | <p>The subject project activity is in accordance with the scenario 13 of the methodology as demonstrated below.</p> <p><b>Project activity</b><br/>80 TPH, 67 kg/cm2 Boiler and 16 MW turbine (new)</p> <p><b>Reference plant (Baseline)</b><br/>55 TPH, 45 kg/cm2 Boiler and 3 MW turbine and 25 TPH, 45 kg/cm2 Boiler and 1.5 MW turbine (new)</p> <p><b>Operational condition during Baseline condition</b><br/>Boiler - 55 TPH (new, 45 kg/cm2), 25 TPH (new, 45 kg/cm2), 35 TPH(21 kg/cm2), 25 TPH (21 kg/cm2)</p> | <p>The response provided by the PP was checked against the evidences /PD01/, /PA01/, /PA17/.</p> <p>It was confirmed during the site visit that all the existing boilers and the turbines will be operational after the implementation of the project activity.</p> <p>The thermal firing capacity of the reference plant (141840 T/year) is almost same with the thermal firing capacity project plant (143733 T/year). The above figure has been validated as per the bagasse balance for both the project and baseline scenario.</p> |

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|  | <p>Turbine - 3 MW, 1.5 MW (new plants) and 1.5 MW</p> <p><b>Operational condition during post project condition</b></p> <p>Boiler - 80 TPH (new) (67 kg/cm<sup>2</sup>), 35 TPH (21 kg/cm<sup>2</sup>)<br/>Turbine - 16 MW (new) and 1.5 MW</p> <p>The project activity involves the installation of a new biomass residue fired power plant (80 TPH boiler and 16 MW turbine) of higher efficiency, which is operated next to the existing biomass residue fired power plants. The existing plant(s) are only fired with biomass residues and continue to operate after the installation of the new power plant (Two 25 TPH boilers and 2.5 MW turbine will continue to operate as backup plant or at lesser load. The 35 TPH power plant and 1.5 MW turbine will continue to operate at full load after the implementation of the project activity).</p> <p>In the absence of the</p> | <p>Hence, validation team concluded that applicability condition of the scenario 13 of ACM 0006 ver 09 is fully met.</p> <p>Hence the CL 2.12 is closed.</p> |
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|  |  | <p>project activity, new biomass residue fired power plants (reference plants, one new 55 TPH, 45 kg/cm<sup>2</sup> and one new 25 TPH, 45 kg/cm<sup>2</sup> boiler and one new 3 MW and one new 1.5 MW turbine) would be installed at the same site. The purchase order of the 55 TPH, 45 kg/cm<sup>2</sup>, boiler and 3 MW turbine was already released by the PP. However before releasing the PO of the 25 TPH boiler and 1.5 MW turbine the PP had decided to install the 16 MW power plant (project activity). The efficiency of the reference plants would be lower than the project plant. The same is evident from the certified true copy of the board resolution no 15 (dated 04/10/1999).</p> <p>The thermal firing capacity of the said reference plant (141840 T/year) is almost same with the thermal firing capacity project plant (143733 T/year).</p> |  |
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|   |                                       | Hence, the project activity is inline with the applicable scenario 13 of the methodology.  |  |
| <p>CAR 3.1: PP needs to provide how the following parameters are monitored</p> <ol style="list-style-type: none"> <li>1. moisture content in the bagasse</li> <li>2. Bagasse measured at different boilers at the site</li> <li>3. Net calorific value of the bagasse.</li> </ol> | <p>6.2<br/>6.9<br/>of<br/>Table 1</p> | <p>The detailed and authenticated procedure for monitoring of moisture content, bagasse fired in different boilers and net calorific value of the bagasse has been described in the Annex 3 of the VCS PD.</p> <p>Reference: "System of Technical control for cane sugar factories in India".<br/>Hard copy of the document has been submitted to the DOE.</p> <p>Moreover, for the estimation of bagasse fired in different boilers, steam to fuel ratio has been used. The value of steam to fuel ratio for different boilers has been taken is based on the related study conducted by certified energy auditors at the site.</p> | <p>The Annex 3 has been reviewed and the description is acceptable to the validation team.</p> <p>Hence CAR 3.1 is closed.</p> |
| <p>CAR 3.2: During Site visit, it was understood there was no meters installed</p>  | <p>6.3 of</p>                         | <p>There are no auxiliary meters for the existing</p>  | <p>The PP has provided the</p>   |

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| <p>to measure the auxiliary power consumption of the old existing boilers of 25 TPH and 35 TPH. How PP will ensure the conservative estimation of the auxiliary power for estimation of <math>EG_{total,y}</math></p> | Table 1 | <p>plants to monitor the auxiliary consumption. This is required to achieve the value of net electricity generated by the plants at the site. For this monitoring period, PP will calculate auxiliary consumption conservatively based on the maximum rated capacity of the auxiliaries connected to the boiler and TG. For the subsequent verification, PP will install dedicated meters to monitor the auxiliary consumption.</p> | <p>maximum rated capacity of all the auxiliary equipments connected to the boiler and the TG. The auxiliary consumption is calculated conservatively. The same was validated from the spreads sheet calculation provided by the PP /P01.4/. The calculations were found to be correct and conservative. Hence the CAR 3.2 was closed.</p> |
| <p>CAR 3.3: The validation team observed wood stocks during the site visit. PP needs to clarify the utilisation of wood in the project activity.</p>  | 6.3     | <p>The wood stock observed at the site is not for the present project activity. This is required for the initial start up of the existing boiler and being used before the project plant came into existence. Evidence for the same has been submitted to the DOE. Moreover the present project is not designed to use the wood stocks and a certificate from the equipment supplier has been submitted to the DOE.</p>             | <p>The validation team has verified the explanation by reviewing the documents submitted from the boiler manufacturer /PM02/. The document clearly mentions that the boiler is not designed to use firewood logs.</p> <p>This was acceptable to the validation team and hence this CAR 3.3 was closed.</p>                                |
| <p>CAR 3.4<br/>All following parameters shall be listed as monitoring parameters:</p>   | 6.1     | <p>All these parameters have now been listed as monitoring parameter in</p>   | <p>OK<br/>Hence the CAR is closed</p>   |

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| <ul style="list-style-type: none"> <li>- Weight of cane</li> <li>- Weight of added water</li> <li>- Gross weight of juice</li> <li>- Saved Bagasse.</li> </ul>   |  | <p>the section 3.3. &amp; 3.2 revised VCS PD.</p>   |   |
| <p>CAR 3.5</p> <p>All tables in the specified section should include "Value of data applied for the purpose of calculating expected emission reductions" or at least reference to the Section PD, where actual value is indicated.<br/>(e.g. parameter FFproject plant: Value = "Measurement", shall be corrected)</p> |  | <p>Values of all the parameters, which have been used in the calculation of expected emission reduction from the project, have now been included in the section the specified tables of section 3.3 of the VCS PD.</p> <p>For parameter FFproject plant the specified row of the table has been corrected accordingly. Subjected to closure of CAR no. 27</p> | <p>OK</p> <p>Hence the CAR is closed</p>  |
| <p>CAR 4.1: Not all steps of the "Tool to calculate the emission factor..." are adopted.</p>   |  | <p>All the steps of the "Tool to calculate the emission factor..." has now been used in the section 4.1 of the VCS PD.</p>  | <p>All steps have now been included and hence this CAR 4.1 is closed.</p>   |
| <p>CAR 4.2: The symbols used in each of the equations are not consistent with the equations in the methodology.</p>  |  | <p>The symbols used in each of the equation are now consistent with the equations in the methodology.</p>   | <p>The same has been checked through the VCS PD and found to be consistent with the equations in the methodology and this CAR 4.2 was closed.</p> |
| <p>CAR 4.3: It is not clear how the grid was chosen and justification needs to be provided in the PD.</p>  |  | <p>As per the "Tool to calculate the emission factor for an electricity system", if the DNA of the</p>  | <p>The justification provided by the PP for the selection of the grid is acceptable to the validation team and</p>                                |

8 [http://www.cea.nic.in/planning/c%20and%20e/user\\_guide\\_ver4.pdf](http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver4.pdf)



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|   |  | <p>host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used.</p> <p>The Indian DNA <sup>8</sup> has published a delineation of the electricity system. The Indian electricity system is divided into two grids, the Integrated Northern, Eastern, Western, and North-Eastern regional grids (NEWNE) and the Southern Grid. Since the present project activity belongs to Maharashtra State, it falls under NEWNE Grid of India, hence NEWNE grid has been taken for the present case.</p> <p>Same Justification has now been included in the section 4.1 of the VCS PD.</p> | <p>hence the CAR 4.3 is closed.</p>  |
| <p>CAR 4.4: Evidence required for assumptions that Bagasse has 50 % moisture content.</p> |  | <p>The moisture content of bagasse (i.e. 50%) is taken from the boiler (80 TPH) agreement (page 5). The same is considered by the boiler manufactures for estimation of thermal</p>  | <p>The submitted evidence has been checked for the correctness of the assumption. It is found acceptable and hence this CAR 4.4 is closed.</p> |

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|   |       | efficiency of the boiler.  |  |
| <p>CAR 4.5<br/>EGhistoric,3 yr corresponds to the 1.5MW and 2.5MW generators, which do not correspond to the baseline scenario (1.5 MW + 3 MW). Baseline data shall not be mixed up with the historical data, as in this case it is not the same.</p> | 4.5.1 | <p>As per ACM 0006, version 09, EGhistoric,3yr = Net quantity of electricity generated during the most recent three years in all power plants at the project site, generated from firing the same type(s) of biomass residues as in the project plant (MWh)<br/>Reference plant would have come in absence of the project plant, which means the reference plant is not the existing plant in the site. Also EGY is the incremental power generation due to the project plant upon the reference plant.<br/>EGhistoric,3 yr as per the ER sheet is estimated for the 2.5 MW and 1.5 MW power plant and not for the baseline. The same has now been presented in both VCS PD and ER sheet in more precise and transparent manner.</p> | <p>EGhistoric,3 yr is calculated for the 2.5 MW and 1.5 MW power plant. This is inline with the methodology. This is transparently presented in the PD and well as in the ER sheet.</p> <p>Hence the CAR 4.5 is closed</p> |
| <p>CL 4.6<br/>It is unclear, how was it validated that the amount of biomass consumed in project activity is within the amount of bagasse likely to be generated in the sugar plant.</p>  |       | <p>The amount of bagasse consumed in the project activity has been estimated from energy balance spread sheet. The value for bagasse</p>   | <p>The relevant RT 8 C form which provides all the technical data related to the sugar processing has been verified for the</p>  |

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|  | <p>percentage in the cane and the total cane crushed has been taken from the annual report published by MSSKL which contain all the necessary technical detailed to estimate the annual bagasse generation. Based on the average of 5 years crushing rate and bagasse percentage cane, the likely amount of bagasse generated from the plant in a year has been established, which is higher than the bagasse required by the project activity.</p> <p>The estimation of bagasse generated in Sugar Plant &amp; consumption has been provided in the annex 7 of VCS PD.</p> | <p>generation of bagasse for the historic year (5 years). Based on the historic data the average bagasse generation is estimated for a season (sugar season). it was found that the generation is bagasses is sufficient to cater the needs for the project activity along with the existing plants.</p> <p>Hence the CL is closed.</p> |
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**Table 3: List of forward action requests (FARs)**

| FAR number  | Reference | Summary of project owner response  | Validation team conclusion                          |
|---|-----------|--|---|
| <b>FAR01</b> As referred in Annex 06 of VCS PD, MSSKL is required to install energy meters for the auxiliary equipment in the old boilers (25 TPH and 35 TPH) and turbo generators (1.5 MW and 2.5 MW) for future verification. |           | The PP will install energy meters for all auxiliary equipments in the old boilers before the verification. | This must be checked again during the verification. |

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