Validation report form for renewal of crediting period for CDM project activities

(Version 03.0)

BASIC INFORMATION	
Title and UNFCCC reference number of the project activity	2.5 MW Rice husk based cogeneration plant at Hanuman Agro Industries Limited (UNFCCC number-1667) https://cdm.unfccc.int/Projects/DB/SGS-UKL1204641540.4/view
Number and duration of the next crediting period	3rd renewable crediting period 07/11/2022 to 06/11/2029
Version number of the validation report	02
Completion date of the validation report	22/07/2022
Version number of PDD to which this report applies	08
Project participants	M/s Hanuman Agro Industries Limited
Host Party	India
Applied methodologies and standardized baselines	AMS I.C - Thermal energy for the user with or whitout electricity version 22 Standardized baseline - Not applicable
Mandatory sectoral scopes	01: Energy industries (renewable - / non-renewable sources)
Conditional sectoral scopes, if applicable	NA
Estimated amount of annual average GHG emission reductions or GHG removals by sinks in the next crediting period	34,308 tCO_2e per annum
Name and UNFCCC reference number of the DOE	LGAI Technological Center, S.A. (Applus+ Certification) UNFCCC Ref. No.: E-0032
Name, position and signature of the approver of the validation report	Mr. Agustin Calle de Miguel *Applus+ Certification : CDM Technical Manager* Signature:

SECTION A. Executive summary

The project activity is undertaken by Hanuman Agro Industries Limited (HAIL) involves the establishment of a 2.5 MW biomass based power plant. The plant utilises rice husk and other agricultural wastes(Crop residue, Fuel wood, Bushes and Industry's waste) available in the area surrounding the plant. The project activity generates electricity and steam by the combustion of the agricultural wastes to meet captive electricity requirement of HAIL thereby displacing power supplied from the Chhattisgarh State Electricity Board.

The plant comprises of a boiler of 22 TPH capacity and 2.50 MW condensing cum extraction turbine. The company was using a 12 TPH boiler (coal fired) for meeting the process steam requirement. The new cogeneration system has replaced the existing coal-fired boiler and the electricity supplied by state utility.

The project proponent has installed these and ancillary equipments to generate electricity for the grid from a renewable energy source and total process steam requirement of around 9 TPH at 10 Kg/cm^2 was being met by coal fired boiler.

The new boiler is a high-pressure boiler with 22 TPH steam production. Envisaged generation MCR of 2,500 KW comfortably meet the peak power demand, including the co- generation auxiliaries. 9 TPH of extraction steam of 10 Kg/cm^2 from the turbine adequately meet the process steam requirement at the mill. A part of the steam is fed to pulp section at 10 Kg/cm^2 and rest goes to paper section at 4 Kg/cm^2 through the existing pressure reducer. The generation is synchronized with utility supply at 11 KV and step down to usage level of 400 V by the existing 11 KV/400 V transformer. Biomass based cogeneration power plant commissioned on 31/08/2006 and inoperation till date as confirmed with commissioning certificates.

The project activity reduce emissions through the generation of electricity from renewable biomass, which is carbon neutral, and replace and supplement existing grid based generation which is predominantly fossil fuel based.

Validation Scope: The scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology AMS-I.C version 22. The validation was based on the requirements in the CDM validation and verification standard for project activities, version 03.0.

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

Validation Process: The project assessment is based on the "CDM validation and verification standard for project activities, version 03.0 and is conducted using standard auditing techniques to assess the correctness of the information provided by the project participants. Before the assessment begins, members of the team covering the technical scope(s), sectoral scope(s), and relevant host country experience for evaluating the CDM project activity are appointed.

Once the project is made available for the global stakeholder consultation process, the members of the assessment team carried out:

I A desk review of the project design documentation;
II Follow-up interviews with project stakeholders;
III The resolution of outstanding issues and the issuance of the final validation report and opinion.

The prepared validation report and other supporting documents then undergo an internal quality control at the HQ (Accredited office) before being submitted to the CDM-EB.

In order to ensure transparency, assumptions must be clear and stated explicitly and background material must also be referenced. Applus+ Certification has developed a specific Checklist customized for the project. The checklist demonstrates, in a transparent manner, the project criteria (requirements), discussion on each criterion by the assessment team, and the results from validating the identified criteria.

Appointment of the assessment team

According to the sectoral scope / technical area and experience in the sectoral or national business environment, Applus+ Certification has composed a project assessment team in accordance with the appointment rules in the internal Quality Management System of Applus+ Certification.

The composition of audit team shall be approved by Applus+ Certification ensuring that the required skills are covered by the team.

The four qualification levels for team members that are assigned by formal appointment rules are as presented below:

●Lead Auditor (LA).

●Auditor (A) / Auditor in Training (AiT).

●Technical Expert (TE).

●Technical Reviewer (TR).

The sectoral scope / technical area knowledge linked to the applied methodology/ies shall be covered by the assessment team.

Name	Role	SS Coverage	TA Coverage	Financial aspect	Host country experience
Mr. Pankaj Kumar	LA/TE	YES	YES	YES	YES
Mr. Denny Xue	TR	YES	YES	YES	NA

The complete list of CVs is included as Appendix 2 of this report.

Document review

The Project Design Document submitted by the Client was reviewed against the approved methodology and other relevant criteria to verify the correctness, credibility, and interpretation of the presented information. Furthermore, a cross-check between information provided and information from other sources like 3rd party Government documents has been done. A complete list of all documents and evidence material reviewed is included in Appendix 3 of this report.

Follow-up interviews

Applus+ Certification performed interviews, telephone conferences to confirm selected information and to resolve issues identified in the document review. The detail is provided in section C.2 and C.3 of this report.

Resolution of Clarification and Corrective Action Request

The objective of this phase of the validation was to resolve the requests for corrective actions and clarification and any other outstanding issues which need to be clarified for Applus+ Certification positive conclusion on the project design. The Corrective Action Requests and Clarification Requests raised by Applus+ Certification were resolved during communications between the Client and Applus+ Certification to guarantee the transparency of the validation process, the concerns raised and responses given are summarized in Appendix 4 below.

The final PDD version 08 submitted by PP on 08/06/2022 serves as the basis for the final assessment presented. Additional changes to the project during the validation process are not considered to be significant with respect to the main CDM objectives. The two CDM main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

Internal quality control

As final step of a validation of the final documentation including the validation report and the checklist have to undergo an internal quality control by the technical review committee, i.e. each report has to be finally approved either by the head of the technical review committee or the deputy. In case one of these two

persons is part of the assessment team approval can only be given by the other one to avoid any conflict of Interest.

After confirmation of the PP the validation opinion and relevant documents are submitted to the EB through the UNFCCC web-platform.

Conclusion

Applus+ Certification has performed a validation of the "2.5 MW Rice husk based Cogeneration plant at Hanuman Agro Industries Limited". The validation was performed on the basis of UNFCCC criteria and host country criteria, as well as criteria, e.g. AMS-I.C version 22, given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation and the subsequent follow-up interviews have provided Applus+ Certification with sufficient evidence to determine the fulfillment of stated criteria. In our opinion, the project meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria. The project will hence be recommended by Applus+ Certification for registration with the UNFCCC.

Applus+ Certification has received a confirmation from the host Party that the project activity assists it in achieving sustainable development.

By displacing fossil fuel-based electricity with electricity generated from a renewable source, the project results in reductions of CO_{2e} emissions that are real, measurable and give long-term benefits to the mitigation of climate change. An analysis of the positive list of renewable project demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity. Given that the project is implemented as designed, the project is likely to achieve the estimated amount of annual emission reductions of 34,308 tCO_2e.

The renewable validation has been performed following the requirements of the latest version of the CDM validation and verification standard for project activities, version 03.0 and on the basis of the contractual agreement. The single purpose of this report is its use during the registration process as part of the CDM/UNFCCC project cycle.

SECTION B. Validation team, technical reviewer and approver

B.1. Validation team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interview(s)	Validation findings
1.	Lead Auditor/ Technical Expert	OR	KUMAR	PANKAJ	True Quality Certifications Private Limited-Outsourced entity	YES	NA	YES	YES

B.2. Technical reviewer and approver of the validation report for RCP

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical Reviewer	EI	Xue	Denny	Applus+ Certification
2.	Approver	IR	Calle de Miguel	Agustín	Applus+ Certification

SECTION C. Means of validation

C.1. Desk/document review

The details of the document observed during desk review /validation process are listed below in Appendix 3 of this report.

C.2. On-site inspection

As per the requirement of Para 30 of CDM validation and verification standard for project activities, version 03 , Para (a) since the emission reduction estimated is less than 100,000 tCO_{2eq} , assessment team didn't conducted physical site visit for 3rd renewal of registered PA (UNFCCC reference number: 1667). To validate the PA design, eligibility criteria, monitoring & management practices as mentioned in the PDD; assessment team has conducted telephonic interviews with PP in compliance with para 31 of VVS for project activities, Ver. 3.0. After telephonic interviews with concerned PP representative; assessment team concluded that the design of PA is same as envisaged in 3rd CP. There is no change in the eligibility of PA design or operation as mentioned in the registered PA of 2nd CP which can alter the applicability or additionality of the project activity/methodology applied i.e. AMS-I.C version 22. Assessment team therefore of the opinion that project is implemented as described in the registered PDD for 3rd crediting period.

Duration of on-site inspection: NA				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
NA	NA	NA	NA	NA

C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Kanoria	Anjan	PP representative	02/06/2022	As explained in section C.2	Mr. Pankaj Kumar
2.	Kulkarni	Rahul	Consultant			

C.4. Sampling approach

The assessment team did not apply any sampling approach for the project activity. All the documentation related to the project activity is checked by the assessment team.

C.5. Clarification requests (CLs), corrective action requests (CARs) and forward action requests (FARs) raised

Area of validation findings	No. of CL	No. of CAR	No. of FAR
Compliance with PDD form	01	01	00
Application and selection of methodologies and standardized baselines	00	00	00
Validity of original baseline or its update	00	00	00
Estimated emission reductions or net anthropogenic removals	00	00	00
Validity of monitoring plan	00	00	00
Crediting period	00	00	00
Project participants	00	00	00
Post-registration changes	00	00	00
Others (EIA and additionality)- . FAR raised in line with the EB 108 meeting report	00	00	01
Total	**01**	**01**	**01**

SECTION D. Validation findings

D.1. Compliance with PDD form

<table>
<tr><td>Means of validation</td><td>Assessment team checked the PDD version 12.0 forms supplied by the project participant and found that the latest form applicable in the UNFCCC web site is used for the presentation of the PDD.</td></tr>
<tr><td>Findings</td><td>CAR 01 and CL 01 were raised during the validation process and closed successfully.</td></tr>
<tr><td>Conclusion</td><td>The PDD mentions all the criteria as detailed out in PDD form version 12.0 properly and found correct by the assessment team.

Assessment team also checked the commissioning details and found the same to be correct. The actual commissioning of the power plant is 31/08/2006 (Commissioning of the biomass power plant) checked from the 3rd party Government documents and found to be accurate. The project activity is connected to the 11 kV Feeder substation in Raipur district.

The plant installed one condensing cum extraction turbine along with 22 TPH high-pressure boiler with steam parameters of 44 kg/cm^2 and 450+5^{o}C.This boiler is of modern design with fluidised bed furnace suitable for outdoor installation with water scrubber for dust collection. Uninterrupted flow of rice husk to the boiler enabled by a twin bunker system located in front of the boiler. In case of exigencies of biomass fuel scarcity, HAIL purposes to use coal as fuel to the extent of 15%. The plant has seven days storage capacity for husk.

Validation team confirmed from technical specification that 100% steaming capacity of the boiler at rated parameters, about 6.6 TPH of rice husk (100% rice husk firing) is required. The plant also has coal-handling facilities with necessary crushers and conveyors to meet the requirement in case of exigencies of biomass fuel scarcity. The project generates a gross power output of 2500 KW at the generator terminals. The power generation in the cogeneration plant is at 440V level. All the technical details provided in PDD confirmed with specification provided and during remote audit, PP also confirmed that plant design has not changed since commissioning of the project and in operational as explained in registered PDD for 2nd crediting period.

The technical details for the revision of Crediting period were checked by the assessment team from the details available from the manufacturers. The details are as below:
<table>
<tr><td>S.no</td><td>Equipment</td><td>Supplier</td></tr>
<tr><td>01</td><td>Boiler</td><td>Cheema Boiler ltd</td></tr>
<tr><td>02</td><td>Turbine</td><td>Pentagon Turbine(P) ltd</td></tr>
<tr><td>03</td><td>Alternator</td><td>Kirloskar Electric</td></tr>
<tr><td>04</td><td>E.S.P</td><td>Adhor and Cheema Bevcon (p) ltd</td></tr>
<tr><td>05</td><td>Fuel Handling Plant</td><td>Bevcon (P) ltd</td></tr>
<tr><td>06</td><td>Ash Handling Plant</td><td>O.S.M Engineering (p)ltd</td></tr>
<tr><td>07</td><td>Mist Cooling tower</td><td>Mist</td></tr>
<tr><td>08</td><td>Balance of plant</td><td>Various suppliers like Siemens for breaker and panel Avr,Kirloskar Ion Exchange ,R.O. D.M Plant Ultra filtration etc</td></tr>
</table>
The project activity is a Greenfield Biomass power project of 2.5 MW capacity capacity. Since the project utilizes biomass energy to generate power, the project does not lead to GHG emissions into the atmosphere which makes it a clean technology. In the absence of the project activity, the equivalent amount of electricity would have been generated in the fossil fuel dominated Indian grid.

Assessment team checked the geographical coordinate of the project activity with the google Map. The latitude and longitude as mentioned in the registered PDD for 3rd crediting period is found correct. The details are as below:</td></tr>
</table>

	The project activity is located in Paragoan village which is situated near to Rajim, Tehsil Head Quarter (between 20^0 57'46" N Latitudes to 81^0 53'05" E Longitude. No post registration changes is envisaged for the 3rd CP. The project activity is in continuous operation as checked from the plant breakdown log sheets apart from scheduled maintenance (as per manufacturer specification) and thus there is no forced scenario observed which can alter the requirement of the methodology. The project activity complies with the applicability criteria of the small scale CDM Project activity category. DoE also confirms that information transferred to the later version of PDD form is materially the same as that in the registered PDD for validation of 3rd crediting period.

D.2. Application and selection of methodologies and standardized baselines

Means of validation	The assessment team has validated the documentation referred to in the revised PDD for renewal of crediting period and verified the documentation content for verifying the justification of the applicability of the methodology AMS-I.C version 22 and confirmed that the documentation referred to in the PDD is correctly quoted and interpreted. The assessment team has also cross-checked the information provided in the registered PDD of 2nd CP with the documentation other than from the PDD based on the local and sectoral knowledge of the assessment team. Following documentation has been reviewed by the assessment team: - Interview with the concerned person mentioned in this report - Technical detail analysis of the power plant from the documents submitted by the manufacturer. - Commissioning certificates of the turbines The assessment of the project's compliance with the applicability criteria of AMS-I.C version 22 are documented in detail in section B.2 of the PDD.
Findings	No finding was raised during the validation process.
Conclusion	The applied baseline methodology is justified as it has been demonstrated that the proposed project activity is: Applicability 1: The project involves a cogeneration system for producing heat and electricity. Electricity is utilized onsite for auxiliary consumption (0.25 MW) for co-generation purposes (i.e. the boiler its accessories). The remaining electricity (2.25 MW) displaces the fossil fuel based grid electricity from INDIAN grid. The steam is utilized for operation of their paper mill. Thus, the project falls under option (b) of para 3 & 4, i.e. Electricity and/or thermal energy production for on-site consumption or for consumption by other facilities which was confirmed during remote audit and manufacturer's specification and commissioning certificates Applicability 2: The project activity is a green field project activity and does not involve any retrofit or modification in an existing facility. Hence, this criteria is not applicable confirmed with CREDA letter and clearances from SPCB. Applicability 3: The project activity is a Type-I green field project activity and does not involve any capacity addition to the existing facility. Hence, this criteria is not applicable confirmed with CREDA letter and clearances from SPCB. Applicability 4: The project involves a cogeneration system for producing heat and electricity. Electricity is utilized onsite for auxiliary consumption (0.25 MW) for co-generation purposes (i.e. the boiler its accessories). The remaining electricity (2.25 MW) displaces the fossil fuel based grid electricity from INDIAN grid. The net thermal energy output from the project activity is approximately 20 MWth which is below 45 MWthermal as specified in the methodology. Hence, the capacity of the project equipment is less than 45 MW thermal. Therefore this applicability criterion has been met as confirmed with copy of purchase orders and plant specification provided by manufacturer. Applicability 5. The net thermal energy output from the project activity is

	approximately 20 MW_{th} which is below 45 MW_{th} thermal as specified in the methodology. Hence, the capacity of the project equipment is less than 45 $MW_{thermal}$. Therefore this applicability criterion has been met. Validation team checked the calculation sheet provided by PP and found the same in line with applied methodology. Applicability 6: The project involves a cogeneration system for producing heat and electricity. Electricity is utilized onsite for auxiliary consumption (0.25 MW) for co-generation purposes (i.e. the boiler its accessories). The remaining electricity (2.25 MW) displaces the fossil fuel based grid electricity from INDIAN grid. The net thermal energy output from the project activity is approximately 20 MWth which is below 45 MWthermal as specified in the methodology. Hence, the capacity of the project equipment is less than 45 MW thermal. Validation team checked the copies of purchase order and invoices of state grid which confirms the captive use of electricity generated at plant.Therefore this applicability criterion has been met. Applicability 7: Validation team confirms that the project activity meets the capacity limits specified in paragraphs 7 to 9 above. The project activity is a green field project activity and does not involve any retrofit or modification in an existing facility. Hence, this criteria is not applicable. Applicability 8: Project involves usage of rice husk and coal for generation of electricity. No solid biomass fuel is involved in the project activity; hence, this criteria is not applicable confirmed with CREDA letter and biomass assessment report. Applicability 9: The electricity generated at the project site is not supplied to any other facility or facilities within the project boundary. Hence the above mentioned condition is not applicable. Applicability 10: The project activity does not involves usage of biogas hence this criterion is not applicable. Applicabilty 11: Not applicable, as the project equipment do not contain refrigerants. Applicability 12: Project involves usage of rice husk and coal for generation of electricity. No charcoal based biomass energy generation is involved in the project activity; hence, this condition is not applicable Applicabilty 13: The project activity does not utilizes biomass sourced from dedicated plantations, hence this criterion is not applicable. The project activity capacity is considered as 2.5 MW, which is less than the maximum qualifying Type I capacity of 15 MW. Thus the project qualifies as small scale project for 3rd CP. Also no additional unit will be added to the project activity during its crediting period; Hence the project activity will remain under small scale project activity during every year of 3rd crediting period.

D.3. Validity of original baseline or its update

Means of validation	The baseline scenario as depicted in the PDD version 08 is checked during the validation desk review and also during the interview with the plant official.
Findings	The baseline is selected as per the requirement of the approved methodology AMS-I.C version 22 for the present Crediting period. No finding was raised on this section.
Conclusion	Assessment team referred “Methodological tool 11 (EB 66, Annex 47) “Assessment of the validity of the original / current baseline and update of the baseline at the renewal of the crediting period.” (Version 03.0.1)” and CDM validation and verification standard for project activities, version 03.0” to check the originality of the baseline. Following are the observation of the assessment team regarding selected baseline for the project activity in this present 3rd renewable crediting

period:

Step 1.1 (EB 66, Annex 47): Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies

The baseline for the project activity is the electricity delivered to the grid by the project activity which would have otherwise been generated by the operation of grid connected power plants and by the addition of new generation sources into the grid. The project activity is claiming the emission reductions from the net exported electricity to the grid only. In absence of project activity this quantity of electricity would have been generated from the electricity grid mix (mainly fossil fuel). The Government of India enacted the Electricity Act in the year 2003 to harmonize and rationalize the provisions in the then existing laws. The Act consolidated the laws relating to generation, transmission, distribution, trading and use of electricity. With the Enactment of the act, the then existing laws viz, The Indian Electricity Act 1910, The Electricity Supply Act, 1948 and The Electricity Regulatory Commissions Act, 1998 were repealed. The Electricity Act 2003 was in force at the time of the completion of the baseline study during first crediting period.

The baseline remains unchanged for the present (3rd)crediting period since there is no policy been revised and/or is currently in force as well, therefore the baseline scenario is still in compliance with all the relevant mandatory national and/or sectoral policies.

Step 1.2 (EB 66, Annex 47) : Assess the impact of circumstances
There are no new circumstances that can impact the original baseline. The baseline emission factor value is however updated based on the current data available for the grid.

Step 1.3 (EB 66, Annex 47): Assess whether the continuation of the use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested

As per the “Tool to determine the remaining lifetime of equipment (Tool 10, ver.01)”, the remaining lifetime of the equipment is the time for which the existing equipment can continue to operate before it has to be replaced/discarded. As per this Tool, Project participant can use one of the following options to determine the remaining lifetime of the equipment:

(a) Use manufacturer’s information on the technical lifetime of equipment and compare to the date of first commissioning;
(b) Obtain an expert evaluation;
(c) Use default value

The project activity started commercial operation in the year 31/08/2006 and since commissioning, the project activity is running satisfactorily. As per Manufacturer specification and. Thus as per manufacturers information, the remaining lifetime of equipment is exceeds crediting period as per option 1 of Tool to determine the remaining lifetime of the Equipment.

The below conditions are fulfilled. (i)The equipment has been operated and maintained according to the recommendations of the equipment supplier; (ii) There are no periodic replacement schedules or scheduled replacement practices specific to the industrial facility, that require early replacement of equipment before the expiry of the technical lifetime; and (iii) The equipment has no design fault or defect and did not have any industrial accident due to which the equipment cannot operate at rated performance levels.

As per option (a), evaluating the remaining lifetime for the type of equipment has been approached and requested to determine the remaining lifetime of the equipment. The assessment of remaining life time of the equipment’s had been done and confirmed that the remaining technical lifetime of the equipment of the project activity exceeds the crediting period for which renewal is requested. As the

remaining technical lifetime of the equipment is not less than the end of the crediting period or which renewal is requested, the current baseline holds good for this crediting period too.

Step 1.4(EB 66, Annex 47): Assessment of the validity of the data and parameters

This step stipulates that "Where emission factors, values or emission benchmarks are used and determined only once for the crediting period, they should be updated, except if the emission factors, values or emission benchmarks are based on the historical situation at the site of the project activity prior to the implementation of the project and cannot be updated because the historical situation does not exist anymore as a result of the CDM project activity."

The project chosen **ex-ante default value i.e. Emission Factor**. As per the Guidance given in Tool the emission factor is updated as follows:

1. The operating margin is calculated as per the latest version of CEA CO_2 baseline database (Version 17) available to the project participant. The operating margin calculation is checked by the assessment team and found correct.

2. The build margin is considered from CEA CO_2 baseline database version 17 as per "Tool to calculate the emission factor for electricity system" version 07. The value considered is checked by the assessment team and found correct

3. The Combined margin calculation is carried out as per "Tool to calculate the emission factor for electricity system" version 07. The value considered is checked by the assessment team and found correct

Application of Steps 1.1, 1.2, 1.3 and 1.4 confirmed that the current baseline is valid for the Third crediting period but data and parameters needs to be updated. Therefore step 2 is used

Step 2.1: Update the current baseline
This step is applicable since the Steps 1.1, 1.2, 1.3 and/or 1.4 showed that the current baseline needs to be updated. As evident from the explanation provided above the baseline scenario remains unchanged.

Updated the baseline emissions based on the latest approved version of the methodology applicable to the project activity for the subsequent crediting period, without reassessing the baseline scenario.

Step 2.2: Update the data and parameters
The updated Data and/or parameter are followed for estimating the baseline emissions

Hence as per AMS-I.C version 22 (latest Methodology), the baseline of the project is as follows:

Project activity is the installation of a Greenfield power plant, the baseline scenario is electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

The above selected baseline is correct and thus applicable to the project activity and in line with approved methodology for the applied renewable of crediting period.

D.4. Estimated emission reductions or net anthropogenic removals

Means of validation	The emission reduction sheet, CEA CO_2 Baseline database version 17.0 (Latest applicable) and PDD version 08 is checked by the assessment team.
Findings	No finding was raised on this section.
Conclusion	The baseline emissions as discussed in section B.6.1 will include emissions that would have occurred in the absence of the project activity. The emission reduction calculation has been done as per the AMS-I.C, Ver. 22 **Baseline Emission (BE_y):** Base line Emission Reductions resulting from Steam/heat produced using fossil fuel: $BE_{th} = HG_y * CO_2EF_{coal} / \eta_{th}$ Where: BE_{th}: The baseline emissions from steam/heat displaced by the project activity during the year y in tCO_2e. ($BE_{thermal\ CO2,y}$) HG_y: The net quantity of steam/heat supplied by the project activity during the year y in TJ. ($EG_{thermal,y}$)CO_2EF_{coal}: the CO_2 emission factor per unit of energy of the fuel that would have been used in the baseline plant in (tCO_2 / TJ), obtained from reliable local or national data if available, otherwise, IPCC default emission factors are used. Here Coal is considered as baseline fuel ($EF_{FF,CO2}$) η_{th} : the efficiency of the plant using fossil fuel that would have been used in the absence of the project activity. This is same as ηBLthermal of methodology. BE_{th} = 24,863 tCO_2e Validation team confirmed the calculation from ER sheet and found the calculation is in line with methodological requirement. 2. Carbon Emission reduction per annum by project activity due to displacement of electricity from Grid: $BE_{el} = EG_y$ x BE_{Fe} Where , BE_e: Carbon Emission reduction per annum by project activity due to displacement of electricity from Grid in t CO_2 EG_y: Net power supplied by the project activity i.e. Clean Power to be consumed by the entity replacing the Grid Power in GWh. BE_{Fe} Baseline Emission Factor for IndianGrid of India in Kg CO_2 per kWh BE_e = 14,416 tCO_2e Validation team confirmed the calculation from ER sheet and found the calculation is in line with methodological requirement. 3. Total Baseline Emission reduction per annum by project activity (BEy) $BE_y = BE_{th} + BE_e$ BE_y = 24,863+14,416 BE_y = 39,279 tCO_2e (Round down value) Validation team confirmed the calculation from ER sheet and found the calculation is in line with methodological requirement. PP has estimated the baseline energy generation considering the Exportable

capacity (after deducting the auxiliary consumption as a conservative approach) of the project activity, yearly generation hour and plant load factor The project activity involves installation of 2.5 MW biomass based power plant in the state of Chhatisgarh. Validation team assessed the technical specification of the promoters of the project activity, Commissioning certificate and found that installed capacity of this project activity is correct.

Baseline emission factor is calculated as combined margin, consisting of a combination of operating margin (OM) and build margin (BM) factors according to the procedure prescribed in the "Tool to calculate the emission factor for an electricity system" version 07.0 which is sourced from CEA CO_2 baseline database version 17.0, Govt. of India and forms the part of emission reduction calculation. The baseline emission factor calculation is checked by the validation team and found that the calculation is transparent and conservative.

The quantity of electricity generated is equal to the difference between gross electricity generated and the electricity used for auxiliary consumption and is based on factors such as installed capacity, operating days and the plant load factor (PLF) and Auxillary consumption.

Hence, for the calculation of $EG_{facility,y}$ during the Renewal of Crediting Period, the PLF is taken to be 90% of power plant- as considered in 2nd registerd PDD where as boiler efficiency considered as 76.7% as considred in 2nd registerd PDD.

Project Emission

The project may use coal as auxiliary fuel to the extent of 15% in case of exigency. The MNES (The Ministry of New and Renewable Energy) also allows use of fossil fuel to the extent of 25% in case of exigencies. The same is checked by the assessment team from the 2nd registred PDD.

Accordingly the project emissions in the form of tonnes CO_2 from combustion of coal is calculated using CO_2 emission factor refereeing the IPCC 2006 Guidelines for National Green House Gas Inventories. Formula used for calculation:

$PEy = NCV_{coal} \times Q_{fC} \times CO_2EF_{coal}$

Where

PE_y : Carbon-dioxide emission due to coal burning at project site in tCO2
NCV_{coal} : Calorific value of sub-bituminous coal in TJ/Kt
Q_{fc} : Quantity of coal burned in MT
CO_2EF_{coal} : Baseline Emission Factor for sub-bituminous coal

$PEy = 4{,}971\ tCO_2e$

Leakage Emissions:
As per the registered PDD of 2nd CP , the biomass assessment survey needed to be conducted annually. Accordingly, biomass assessment survey was done in years by third party contracted by PP. Validation team checked the biomass survey report prepared by and confirms that surplus biomass (more than 58.38 %) is available in the region. Also, there is no transfer of equipements observed.
Hence leakage is considered as zero.

Emission Reductions:

The project activity reduces carbon dioxide emissions through displacement of grid electricity generation with predominantly fossil fuel based power plants 1 by renewable electricity. The emission reduction (ERy) due to project activity during a

	given year y is calculated as the difference between baseline emissions (BEy), project emissions (PEy) and leakage emission (LEy) as per the formulae given below: $ER_y = BE_y - PE_y - LE_y$ = 39,279 - 4,971 - 0 = 34,308 tCO_2. From the analysis above the emission reductions are calculated as 34,308 tCO_2.

D.5. Validity of monitoring plan

Means of validation	Assessment team checked the monitoring practice during telephonic interview, Plant log sheets and records and also checked the requirement of AMS-I.C version 22 and procedure mentioned in the registered PDD of 2nd CP.
Findings	No finding was raised in this section
Conclusion	**Parameters determined ex-ante:** 1. **$EF_{grid,OM,y}$: = (0.9522 tCO_2/MWh) =** Operating Margin emissions factor for grid connected power generation in year y calculated using the latest version of "Tool to calculate the emission factor for an electricity system version 07." $EF_{grid, OM, y}$ is computed using the Simple Operating margin CO_2 emission factor. Simple Operating margin CO_2 emission factor is calculated from 3-year generation weighted average using data for the years 2018-19, 2019-20, 2020-21 CO_2 emissions per unit net electricity generation of all power plants serving the system, not including low-cost / must-run. This is in agreement with the guidance provided in the Tool to calculate the emission factor for an electricity system. **The value is considered from CEA CO_2 baseline databae, version 17**.The value is fixed ex-ante for the entire duration of 3rd crediting period. As the value is sourced from CEA (publicly available document) no further analysis is required 2. **$EF_{grid,BM,y}$: = (0.8811 tCO_2/MWh)** CDM PDD used option 1 to calculate Build Margin Emisison Factor. In accordance with the para 72 of Tool to calculate the emission factor for an electricity system, version 7.0, for 3rd creding period . For 3rd CP, value of BM will be the same as 2nd CP. **3.** **$EF_{grid,CM,y}$:= (0.8989 tCO_2/MWh)** Combined Margin emissions factor for grid connected power generation in year y calculated using the latest version of "Tool to calculate the emission factor for an electricity system version 07." Combined Margin is computed using the official data sources and is in-line with the guidance provided in the tool. The same is calculated as : $EF_{grid,CM,y} = EF_{grid,OM,y} * W_{OM} + EF_{grid,BM,y} * W_{BM}$ Where: $EF_{grid,BM,y}$= Build margin CO_2 emission factor in year y (tCO_2/MWh) $EF_{grid,OM,y}$ = Operating margin CO_2 emission factor in year y (tCO_2/MWh) W_{OM} = Weighting of operating margin emissions factor (%) = 25% W_{BM} = Weighting of build margin emissions factor (%) = 75% The value of Simple Operating Margin Emission factor is considered from CEA CO_2 baseline database, version 17, which is calculated from 3-year generation weighted average using data for the years 2018-19, 2019-20, 2020-21CO_2 emissions. The value is fixed ex-ante for the entire duration of 3rd crediting period. As the value is sourced from CEA CO2 baseline database (publicly available document) no further analysis is required. 4. **NCV_{coal} (** Net Calorific Value of fossil fuel (coal) : 18.9 TJ/Kt taken from IPCC 2006 guidelines for National GHG Inventories, Volume 2, Table 1.2, p.1.1 5. **$EF_{CO2,coal}$:** 96.1 tCO_2/TJ. Weighted average CO_2 emission factor of fuel type i (diesel) in year y. Value provided by the fuel supplier in invoices may not be

available; therefore IPCC default value at the upper limit of the uncertainty at a 95% confidence interval is used. The approach is correct as per the 1st CP and 2nd CP and hence acceptable to the assessment team.

6. **ηth** (Boiler Efficiency) : 76.7% fixed ante and calculated on the basis of actual measured data during last six years . Validation team confirmed the approach to be appropriate and conservative.

7. **$Q_{\_biomass}$** (Evaluation of Surplus Biomass within a range of 25 Km from plant site): 379,252 MT/ Year fixed ante and calculated on the basis of Secondary as well as primary data to be collected by the third party working in this field. The availability of biomass is about 58.38% larger than the required quantity of biomass for the project. Hence leakage due to competing uses for the biomass is neglected. Validation team confirmed the approach to be appropriate and conservative.

Parameters determined ex-post:

1. **EG_{Gross}**: Total electricity generated by the project activity activity in GWh/y will be measured continuously using 0.2s accuracy class (Secure make) generation meter installed in the control room of the plant and electricity generation figures will be recorded on daily basis in electrical log book. The generation meter will be calibrated annually by independent third party. The data will be archived electronically for a minimum of two years after the end of the crediting period.
2. **EG_{aux}** (Auxilliary Consumption by Power Plant) is measured through energy meter installed within the project boundary on continuous basis and Data is recorded electronically through online PLC system and spot readings of the meter is made hourly and recorded on logbook. The generation meter will be calibrated annually.
3. **EG_y:** Quantity of electricity consumed by the paper mill from the project activity is measured through energy meter of accuracy class 0.2s of secure make installed within the project boundary on continuos basis and data recorded electronically through online PLC system and spot reading of the meter made hourly and on daily basis in electrical log book. The generation meter will be calibrated annually by independent third party The data will be kept for the later of, two years after the end of the crediting period.

4. **$Q_{fc,biomass}$:** Quantity of biomass procured for the project activity during year y. The trucks carrying biomass will be weighted by a weighbridge upon entry and exit, to arrive at net quantity of biomass procured. The supply of fuel to the steam generation set had been monitored on daily basis. Data had been recorded electronically as well as manually. Weighbridge are of Avery make and accuracy class 0.5% . The weighbridge will be calibrated annually. The data will be kept for the later of, two years after the end of the crediting period.

5. **$Q_{fc,coal}$:** Quantity of coal procured for the project activity during year y. The trucks carrying biomass will be weighted by a weighbridge upon entry and exit, to arrive at net quantity of coal procured. The supply of fuel to the steam generation set had been monitored on daily basis. Data had been recorded electronically as well as manually. Weighbridge are of Avery make and accuracy class 0.5% . The weighbridge will be calibrated annually. The data will be kept for the later of, two years after the end of the crediting period.
6. **$Q_{totalsteam}$:** Total quantity of steam generated per hour measured through steam flow meter of ABB make and accuracy class of 0.2% continuously and date recorded electronically through online PLC system. Hourly readings taken and recorded in log book.
7. **$Q_{processsteam}$** : Total quantity of steam supplied per hour measured through steam flow meter installed within the project boundary on continuous basis

	and Data had been recorded electronically through online PLC system and spot readings of the steam generation was made on daily basis and recorded on logbook. 8. **$P_{processsteam}$** : Pressure of process steam supplied per hour Online measurement and manual logging Spot reading through PLC system and manual logging on daily basis as per standard industrial norms which shall be averaged on monthly basis. 9. **$t_{processsteam}$** : Temperature of process steam supplied per hour Online measurement and manual logging Spot reading through PLC system and manual logging on daily basis as per standard industrial norms which shall be averaged on monthly basis. 10. **Steam Enthalpy :** Heat value of process steam supplied to paper & pulp section, Calculated based on temp and pressure of process steam. Pressure and Temperature of steam supplied to Paper & Pulp section had been measured through pressure and steam temperature gauge installed within the project boundary on continuous basis and data has been recorded electronically through online PLC system and spot readings of the Pressure and Temperature of steam supplied to Paper & Pulp section was made on daily basis and recorded log book and further on excel sheet and used for calculation of emission reductions. Monthly average is calculated which is used to calculate enthalpy. Validation discussed all ex post paramters with PP representatives during interviews with PP representatives and checked calibration certificates of measuring equipments. DoE confirmed that monitoring procedure not change since 2nd crediting period and in line with registered PDD for 2nd CP.

D.6. Crediting period

Means of validation	The crediting period is checked as per UN home page (reference number : 1667) and discussion with Client.
Findings	No CAR is raised.
Conclusion	This is 3rd renewable crediting period and the duration is 7-year renewable (3rd CP duration: 07/11/2022- 06/11/2029).

D.7. Project participants

Means of validation	The project participant names were checked from UN homepage https://cdm.unfccc.int/Projects/DB/SGS-UKL1204641540.4/view
Findings	No findings raised
Conclusion	Following are the details of PP (host country) and Annex 1 country. The same is correct and in line with PDD registered under 2nd Crediting period as well as MOC obtained from UN home page.

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (host Party)	M/s Hanuman Agro Industries Limited	No

D.8. Post-registration changes

Type of post-registration changes (PRCs)	Confirmation (Y/N)	Validation report for PRCs	
		Version	Completion date
Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents[2]	N	NA	NA
Corrections	N	NA	NA
Change to the start date of the crediting period	N	NA	NA
Inclusion of a monitoring plan	N	NA	NA
Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents	N	NA	NA
Changes to the project design	N	NA	NA
Changes specific to afforestation and reforestation project activities	N	NA	NA

SECTION E. Internal quality control

As final step of a validation of the final documentation including the Renewable crediting period validation report and the checklist have to undergo an internal quality control by the technical review committee, i.e. each report has to be finally approved either by the head of the technical review committee or the deputy. In case one of these two persons is part of the assessment team approval can only be given by the other one to avoid any conflict of Interest.

SECTION F. Validation opinion

Applus+ Certification has performed a validation of the "2.5 MW Rice husk based cogeneration plant at Hanuman Agro Industries Limited ". The validation was performed on the basis of UNFCCC criteria and host country criteria, as well as criteria, e.g. AMS-I.C,Ver. 22, given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation and the subsequent follow-up interviews have provided Applus+ Certification with sufficient evidence to determine the fulfillment of stated criteria. In our opinion, the project meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria. The project will hence be recommended by Applus+ Certification for registration with the UNFCCC.

Applus+ Certification has received a confirmation from the host Party that the project activity assists it in achieving sustainable development.

By displacing fossil fuel-based electricity with electricity generated from a renewable source, the project results in reductions of CO_2e emissions that are real, measurable and give long-term benefits to the mitigation of climate change. An analysis of the positive list of renewable project demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity. Given that the project is implemented as designed, the project is likely to achieve the estimated amount of annual emission reductions of 34,308 tCO_2e for 3rd crediting period from 07/11/2022- 06/11/2029 based on final PDD, ver. 8.0 dated 08/06/2022.

The validation has been performed following the requirements of the latest version of the CDM validation and verification standard for project activities, version 03.0 and on the basis of the contractual agreement. The single purpose of this report is its use during the registration process as part of the CDM/UNFCCC project cycle.

[2] Other standards, methodologies, methodological tools and guidelines (to be) applied in accordance with the applied(selected) methodologies are collectively referred to as the other (applied) methodological regulatory documents).

Appendix 1. Abbreviations

Abbreviations	Full texts
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CEA	Central Electricity Authority
CL	Clarification request
CMS	Central Monitoring system
CP	Crediting period
CM	Combined Margin
CMS	Central Monitoring system
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
DR	Document Review
EF	Emission Factor
ER	External Resource
EIA	Environmental Impact Assessment
ER	Emission Reductions
FAR	Forward Action Request
GHG	Greenhouse gas(es)
HAIL	Hanuman Agro Industries Limited
IR	Internal Resource
OR	Outside resource
OEM	Original Equipment manufacturer
OM	Operating Margin
PP	Project Participant

Appendix 2. Competence of team members and technical reviewers

1. **Mr. Pankaj Kumar** worked as team leader – Bihar for South Asia Climate Proofing and Growth Development(CPGD) – Climate Change Innovation Programme (CCIP) supported by DFID that seeks to mainstream climate change resilience into planning and budgeting at the national and sub-national level in India,Pakistan, Nepal, and Afghanistan. Pankaj Kumar has worked previously with IL&FS Infrastructure Development Corporation and BUIDCO(Bihar Urban Infrastructure Development Corporation), Govt. of Bihar as Environmental Specialist for WB & ADB funded projects. Prior to this, he worked with Carbon Check (UNFCCC accredited DoE), Johannesburg, RSA as Team Leader for validation, verification of around 100 GHG projects in Asia, Africa, USA, Asia Pacific & Americas. Pankaj is accredited Lead Auditor, Validator, Verifier and Technical Expert for Sectoral Scope/Technical Area – 1.1, 1.2, 3.1 & 13.1 by UNFCCC DoE (Designated Operational Entity), APPLUS, Spain. He is also member of task force on climate change & human health, Health Department, GoB.He is an experienced, qualified and result oriented Environment Professional having more than 14 yrs. of relevant experience in Climate Change (Mitigation & Adaptation), Environmental Due Diligence, Disaster Risk Reduction, Validation and Verification of GHG project under CDM, Verified Carbon Standard, Gold Standard & Social Carbon Standard, Brazil. He provides technical support for environmental investigative, consultative and remedial projects involving air, water and soil, Waste management, EIA, Environmental Compliance, ISO 14001, OHSAS 18001, GHG accounting (ISO 14064) and Carbon foot printing.Pankaj Kumar is Masters in Environment Management from Forest Research Institute (University), I.C.F.R.E, Dehradun, which is Centre of Excellence in South East Asia for Forestry education & research and PGDEL from National Law School of India University, Bangalore (India).

2. **Mr. Denny Xue** (Master's Degree in Environmental Engineering, Bachelor's Degree in Thermal Engineering) is an Auditor appointed by Applus+ LGAI for the GHG project assessment, auditing and technical review. He has more than 6 years of work experience in CDM/GS4GG/VCS project assessment and technical review with Applus+. Before he joined Applus+ LGAI, he has been working for Shanghai Chuanji Investment and Management which is a CDM consultancy company as a project manager for CDM project development. Mr. Denny Xue is based in Shanghai, China.

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	NA	Contract of the project participant with the DOE	Contract document signed between PP and DOE	Project participant
2	NA	Technical specifications of Biomass power plant and other equipements	Manufacturer technical specifications	Project participant
3	NA	PDD based on which opinion is provided- Version 08	08/06/2022	Project participant
4	NA	Estimated Emission reduction calculation sheet- (final)	08/06/2022	Project participant
5	NA	AMS-I.C version 22	UNFCCC CDM web site	UNFCCC
6	NA	Ministry of Environment and forest: www.envfor.nic.in UNFCCC www.cdm.unfccc.int CEA: Central electricity authority www.cea.nic.in	Reference link is provided.	Independent Search
7	NA	Tools/ guidelines used in the project activity: • Clarification on national and/or sectoral policies Para 27 EB 55. • Tool 10: Tool to determine the remaining lifetime of the project activity, Ver. 01 in line with Annex 15 EB 50. • Tool 03 :Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion, Version 3. • Tool 07: Tool to calculate the emission factor for an electricity system version 07. • Tool 11: Assessment of the validity of the original / current baseline and update of the baseline at the renewal of the crediting period." (Version 03.0.1).	UNFCCC CDM web site	UNFCCC
8	NA	Commission Certificate for biomass Power plant	Commissioning certificate as provided by 3rd party	Project participant
9	NA	Consent Letter from "**Chhattishgarh**	Power Plant Consent	Project

		Environment Conservation Board"	dated 28/05/2021	participant
10	NA	Plant records for steam and electricity generation	Plant records and elecgtricity bills ford. the present financial year	Project participant

Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. CL from this validation

CL ID	01	**Section no.**	D.1	**Date:** 06/06/2022
Description of CL				
At some places in the PDD, description mentioned in past tense like "proposed project activity" which is not correct as project is undergoing 2nd RCP. PP shall reframe the description throughout the PDD				
Project participant response				Date : 08/06/2022
Necessary changes done in relevant sections of the PDD, submitting herewith revised PDD (versión 08) to DoE for review.				
Documentation provided by project participant				
Revised PDD (versión 08)				
DOE assessment				**Date: 13/06/2022**
PP has reframed the description throughout the PDD as project is undergoing 2nd RCP, and same is revised in the relevant section of the PDD, Version 08, Dated-08/06/2022.Thus, **CAR is Closed.**				

Table 2 CAR from this validation

CAR ID	01	**Section no.**	D.1	**Date: 06/06/2022**
Description of CAR				
1. PP shall provide copies of latest consent to operate issued by state pollution control board				
Project participant response				**Date:08/06/2022**
Submitting herewith latest copy of consent to opérate (No. 646/TS/CECB/2021, dated 28/05/2021) issued by Chhattisgarh Environment Conservation Board to DoE for review.				
Documentation provided by project participant				
Copy of consent to opérate (No. 646/TS/CECB/2021, dated 28/05/2021)				
DOE assessment				**Date: 13/06/2022**
PP has submitted the latest copy of consent to opérate (No. 646/TS/CECB/2021, dated 28/05/2021) issued by Chhattisgarh Environment Conservation Board to DoE for review and it is found correct. Thus, accepted. **CAR is Closed.**				

Table 3. FAR from this validation

FAR ID	01	**Section no.**		**Date:** 06/06/2022
Description of FAR				
In accordance with the provisions stated in the EB 108th Meeting Report, Para 7 (c), the project participant(s) are required to: (i) Apply any global warming potential values that may be adopted by the CMP for that period in their monitoring reports for any emission reductions achieved on or after 1 January 2021; and (ii) Update their project or programme design documents in accordance with any requirements of the CMP guidance.				
Project participant response				**Date:**

Documentation provided by project participant	
DOE assessment	**Date:**

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Document information

Version	*Date*	*Description*
03.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the "CDM validation and verification standard for project activities" (CDM-EB93-A05-STAN) and version 02.0 of the "CDM project cycle procedure for project activities" (CDM-EB93-A06-PROC); • Make editorial improvements.
02.0	31 October 2017	Revision to align with the requirements of the "CDM validation and verification standard for project activities" (version 01.0).
01.0	23 March 2015	Initial publication.

Decision Class: Regulatory
Document Type: Form
Business Function: Renewal of crediting period
Keywords: crediting period, project activities, validation report