VALIDATION REPORT

HUBEI HONGSHAN IFM (CONVERSION OF LOGGED TO PROTECTED FOREST) PROJECT

Document Prepared By China Quality Certification Centre

Project Title	Hubei Hongshan IFM(Conversion of Logged to Projected Forest) Project
Version	02.1
Report ID	CDM-VCS-2019-0003

Report Title	VCS Validation Report for Hubei Hongshan IFM(Conversion of Logged to Projected Forest) Project
Client	Zhong Che (Beijing) Environmental Energy Technology Development Co.,Ltd
Pages	104
Date of Issue	01-05-2020
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Summary:

- A brief description of the validation and the project

China Quality Certification Centre (CQC) is commissioned by Zhong Che (Beijing) Environmental Energy Technology Development Co.,Ltd. to perform a validation on the project -Hubei Hongshan IFM(Conversion of Logged to Projected Forest) Project with regard to the requirements of VCS (version 4.0), VM0010/Version 1.3 as well as criteria given to provide for consistent project operations, monitoring and reporting.

The proposed VCS project activity Hubei Hongshan IFM(Conversion of Logged to Projected Forest) Project is implemented in Hongshan County, Suizhou City, Hubei Province of China by Zhejiang Zhongzheng Forestry Development Co.,Ltd, the area of the project activity is 23,769.42ha, the species involved in the project are Oak, Masson Pine, Broad-Leaved Mixed Forest and Coniferous and Broad-Leaved Mixed Forest. The approved VCS methodology VM0010/Version 1.3 “Methodology for Improved Forest Management: Conversion of Logged to Protected Forest” is applied to quantify the GHG removals achieved in this project. The calculation of the project emission removals is carried out in a transparent and conservative manner.

- The purpose and scope of validation

The objective of this validation is to assess the proposed VSC project independently by a Third Party against all defined criteria set for the registration under the VCS. In order to confirm that the project activity, as documented, is sound reasonable and meets the identified criteria, the validation involves the assessment of: project conformance to VCS rules, project conformance to the applied methodology, including the procedure for the demonstration of additionality specified in the methodology; and the procedures set out in the project description for likelihood of generateing verifiable GHG data when implemented. Validation is a requirement and is seen as necessary to provide assurance to stakeholders of the quality of project and its intended generation of VCUs. Validation is part of the VCS project cycle and will finally result in a conclusion by the executing VVB whether a project activity is valid to be submitted for registration to VCS registry. The ultimate decision on the registration of a proposed project activity rests with the VERRA.

- The method and criteria used for validation

CQC team has employed a risk-based approach in the validation, focusing on the identification of significant risks and reliability of project design and generation of emission reductions according to the relevant applicable version of the VCS Validation and Verification Manual and applying auditing techniques. The validation team assessed the proposed project activity’s compliance under the VCS Version 4.0, the selected methodology and the project description. The project activity is found to be

appropriately eligible under Project Scope 14 “Agriculture, Forestry, and other Land Use (AFOLU). The validation criteria followed the guidance documents provided by VCS included the following: VCS Standard version 4.0, VCS Program Guide version 4.0, AFOLU Non-Permanence Risk Tool version 4.0 and the VCS Methodology VM0010/Version 1.3 “Methodology for Improved Forest Management: Conversion of Logged to Protected Forest”.

- The number of findings raised during validation.

In the course of the validation 1 Corrective Action Request (CARs) and 6 Clarification Requests (CLs) were raised and successfully closed.

- Any uncertainties associated with the validation

There are no restrictions of uncertainty.

- Summary of the validation conclusion

CQC team confirms all validation activities including objectives, scope and criteria, level of assurance, monitoring and project documentation adhere to VCS version 4.0 and the relevant host country criteria as documented in this report, are complete. CQC team concludes that the “Hubei Hongshan IFM(Conversion of Logged to Projected Forest) Project” meets the requirements of VCS .The GHG assertion provided by Zhong Che (Beijing) Environment Energy Technology Development Co., Ltd. and validated by CQC will result in GHG emissions reductions about 8,769,291 tCO_2e in 30 years, the average annual emission reduction is 292,309 tCO_2e and Verified Carbon Units with buffer deduction is about 6,840,033 tCO_2e in 30 years, the average annual VCUs with buffer deduction is 228,001 tCO_2e.

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1 INTRODUCTION

1.1 Objective

Zhong Che (Beijing) Environment Energy Technology Development Co., Ltd. has commissioned China Quality Certification Centre（CQC） to carry out the Verified Carbon Standard (VCS) validation of the project, Hubei Hongshan IFM(Conversion of Logged to Projected Forest) Project with regard to the relevant requirements of VCS standard version 4.0 and the VCS Methodology VM0010/Version 1.3 “Methodology for Improved Forest Management: Conversion of Logged to Protected Forest”.

The objective of this validation is to assess the proposed VCS project independently by a Third Party against all defined criteria set for the registration under the VCS. In order to confirm that the project activity, as documented, is sound reasonable and meets the identified criteria, the validation involves the assessment of: project conformance to VCS rules, project conformance to the applied methodology, including the procedure for the demonstration of additionality specified in the methodology; and the procedures set out in the project description for likelihood of generating verifiable GHG data. Validation is a requirement and is seen as necessary to provide assurance to stakeholders of the quality of project and its intended generation of VCUs. Validation is part of the VCS project cycle and will finally result in a conclusion by the executing VVB whether a project activity is valid to be submitted for registration to VCS registry. The ultimate decision on the registration of a proposed project activity rests with the VERRA.

1.2 Scope and Criteria

CQC team has employed a risk-based approach in the validation, focusing on the identification of significant risks and reliability of project design and generation of emission reductions according to the relevant applicable rules for VCUs validation under the VCS.

A risk-based approach and document review and an on-site visit combined method were followed by CQC team to perform this validation. As a result of the validation, the validation team confirms that the project follows the VCS (version 4.0).

The validation scope is to review the criteria against the VCS version 4.0 requirements, to given as a thorough independent and objective assessment of the project design including especially: the correct application of the methodology, project’s physical boundaries, the project’s baseline study, additionality justification, management activities and the temporal boundaries as the years when the GHG emission reductions and removals are quantified, monitoring plan and stakeholder involvement, environmental impact and so on, which are included in the VCS PD and other relevant supporting documents, to ensure that the proposed VCS project activity meets all relevant and applicable criteria as follow：

- VCS Program Guide, v4.0
- VCS Standard, v4.0
- Program Definitions, v4.0
- AFOLU Non-Permanence Risk Tool, v4.0
- VCS Validation Verification Manual v3.2

The methodology VM0010 version 1.3: Methodology for Improved Forest Management: Conversion of Logged to Protected Forest uses the latest versions of the following methodologies, modules and tools:

- CDM Tool for Calculation of the Number of Sample Plots for Measurements within A/R CDM Project Activities
- CDM Tool for testing significance of GHG emissions in A/R CDM project activities

- VCS methodology VM0003 Methodology for Improved Forest Management through Extension of Rotation Age
- VCS methodology VM0005 Methodology for Conversion of Low-Productive Forests to High-Productive Forests
- VCS methodology VM0007 REDD+ Methodology Framework (REDD-MF)
- VCS methodology VM0011 Methodology for Improved Forest Management: Calculating GHG Benefits from Logged to Protected Forest
- VCS tool VT0001 Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities

The information included in the PD and the supporting documents were reviewed and assessed against the requirements as set out by the VCS Version 4.0. The validation is based on the information made available to CQC and on the contract conditions. CQC cannot be held liable by any entities for making its validation opinion based on any false or misleading information supplied to it during the course of validation.

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

1.3 Level of Assurance

As the VCS (version 4.0) only recognizes verified emission reductions, CQC has focused on providing a reasonable level of assurance that the emission reduction calculation methodology used is appropriate and correctly applied, and that emission reductions will be accurately monitored.

The validation report is based on supplement VCS PD[/1/~/3/], supporting evidence made available to CQC team and information collected through performing interviews and during the on-site visit.

1.4 Summary Description of the Project

Hubei Hongshan IFM(Conversion of Logged to Projected Forest) Project (hereafter “the project”) is implemented in Hongshan County, Suizhou City, Hubei Province of China by Zhejiang Zhongzheng Forestry Development Co.,Ltd, the geo-coordinate of the project is 112°43'E~113°46'E and 31°19'N~32°26'N.

The area of the project activity is 23,769.42ha , including 5,562 subcompartments spreading over Baoji country, Wangtai country, Baiguofan country, Huoyantao country, Jimingsi country, Sanshenmiao country, Peijiayan country, Qiaohe country, Shuangfeng country, Zhoujiawan country, Qinglongmiao country, Wushenggong country, Yutingling country, Jieshanchong country, Yunlin country, Sishan Neighborhood committee, Maocifan Neighborhood committee, Zhoujiazui country, Huanglongsi country, Wenquan country, Gaojianshan country, Xujiachong country, Guanyintang country, Zhuji country, Dujiadian country, Liangtinghe country, Wangheshan country, Guoji country, Dianzihe country, Huangjiafan country, Guihuayuan country. All these countries have the legal right to forest ownership. The species involved in the project are Oak, Masson Pine, Broad-Leaved Mixed Forest and Coniferous and Broad-Leaved Mixed Forest.

Before the implementation of the project activity, the trees are logged based on a valid and verifiable government-approved timber management plan for harvesting the project area. The implementation of

the project activity converses the trees to protected forest to reduce the GHG emissions for about 8,769,291 tCO2e in 30 years, the average annual emission reduction is 292,309 tCO2e and Verified Carbon Units with buffer deduction is about 6,840,033 tCO2e in 30 years, the average annual VCUs with buffer deduction is 228,001 tCO2e.The project activity will contribute to the environment, thus contribute to sustainable development.

The project is being developed and registered under the Verified Carbon Standard (VCS) .

2 VALIDATION PROCESS

2.1 Method and Criteria

The validation method of the project consisted of the following steps:

- Contract review
- Appointment of validation team and technical reviewers
- A desk review of the VCS PD submitted by the client and additional supporting documents with the use of customized validation protocol
- Validation planning
- On-Site assessment
- Background investigation and follow-up interviews with personnel of the project developer and its contractors
- Draft validation reporting
- Resolution of corrective actions and clarifications
- Final validation reporting
- Technical review
- Final approval of the validation.

The validation criteria consisted of the following:

- VCS Standard, v4.0
- VCS Program Guide, v4.0
- Program Definitions, v4.0
- VM0010 version 1.3: Methodology for Improved Forest Management: Conversion of Logged to Protected Forest
- AFOLU Non-Permanence Risk Tool, v4.0
- CDM Tool for Calculation of the Number of Sample Plots for Measurements within A/R CDM Project Activities
- CDM Tool for testing significance of GHG emissions in A/R CDM project activities
- VCS methodology VM0003 Methodology for Improved Forest Management through Extension of Rotation Age
- VCS methodology VM0005 Methodology for Conversion of Low-Productive Forests to High-Productive Forests
- VCS methodology VM0007 REDD+ Methodology Framework (REDD-MF)

- VCS methodology VM0011 Methodology for Improved Forest Management: Calculating GHG Benefits from Logged to Protected Forest
- VCS tool VT0001 Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities
- VCS Validation Verification Manual v3.2

2.2 Document Review

The validation was planned after reviews of the Project Description specified as VCS PD template to cover all the requirements set out in the VCS standard (version 4.0) , and the methodology used to develop the project's greenhouse gas assertion.

PP submitted PD (version 01) and supporting background documents related to the project design to CQC on 17 July 2019.

PP submitted PD (version 02) and supplementary evidence for closing the CARs and CLs raised during the validation.

PP submitted PD (version 03) and supplementary evidence for closing the findings from VERRA.

Furthermore, the validation team used additional documentation by third parties like host party legislation, technical reports referring to the project design or to the basic conditions and technical data.

The references used in the course of this validation are summarized in Appendix 2.

2.3 Interviews

The objective of the interview process was to solicit important information from personnel related to project and relevant to the validation process. On-site interviews and information discussions were conducted with project developer , local government officer , local residents and Project VCS development consultant. The interviews were performed by the validation team on-site and the following Table2-1 is a list of the main interviewees and subject.

Table 2-1: Interview and Interview Topics

Date	Interviewee	Organization	Interview Topics
24/09/2019	Mr. Zhou Xiongjie Local representative	Zhejiang Zhongzheng Forestry Development Co.,Ltd (the PP)	-Chronological description of the project activity with documents of key steps of the implementation. -Technical details of the project realization, project feasibility, designing, operational life time -Baseline and Additionality -Project Boundary -Eligibility criteria - Monitoring plan and arrangements -Crediting period -Project activity starting date -Ownership -local stakeholder consultation
24/09/2019	Mr.Liu Jun Head of station	Hongshan County Forestry Management Station	-National and Provincial legislation to forest -Local forestry development - Roles & responsibilities of the Government - Annual income
24/09/2019	Mr. Chen Fang Mr. Li Baoshan	Local villager	- Baseline scenario - Local stakeholder consultation - Project activity and environmental impact - Anual income
24/09/2019	Ms.Tao yun General Manager Mr. Yu Kaiquan Mr.Li Wei Project manager	Zhong Che (Beijing) Environment Energy Technology Development Co., Ltd. (the Consultant)	-Financial aspects -Crediting period -Project activity starting date -Baseline study assumptions -Additionality -Monitoring -ER calculation - Editorial issues of the VCS

2.4 Site Inspections

The validation site inspection was conducted on 24/09/2019~25/09/2019. A ground inspection of the project area was conducted during the site visit and the validation team visited several targeted areas within the project area. During the site inspection, the validation team was accompanied by the project proponent, local government officers, consultant.

2.5 Resolution of Findings

Material discrepancies identified in the course of the validation are addressed either as CARs, CLs or FARs.

A **Corrective Action Request (CAR)** is established where:

- mistakes have been made in assumptions, application of the methodology or the project documentation which will have a direct influence the project results,
- the requirements deemed relevant for validation of the project with certain characteristics have not been met or
- there is a risk that the project would not be registered or that emission reductions would not be able to be verified and certified.

A **Clarification Request (CL)** will be issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

A **Forward Action Request (FAR)** will be issued when certain issues related to project implementation should be reviewed during the first verification.

A detailed list of the CARs and CLs raised and discussed in the course of this validation is included in Appendix 2 of this report.

2.5.1 Forward Action Requests

There is no FAR raised during the validation.

3 VALIDATION FINDINGS

3.1 Project Details

- Project type, technologies and measures implemented, and eligibility of the project

The proposed project is located in Hongshan County, Suizhou City, Hubei Province of China, the geo-coordinate of the project is 112°43'E~113°46'E and 31°19'N~32°26'N, the area of the project activity is 23,769.42ha , including 5,562 subcompartments spreading over Baoji country, Wangtai country, Baiguofan country, Huoyantao country, Jimingsi country, Sanshenmiao country, Peijiayan country, Qiaohe country, Shuangfeng country, Zhoujiawan country, Qinglongmiao country, Wushenggong country, Yutingling country, Jieshanchong country, Yunlin country, Sishan Neighborhood committee, Maocifan Neighborhood committee, Zhoujiazui country, Huanglongsi country, Wenquan country, Gaojianshan country, Xujiachong country, Guanyintang country, Zhuji country, Dujiadian country, Liangtinghe country, Wangheshan country, Guoji country, Dianzihe country, Huangjiafan country, Guihuayuan country. All these countries have the legal right to forest ownership. The species involved in the project are Oak, Masson Pine, Broad-Leaved Mixed Forest and Coniferous and Broad-Leaved Mixed Forest.

As per the information available in the PD and confirmed by the PP during the on-site visit, the project proponent responsible for project develop, project design, project implementation and project management is Zhejiang Zhongzheng Forestry Development Co.,Ltd

The contact details are:

Contact person	Zhou Xiongjie
Title	General Manager
Address	Room 308, Block C, Weiye Road, Puyan Street, Binjiang District,Hangzhou, Zhejiang
Telephone	+86 0571-87424258
Email	391190031@qq.com

Based upon professional judgement, it is reasonable to assume that the project proponent is capable effectively to conduct the project activities and oversee the project activity implementation due to relevant experience and skills in forest development and management.

The project area is under the control of PP at the beginning of the project validation identifying the responsibilities with respect to the project implementation, management and monitoring.

As per the information available in the PD and confirmed by the PP during the on-site visit, the other entities involved is the project consulting company Zhong Che (Beijing) Environment Energy Technology Development Co., Ltd. who has signed the consulting service[26] with the project proponent. The contact details are:

Tao Yun (General Manager)

- Room 1006, Tower B,Juanshi Tiandi Mansion, No.502 Wangjing West Street, ChaoYang Distrct, Beijing, P.R.China

- Project start date

The project start date is 01/01/2015 when the application for logging suspension was approved by local forest bureau, and it represents the date on which the project began generating GHG emission reductions or removals as defined by the VCS requirements.

- Project crediting period

The project crediting period is from 01/01/2015 to 31/12/2044 with the total length of 30 years.

- Project scale and estimated GHG emission reductions or removals

Project scale is selected as “Project” at reduce the GHG emissions for about 8,769,291 tCO2e in 30 years, the average annual emission reduction is 292,309 tCO2e and Verified Carbon Units with buffer deduction is about 6,840,033 tCO2e in 30 years, the average annual VCUs with buffer deduction is 228,001 tCO2e, less than the 300,000 tons of CO_2 per year, which indicates a “Project” as per VCS Standard section 3.9.1.

- Project location

The project is located in Hongshan County, Suizhou City, Hubei Province of P.R.China. The geo-coordinate range of the project is 112°43'E~113°46'E and 31°19'N~32°26'N. There are 5,562 subcompartments spreading over Baoji country, Wangtai country, Baiguofan country, Huoyantao country, Jimingsi country, Sanshenmiao country, Peijiayan country, Qiaohe country, Shuangfeng country, Zhoujiawan country, Qinglongmiao country, Wushenggong country, Yutingling country, Jieshanchong country, Yunlin country, Sishan Neighborhood committee, Maocifan Neighborhood committee, Zhoujiazui

country, Huanglongsi country, Wenquan country, Gaojianshan country, Xujiachong country, Guanyintang country, Zhuji country, Dujiadian country, Liangtinghe country, Wangheshan country, Guoji country, Dianzihe country, Huangjiafan country, Guihuayuan country.

The PD includes a schematic diagram of the location of the project and lists the local name and the geodetic coordinates of 52 subcompartments. All the information have been cross-checked through the maps and the project layout .

- Conditions prior to project initiation

Prior to the implementation of the project, the forest within the project area was logged annually according to the timber harvest plan.

Through on site validation and interview with local forest bureau, CQC team confirms that the present and prior environmental conditions of the project area, including information on the climate, hydrology, topography, relevant historic conditions, soils, vegetation and ecosystems are fully described in PD(version 03).

- Project compliance with applicable laws, statutes and other regulatory frameworks

The project activity is in line with the Forest Law of People's Republic of China and all the trees in the project will not been logged within the project crediting period. According to the Approval of application for cutting suspension, the project has complied with the above regulations and laws during construction period and will be under regular inspection by local government during the implementation period to ensure the continuous compliance.

- Ownership and other programs:

During the on-site visit, Validation Team checked the business license of the participant party, Agreement on project development which signed by local village committee, Zhejiang Zhongzheng Forestry Development Co.,Ltd and Zhong Che (Beijing) Environment Energy Technology Development Co., Ltd. Validation team confirms the original project proponent is Zhejiang Zhongzheng Forestry Development Co.,Ltd, which is in charge of the integrated implementation and management of the project. The area land involved in the project was collectively owned by the village.

Based on reviewing the public websites ,such as CCER(http://cdm.ccchina.org.cn/ccer.aspx) UNFCCC(http://cdm.unfccc.int), VCS(http://www.verra.org) and GS (http://www.goldstandard.org) and interviewing the local government official, CQC validation team confirms that the project has not sought or received other forms of GHG-related environmental credit. Additionally,the project has not been registered, or is seeking registration under any other GHG programs.

The validation team by the mean of on-site inspection and cross check with the supporting documents provided during the validation process, is able to conclude that the description of project in the PD is accurate, complete, and provides an understanding of the nature of the project.

However, **CAR 01** and **CL 01**~ **CL 04** were raised and successfully closed, Refer to Appendix 2 for details.

3.2 Application of Methodology

3.2.1 Title and Reference

The project uses approved VCS Methodology VM0010/Version 1.3 “Methodology for Improved Forest Management: Conversion of Logged to Protected Forest”.

3.2.2 Applicability

The proposed project activity meets the criteria defined in the applied methodology as described below:

• Forest management in the baseline scenario must be planned timber harvest

The forest management in the baseline scenario can be validated as planned timber harvest according to the historical management records and the forestry right certificates. CQC validation team checked the Logging Plan from local forest management station, and can confirm the applicability.

• Under the project scenario, forest use must be limited to activities that do not result in commercial timber harvest or forest degradation;

Under the project scenario, the forest use of the Project activity is switched to forestry management and conservation, logging is forbidden, thus the forest use would do not result in commercial timber harvest or forest degradation.

• Planned timber harvest must be estimated using forest inventory methods that determine allowable off take as volume of timber (m3 ha-1);

The timber harvest plan estimated the volume of timber with the allometric equation for the local region and the special species of the Project.

• The boundaries of the forest land must be clearly defined and documented;

The boundaries of the forest land are clearly defined in line with administrative division in the maps and documented in the local forestry government.

• Baseline condition cannot include conversion to managed plantations;

The baseline plantations are timber forest, not including the conversion to managed plantations. CQC Validation Team checked the forest right certificate of the Project, and can confirm the applicability.

• Baseline scenario, project scenario and project case cannot include wetland or peatland.

According to the proof provided by the local forest bureau which shows the land type of the project, there is no wetland or peatland included in the project.

• All applicability conditions of VCS and CDM tools used in conjunction with this methodology are met.

CQC Validation Team hereby confirmed that the selected VCS baseline and monitoring methodology is applicable to the project, which complies with all the applicability conditions therein, and the selected version is valid at the time of the validation commencement.

It is also confirmed that the methodology and the methodological tools are correctly applied by comparing it with the actual text of the applicable versions.

However, **CL 05** were raised and successfully closed, Refer to Appendix 2 for details.

3.2.3 Project Boundary

The applied methodology and VCS Standard require the project describe the project boundary so as to temporal boundary, identify, and select appropriate carbon pools as well as Green House Gases.

• *Geographical Boundaries*

The Project is implemented in Hongshan County, Suizhou City, Hubei Province of China by Zhejiang Zhongzheng Forestry Development Co.,Ltd, the geo-coordinate of the project is 112°43′E~113°46′E and 31°19′N~32°26′N, the area of the project activity is 23,769.42ha, including 5,562 subcompartments spreading over Baoji country, Wangtai country, Baiguofan country, Huoyantao country, Jimingsi country, Sanshenmiao country, Peijiayan country, Qiaohe country, Shuangfeng country, Zhoujiawan country, Qinglongmiao country, Wushenggong country, Yutingling country, Jieshanchong country, Yunlin country, Sishan Neighborhood committee, Maocifan Neighborhood committee, Zhoujiazui country, Huanglongsi country, Wenquan country, Gaojianshan country, Xujiachong country, Guanyintang country, Zhuji country, Dujiadian country, Liangtinghe country, Wangheshan country, Guoji country, Dianzihe country, Huangjiafan country, Guihuayuan country.

When describing physical project boundaries, The Forestry Right Certificates are provided to identify the following information:

- Name of the project area (including compartment number, allotment number, local name)
- Unique identifier for each discrete land parcel used in the timber harvest plan
- Map(s) of the area (preferably in digital format)
- Geographic coordinates of each polygon vertex (preferably obtained from a geodetic coordinate or from a geo-referenced digital map)
- Total land area
- Details of forest land rights holder and user rights

CQC validation team checked the documents provided and found the information listed in the PD and the ER calculation of the Project are consistent with the Forestry Right Certificates, and the geographic boundaries of the Project are fixed and thus do not change over the project lifetime and the crediting period.

The geographic boundaries for leakage from market effects are those of the country in which the project area occurs.

• *Temporal Boundaries*

The following temporal boundaries are defined:

a. Start date and length of the project crediting period

According to VCS standard version 4.0, the start date of the project activity is 01/01/2015 on which date the application for logging suspension was approved by local forest bureau. The length of the project crediting period is 30 years.

b. Duration of the monitoring periods

The project proponent decides the periodicity of verifications every 5 years.

•*Carbon Pools*

The following table present the carbon pool considered within the project boundary:

Table 3-1 The carbon pool considered within the project boundary

Carbon pools	**Included/Optional/ Excluded**	**Justification / Explanation of choice**
Aboveground trees	Included	The stock change in the aboveground tree biomass is estimated
Aboveground non-tree	Excluded	Exclusion is always conservative when forests remains as forest
Belowground	Excluded	Unlikely to change significantly in forests remaining as forests and is difficult to measure - omission is conservative
Dead wood (logging slash)	Included in the baseline	The dead wood (logging slash) carbon pool is expected to be larger in the baseline than in the project scenario, and therefore this pool must be included
Dead wood (naturally accumulated)	Excluded	Following IPCC guidelines, it is assumed that carbon stocks in the naturally occurring dead wood pool (both standing and lying) are equivalent in both the project and baseline scenario, and therefore this pool is conservatively excluded.

Harvested wood products	Included	Will be greater in baseline than project scenario and significant
Litter	Excluded	Insignificant and exclusion is conservative
Soil organic carbon	Excluded	Exclusion is always conservative when forests remains as forest

By checking the information and evidences available and by the physical site, CQC team confirms that the appropriate carbon pools have been considered and the description in the PD is accurate and complete, and also the selected carbon pools are justified for the proposed project activity.

•*Green House Gases*

The emissions sources included in or excluded from the project boundary are shown in the table below.

The project proponent has chosen to exclude to account for GHG emissions related to the combustion of fossil fuels, which is conservative.

Gas	Source	Included?	Justification
CO_2	Combustion of fossil fuels (in vehicles, machinery and equipment)	Excluded	Conservative as emissions will be greater in the baseline scenario than in the project scenario.
	Removal of herbaceous vegetation	Excluded	Based on CDM EB decision reflected in paragraph11ofthe report of the 23rd session of the board: cdm.unfccc.int/Panels/ar/023/ar_023_rep.pdf
CH_4	Combustion of fossil fuels (in vehicles, machinery and equipment)	Excluded	Conservative as emissions will be greater in the baseline scenario than in the project scenario.
	Burning of biomass	Included	Included as CO_2 equivalent emission
N_2O	Combustion of fossil fuels (in vehicles, machinery and equipment)	Excluded	Conservative as emissions will be greater in the baseline scenario than in the project scenario.
	Nitrogen based fertilizer	Excluded	Potential emissions are negligible. Following the VCS update to the Tool for AFOLU Methodological Issues and Guidance for AFOLU Projects, emissions through the use of fertilizer

			are considered insignificant and are not considered here.
	Burning of biomass	Excluded	Potential emissions are negligible

3.2.4 Baseline Scenario

Selection of baseline

According to VM0010, the "Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities" (version 3.0), the following steps are applied for the demonstration of the additionality for the project by project proponent:

a) STEP 1. Identification of alternative land use scenarios to the AFOLU project activity;

b) STEP 2. Investment analysis to determine that the proposed project activity is not the most economically or financially attractive of the identified land use scenarios; or

c) STEP 3. Barriers analysis; and

d) STEP 4. Common practice analysis.

Step 1. Identification of alternative land use scenarios to the proposed VCS AFOLU project activity

Sub-step 1a. Identify credible alternative land use scenarios to the proposed VCS AFOLU project activity

a) Identify realistic and credible land-use scenarios that would have occurred on the land within the proposed project boundary in the absence of the AFOLU project activity under the VCS. The scenarios should be feasible for the project area taking into account relevant national and/or sectoral policies and circumstances, such as historical land uses, practices and economic trends. The identified land use scenarios at least include:

i) Continuation of the pre-project land use as the timber harvest plan;

ii) Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project;

iii) If applicable, activities similar to the proposed project activity on at least part of the land within the project boundary of the proposed VCS AFOLU project at a rate resulting from:

 ● Legal requirements; or

- Extrapolate similar activities in the geographical area under similar socioeconomic and ecological conditions to the proposed VCS AFOLU project activity which cover a period began a decade earlier than the project start date.

For (ii), the Net Present Value (NPV) under this scenario is obviously not financially attractive compared to the scenario of logging.

For (iii), the lands within the project boundary of the proposed VCS AFOLU project are all with the same legal requirements and are existed as forests more than ten years prior to the project start date. So (iii) is not applicable.

Therefore, the baseline scenario is continuation of the pre-project land use as the timber harvest plan.

The baseline is further confirmed by the timber harvest plan issued by the forestry authority and is determined both in PD and MR.

Modelling the baseline scenario

According to VM0010 version 1.3, a historical baseline scenario is used for determining how to model the baseline management scenario as:

1. Historical records of forest management exist for 5 years preceding the project start date;

2. Historical records indicate that the management practices have surpassed the legal requirements provided by conforming to all local and regional forest legislation;

3. Historical records that indicate that the historical management surpasses financial barriers by providing above average financial returns.

A timber harvest plan including a detailed timber harvesting schedule based on the historical common practice and the academic research are provided. CQC validation team checked the evidences provided and cross-checked with local forestry bureau, and confirm the timber harvest plan is reasonable and following local best practice for timber harvest and the timber resource volume and extraction quotas defined in the legal requirements.

The timber harvest plan includes:

a. The species to be harvested are: Oak, Masson Pine, Broad-Leaved Mixed Forest and Coniferous and Broad-Leaved Mixed Forest;

b. The detailed years for the timber harvest of the land is scheduled to occur;

c. the number of years each land parcel is in a post-harvest state during the project crediting period;

d. the maximum and minimum diameters at breast height (DBH), at stump and at top for tree

harvesting ;

e. the planned harvesting regime (clear felling, specie/stratum-selective logging, area selective

logging);

f. technical specifications for the categories of wood products to be harvested; and

g. the total volumes or fractions to be harvested, broken down by categories of wood products defined as sawnwood, wood-based panels, other industrial roundwood, paper and paper board, and other.

Stratification

As the project activity area contains different forest types or forests with different carbon density, stratification is carried out in order to improve the accuracy and precision of carbon stock estimates. The details of the subcompartments (e.g. area, age, species, stock volume and location) are shown in forest second class investigation and confirmed by CQC validation team.

Based on the availability of data regarding the nature and composition of forest stocks in the project area, stratification is developed on the basis of existing vegetation stratification, where these are documented in the legal right to harvest. The purpose of strata is to improve accuracy and reduce the sampling cost. The strata is usually based on the tree species, age and canopy density, but it does not mean all these factors should be considered for all projects, more strata means more workload and cost. For this project, the factor of species for strata could reduce the variation within the same stratum and reach the accuracy level of 90% under certain degree of freedom. So the strata are reasonable and feasible. The strata is showed as following:

Serial number of strata	Area (ha)	Tree species	Source
1	7415.59	Oak	Forest second class investigation issued by local forestry bureau
2	3087.63	Masson Pine	
3	7244.29	Broad-Leaved Mixed	
4	6021.91	Coniferous and Broad-Leaved Mixed	
Total	23769.42		

3.2.5 *Additionality*

According to VM0010 version 1.3, the additionality of the project is demonstrated using the VCS "Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities" version 3.0. The approach used in the PD was assessed as below:

● Step 1: Identification of alternative land use scenarios to the AFOLU project activity;

Sub-step 1a: Identify credible alternative land use scenarios to the proposed VCS AFOLU project activity

a) Identify realistic and credible land-use scenarios that would have occurred on the land within the proposed project boundary in the absence of the AFOLU project activity under the VCS. The scenarios should be feasible for the project area taking into account relevant national and/or sectoral policies and circumstances, such as historical land uses, practices and economic trends.

The identified land use scenarios shall at least include:

i) Continuation of the pre-project land use as the timber harvest plan as analysed in section 2.4;

ii) Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project.

iii) If applicable, activities similar to the proposed project activity on at least part of the land within the project boundary of the proposed VCS AFOLU project at a rate resulting from:

- Legal requirements; or
- Extrapolate similar activities in the geographical area under similar socioeconomic and ecological conditions to the proposed VCS AFOLU project activity which cover a period began a decade earlier than the project start date.

For (iii), the lands within the project boundary of the proposed VCS AFOLU project are all with the same legal requirements and are existed as forests more than ten years prior to the project start date. So (iii) is not applicable.

Pre-project land use scenario is the timber forest which is the common practice in China, it is feasible for the project area taking into account Forest Law of People's Republic of China. And there is no land within the project boundary performed being registered as the VCS AFOLU project.

b) All identified land use scenarios must be credible. All land-uses within the boundary of the proposed VCS AFOLU project that are currently existing or that existed at some time in the period beginning ten years prior to the project start date but no longer exist, may be deemed realistic and credible. For all other land use scenarios, credibility shall be justified. The justification shall include elements of spatial planning information (if applicable) or legal requirements and may include assessment of economic feasibility of the proposed land use scenario.

The (i) and (ii) identified land-use scenarios that would have occurred on the land within the proposed project boundary in the absence of the AFOLU project activity under the VCS are realistic and credible, as all land-uses within the boundary of the project activity that existed in the period beginning ten years prior to the project start date but no longer exist. Therefore, it is deemed realistic and credible. Outcome of Section 2.5.1.1:

The identified land use scenarios include the two below:

i) Continuation of the pre-project land use as the timber harvest plan as analysed in section 2.4;

ii) Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project.

Sub-step 1b: Consistency of credible land use scenarios with enforced mandatory applicable laws and regulations

The scenarios are feasible for the project area taking into account Forest Law of People's Republic of China. Therefore, the 2 identified realistic and credible alternative land used scenarios that could have occurred on the land within the project boundary of the VCS AFOLU project are listed below. The identified land use scenarios include the two below:

i) Continuation of the pre-project land use as the timber harvest plan as analysed in section 2.4;

ii) Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project.

● Step 2: Investment analysis to determine that the proposed project activity is not the most economically or financially attractive of the identified land use scenarios; or

This section will determine whether the proposed project activity, without the revenue from the sale of GHG credits is economically or financially less attractive than at least one of the other land use scenarios. To conduct the investment analysis, use the following sections.

Sub-step 2a: Determine appropriate analysis method

Determine whether to apply simple cost analysis, investment comparison analysis or benchmark analysis. If the VCS AFOLU project generates no financial or economic benefits other than VCS related income, then apply the simple cost analysis (Option I). Otherwise, use the investment comparison analysis (Option II) or the benchmark analysis (Option III). Note, that Options I, II and III are mutually exclusive hence, only one of them can be applied.

According to the tool, Option I is not applicable for the proposed project since the project will generate other financial and economic benefits (e.g. income from tending and managing instead of commercial harvest) other than VCS related income.

The benchmark analysis is not applicable for the proposed project since there is neither practical nor public available standard benchmark for forest industry within the project area.

Therefore, the project will use the investment comparison analysis (Option II) since the 2 alternatives identified in step 1 both have cost and benefit separately.

Sub-step 2b: Option II. Apply investment comparison analysis

As the PP should compare to determine which one is more economic attractive in the 2 scenarios identified in step 1, NPV will be used as the financial indicator to calculate the discounting in 30 years for decision-making context.

Sub-step 2c: Calculation and comparison of financial indicators (only applicable to options II and III): NPV

a) Calculate the suitable financial indicator for the proposed VCS AFOLU project without the financial benefits from the VCS for the 2 alternatives identified in step 1. Include all relevant costs and revenues, and, as appropriate, non-market cost and benefits in the case of public investors.

Series	Item	Unit	Baseline value	Project value	Data source
Revenue					
1	*Oak*	RMB/m^3	862	0	Financial statement
2	*Masson Pine*	RMB/m^3	1316	0	
3	*Broad-Leaved Mixed*	RMB/m^3	934	0	
4	*Coniferous and Broad-Leaved Mixed*	RMB/m^3	1125	0	
Extracted Volume					
1	*Oak*	m^3	567755	0	Timber Harvest Plan
2	*Masson Pine*	m^3	236544	0	
3	*Broad-Leaved Mixed*	m^3	721089	0	
4	*Coniferous and Broad-Leaved Mixed*	m^3	440702	0	

5	Total Area	Mu	356541.3	356541.3	
Cost					
1	A/R cost	RMB/Mu	1200	0	Financial statement
2	Harvest cost	RMB/m^3	300	0	
3	Management Fee	RMB/Mu	200	200	
4	Additional maintenance cost for protected forest	RMB/Mu/working day	0	0.1	

b) Present the investment analysis in a transparent manner and provide all the relevant assumptions in the VCS AFOLU project description

The NPV before and after the conversion of logged to protected forest is shown in the table below. The NPV under the scenario of logging is ¥4,292*10^4 Yuan with the discount rate of 8%. However, the NPV under the scenario of protected forest is ¥ -11,420*10^4 Yuan with the discount rate of 8%, which is lower than the scenario of logging. Therefore, the NPV under the scenario of protected forest is obviously not financially attractive compared to the scenario of logging. By taking into account the VCUs revenue, the NPV under the scenario of protected forest is increased to be ¥ -8,550*10^4 Yuan. With revenue from VCS at the assumed price level, the project would be more financially attractive. Below table shows the comparison of the NPV between project and baseline scenario.

	NPV (10^4 Yuan)
Scenario of Logging	¥ 4,292
Scenario of protected	¥ -11,420

Sub-step 2d: Sensitivity analysis

The objective of the sensitivity analysis is to show whether the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumptions. The investment analysis provides a valid argument in favour of additionality only if it consistently supports (for a realistic range of assumptions) the conclusion that the proposed VCS AFOLU project without the financial benefits from the VCS is unlikely to be financially attractive.

For the project, the key parameters of timber price, the O&M cost, and the extracted volume will be taken into account of the sensitivity analysis. Results of the 3 parameters are shown in the table below:

Key parameters	**NPV of baseline scenario (10^4 Yuan)**					**NPV of project scenario (10^4 Yuan)**				
	-10%	**-5%**	**0%**	**5%**	**10%**	**-10%**	**-5%**	**0%**	**5%**	**10%**
Timber price	1,779	3,035	4,292	5,548	6,804	-11,420	-11,420	-11,420	-11,420	-11,420
O&M cost	6,373	5,332	4,292	3,251	2,210	-10,278	-10,849	-11,420	-11,991	-12,562
Extracted volume	1,779	3,035	4,292	5,548	6,804	-11,420	-11,420	-11,420	-11,420	-11,420

By referring to the Figures above, the NPV under protected scenario will not exceed the baseline scenario if the price, the O&M cost and the extracted volume varies within ±10%.

In the baseline scenario, the project receives revenue from the commercial harvest. Under the project scenario, all the commercial harvest has been cancelled and only tending and managing is allowed, the revenue of the project scenario is 0. It is obvious that the revenue of the project can't reach the baseline scenario, which would not be influenced by the variation of the timber price and extracted volume. On the other hand, the cost in the project scenario will increase due to the more cost on tending and maintenance. Therefore, it is impossible for the NPV of the project scenario to reach to the baseline scenario no matter how the two parameters vary.

Therefore, the result of the sensitivity analysis confirms that the project is financially unattractive.

According to the tool, if after the sensitivity analysis it is concluded that the proposed VCS AFOLU project without the financial benefits from the VCS is unlikely to be financially most attractive (Option II and Option III), then proceed directly to Step 4 *(Common practice analysis).*

● Step 3. *Barrier analysis*

Not applicable.

● Step 4. *Common practice analysis*

According to the "Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities" (version 3.0). "Similar activities are defined as that which are of similar scale, take place in a comparable environment, inter alia, with respect to the regulatory framework and are undertaken in the relevant geographical area, subject to further guidance by the underlying methodology".China has a vast territory, the development policies and economic environment for projects in each province of China are not same. The investment environment varies considerably from province to province depending on the local conditions. The Project is located in Hubei

Province. However, the geographic and geomorphic conditions are totally different in the whole province. And by searching the VCS, CDM websites, there is no similar project without applying the VCS, CDM or other voluntary emission reduction project.

Therefore, according to the analysis above, the similar activities which haven't applied for the VCS are not common practice in Hubei Province. So the proposed project has additionality.

3.2.6 *Quantification of GHG Emission Reductions and Removals*

The emission reduction are calculated according the applied methodology VM001/Version 1.3. The algorithms and formulae used are provided in this section.

Baseline Emissions

Calculation of baseline emissions for all land parcels under both the historical and common practice baseline scenarios requires the application of the equations presented in Sections 8.1.1 to Section 8.1.6 of the methodology.

Baseline projections are calculated ex-ante and are not adjusted through-out the project lifetime.

According to the methodology, Section 8.1.1 serves to calculate carbon stocks in commercial timber volumes. Next, baseline emissions are estimated based on the calculation of deadwood (logging slash) generated in the process of timber harvest and establishment of forestry infrastructure (Section 8.1.2), the emissions resulting from production and subsequent retirement of wood products derived from timber harvesting (including timber harvesting from the establishment of forestry infrastructure (Section 8.1.3)), the combustion of fossil fuels in forestry machinery including mechanized felling, skidding / forwarding /hauling, loading and transporting inside the project area, and processing (Section 8.1.5), minus the rates of forest regrowth post-timber harvest (Section 8.1.6).

The following table lists the baseline emissions modelled by the methodology:

Included in modelling
1. Emission from wood product conversion 2. Decomposition of deadwood from harvested trees 3. Emissions from wood product retirement 4. Stock change due to regrowth following timber harvest
5. Decomposition of trees incidentally killed during tree felling Where project proponent accounts for forest infrastructure： 6. Decomposition of trees killed through skid trail creation 7. Decomposition of trees killed through road construction Optional (as omission is conservative) 8. Emissions from fossil fuels burned in baseline harvesting practices

Conservatively excluded from modeling
9. Emissions through subsequent forest re-entry

The options of 5 to 9 are hard to calculate and tiny in baseline scenario, as emission is conservative so it is reasonable to exclude those from baseline emissions modelling. Baseline commercial timber volumes must be derived for development of the timber harvest plan and for ex-post accounting of emissions resulting from natural forest disturbance.

The equations below calculate the total emissions across the project crediting period for each emission source. Total emissions are averaged across the crediting period to give annual emissions and are multiplied by t*, time elapsed since the start of project activity. EX-post, t* is updated so baseline projections are available for each proposed future verification date.

Data for input into these carbon stock change calculations for the baseline scenario shall be established from the same data used to create the timber harvest plan.

According to VM0010 version 1.3, the baseline emissions are calculated in the sections below:

Calculation of carbon stocks in commercial timber volumes

This section calculates $C_{HB,j,i|BSL}$, the mean carbon stock in total harvested biomass in $tC \cdot ha^{-1}$ and $C_{EX,j,i|BSL}$, the mean carbon stock in extracted timber (merchantable timber that leaves the forest) in $tC \cdot ha^{-1}$.

The pre-existing forest inventory data are used for this purpose provided that the pre-existing data:

a) represents the project strata;

b) is not more than 10 years old.

These inventory data used the method of sample plot inventory. These data were carried out through field surveys which were finished at the end of 2014 by who is qualified, experienced for the forestry investigation. The project involves 4 strata and 5,562 subcompartments. For each stratum, mean volume is estimated from sample plot size of 0.04 ha and at least 1 sample plot will be selected in 1 subcompartment within the project area using standard forest inventory assessment methods, which satisfies the number of sample plots required by the Tool for Calculation of the Number of Sample Plots for Measurements within A/R CDM Project Activities (version 02.1.0) as stated in section 5.3.5.

The estimate of merchantable volume for each species j at the sample plot level will be calculated as:

$$V_{j,i,sp} = \sum_{l=1}^{L} V_{l,j,i,sp} \quad (1)$$

Where:

$V_{j,i,sp}$	merchantable volume for species j in stratum i in sample plot sp, m^3;
$V_{l,j,i,sp}$	merchantable volume for tree l of species j in stratum i in sample plot sp, m^3;
l	1, 2, 3 …L sequence of individual trees in sample plot;
i	1, 2, 3 …M strata;
sp	1, 2, 3 …SP sample plots; and
j	1, 2, 3 …J tree species.

Therefore, the merchantable volume per unit area of species j in stratum i will be calculated as the mean merchantable volume in all sample plots in stratum i:

$$V_{j,i|BSL} = \frac{1}{SP} * \sum_{sp=1}^{SP} \frac{V_{j,i,sp}}{A_{sp}} \quad (2)$$

Where:

$V_{j,i\|BSL}$	mean merchantable volume per unit area of species j in stratum i in the baseline scenario, $m^3 \cdot ha^{-1}$;
$V_{j,i,sp}$	merchantable volume for species j in stratum i in sample plot sp; m^3;
A_{sp}	area of sample plot sp, ha;
i	1, 2, 3 …M strata;
sp	1, 2, 3 …SP sample plots; and
j	1, 2, 3 …J tree species.

Therefore, the carbon stock of timber harvested per unit area for species j in stratum i will be calculated from this mean volume of extracted timber:

$$C_{HB,j,i|BSL} = V_{EX,j,i|BSL} * BCEF_R * CF_j \quad (3)$$

Where:

$C_{HB,j,i\|BSL}$	mean carbon stock of harvested biomass per unit area for species j in stratum i,

	$tC \cdot ha^{-1}$;
$V_{EX,j,i\|BSL}$	mean volume of extracted timber per unit area for species j in stratum i, $m^3 \cdot ha^{-1}$;
$BCEF_R$	biomass conversion and expansion factor applicable to wood removals in the project area, t.d.m m^{-3};
CF_j	carbon fraction of biomass for species j, tC t $d.m^{-1}$;
i	1, 2, 3 …M strata; and
j	1, 2, 3 …J tree species.

Not all of the harvested biomass leaves the forest because the timber harvested has two components: 1) wood removed to market (extracted timber) and, 2) wood remaining in the forest as a result of harvest.

Therefore, the mean carbon stock of extracted timber per unit area for species j in stratum i will be calculated from the mean volume of extracted timber multiplied by density and carbon fractions:

$$C_{EX,j,i|BSL} = V_{EX,j,i|BSL} * D_j * CF_j \quad (4)$$

Where:

$C_{EX,j,i\|BSL}$	mean carbon stock of extracted timber per unit area for species j in stratum i; $tC \cdot ha^{-1}$;
$V_{EX,j,i\|BSL}$	mean volume of extracted timber per unit area for species j in stratum i, $m^3 \cdot ha^{-1}$;
D_j	basic wood density of species j; t d.m. m^{-3};
CF_j	carbon fraction of biomass for species j, tC t $d.m^{-1}$;
i	1, 2, 3 …M strata; and
j	1, 2, 3 …J tree species.

Calculation of dead wood (logging slash) generated in the process of timber harvest

This section calculates $\Delta C_{DWSLASH,i,p|BSL}$, the change in carbon stock in dead wood resulting from timber harvest in stratum i in land parcel p, using $C_{EX,j,i|BSL}$ and $C_{HB,j,i|BSL}$.

The simplifying assumption is made that dead wood created during timber harvest is emitted in the year of harvest.

Therefore, the change in carbon stock in the dead wood pool in stratum i in land parcel p will be calculated as the difference between the total carbon stock of the harvested biomass and the carbon stock of the extracted timber:

$$\Delta C_{DWSLASH,i,p|BSL} = [\sum_{j=1}^{J}(C_{HB,j,i|BSL} - C_{EX,j,i|BSL})] \quad (5)$$

Where:

$\Delta C_{DWSLASH,i,p\|BSL}$	change in carbon stock of dead wood as logging slash resulting from timber harvest per unit area in stratum i in land parcel p, in $tCha^{-1}$;
$C_{HB,j,i\|BSL}$	mean carbon stock of harvested biomass per unit area for species j in stratum i, $tC \cdot ha^{-1}$;
$C_{EX,j,i\|BSL}$	mean carbon stock of extracted timber per unit area for species j in stratum i, $tC \cdot ha^{-1}$;
i	*1, 2, 3 …*M strata; and
j	*1, 2, 3 …J tree species.*
p	1, 2, 3 ...P land parcels.

Calculation of baseline carbon sequestered in wood products

The carbon stock of extracted timber across species is calculated as:

$$C_{EX,i|BSL} = \sum_{j=1}^{J} C_{EX,j,i|BSL} \quad (6)$$

Where:

$C_{EX,i\|BSL}$	change in carbon stock of extracted wood products resulting from timber harvest per unit area in stratum i in land parcel p, $tC \cdot ha^{-1}$;
$C_{EX,j,i\|BSL}$	mean carbon stock of extracted timber per unit area for species j in stratum i, $tC \cdot ha^{-1}$;
i	*1, 2, 3 …*M strata; and
j	*1, 2, 3 …J tree species.*

In accordance with the VCS AFOLU Requirements, the amount of carbon stored in wood products that would decay within 3 years after harvest (ie, the Wood Waste (WW) and the Short Lived Fraction (SLF)), are assumed to be emitted at the time of harvest.

Wood products that are retired between 3 and 100 years after harvest (ie, the Additional Oxidised Fraction, OF), must be accounted according to a 20 year linear decay function. This decay

function is applied when the net greenhouse gas emissions/removals are calculated on an annual basis in equations 11 and 12.

All other wood product pools are considered to permanently store carbon.

Therefore, the carbon stock of extracted timber that is immediately emitted to the atmosphere at the time of harvest is calculated as

$$C_{WP0,i|BSL} = \sum_k C_{EX,i,k|BSL} * (WW_k + SLF_k) \quad (7)$$

Where:

$C_{WP0,i\|BSL}$	carbon stock of extracted timber from stratum i that is assumed to be emitted immediately at the time of harvest, in $tC \cdot ha^{-1}$;
$C_{EX,i\|BSL}$	mean carbon stock of extracted timber per unit area in stratum i, for wood product type k, $tC \cdot ha^{-1}$;
WW_k	fraction of biomass carbon from wood waste that is assumed to be emitted to the atmosphere immediately at the time of harvest for wood product k, dimensionless;
SLF_k	fraction of biomass carbon from the short lived wood product pool that is assumed to that be emitted to the atmosphere immediately at the time of harvest for wood product k, dimensionless;
i	1, 2, 3 …M strata; and
k	Wood products (sawnwood, wood base products, etc).

The amount of extracted carbon stock that is assumed to enter the wood products pool that is not immediately emitted at harvest is calculated as per equation 8 below:

$$C_{WPi|BSL} = \sum_k C_{EX,i,k|BSL} - C_{WP0,i|BSL} \quad (8)$$

Where:

$C_{WP,i\|BSL}$	carbon stock of extracted timber from stratum i that is assumed to enter the wood products pool that is not immediately emitted at the time of harvest ,in $tC \cdot ha^{-1}$;
$C_{EX,i\|BSL}$	mean carbon stock of extracted timber per unit area in stratum i, for wood product type k, $tC \cdot ha^{-1}$;
$C_{WP0,i\|BSL}$	carbon stock of extracted timber from stratum i that is assumed to be emitted

	immediately at the time of harvest, in tC·ha^{-1};
i	1, 2, 3 …M strata; and
k	Wood products (sawnwood, wood base products, etc).

Therefore, the carbon stock of wood products assumed to be retired between 3-100 years following harvest is calculated as:

$$C_{WP100,i|BSL} = C_{WP,i|BSL} * OF_k \quad (9)$$

Where :

$C_{WP100,I,p|BSL}$	Amount of carbon stored in wood products that are assumed to be retired between 3-100 years after harvest from stratum i in land parcel p, tC·ha^{-1};
$C_{WP,i|BSL}$	carbon stock of extracted timber from stratum i that is assumed to enter the wood products pool that is not immediately emitted at the time of harvest ,in tC·ha^{-1};
OF_k	fraction of biomass carbon for wood product type k that is assumed to be emitted to the atmosphere between 3 and 100 years of timber harvest, dimensionless; and
i	1, 2, 3 …M strata

Change in carbon stocks due to forest regrowth after harvest

The carbon sequestration in the baseline resulting from forest regrowth after timber harvest up to year t is equal to the forest regrowth rate of each stratum.

Therefore, carbon sequestration resulting from forest regrowth after timber harvest is calculated as:

$$C_{RG,i,p|BSL} = \sum_i RGRi \quad (10)$$

Where:

$C_{RG,i,p|BSL}$	carbon sequestration resulting from forest regrowth after timber harvest in stratum i in land parcel p, tC ha^{-1} yr^{-1};
RGR_i	regrowth rate of forest post timber harvest for stratum i, tCha^{-1} yr^{-1};
i	1, 2, 3 …M strata

Calculation of baseline scenario greenhouse gas emissions from change in carbon stocks

The net carbon stock change to be converted to emissions is equal to the carbon stock change as a result of timber harvest plus the carbon stock change resulting from conversion and retirement of wood products minus carbon sequestration from forest regrowth after harvest.

In order to generate the annual carbon stock change in the baseline scenario, the total net change in carbon stocks for parcels within is multiplied by the area of forest in the particular age class (ie, years since harvest in the baseline).

The annualized calculations vary between years 1, 2-10; 10-20; and all years since the start of the project activity, depending on which decay functions apply.

Therefore, the net change in carbon stock from wood products and logging slash across all parcels within the first year of harvest in the baseline is calculated as:

$$\Delta C_{NET|BSL(1)} = \sum_{i,p} A_{1,i,p} * \sum_{i=1}^{M} (C_{DWSLASH,i,p\backslash BSL}/10) + C_{WP0,i,p\backslash BSL} + (C_{WP100,i,p\backslash BSL}/20) \quad (11)$$

Where:

$\Delta C_{NET\|BSL(1)}$	net change in carbon stock across all parcels in the baseline scenario in the first year since harvest in the baseline scenario, in tC;
$\Delta C_{DWSLASH,i,p\backslash BSL}$	change in carbon stock of dead wood as logging slash resulting from timber harvest per unit area in stratum i in land parcel p, in tC ha^{-1};
$\Delta C_{WP0,i,p\backslash BSL}$	change in carbon stock resulting from wood product conversion and retirement from stratum i in land parcel p, that is assumed to be emitted in the first year of harvest in the baseline tC ha^{-1};
$\Delta C_{WP100,i,p\backslash BSL}$	Amount of carbon stored in wood products that is assumed to be retired between 3-100 years after harvest from stratum i in land parcel p, tC ha^{-1};
$A_{1,i,p}$	the area of stratum i in land parcel p that was harvested 1 year ago, ha;
i	1, 2, 3 …M strata; and
p	1, 2, 3 ...P land parcels harvested within the project crediting period.

The net change in carbon stock from wood products and logging slash across all parcels the years 2-10 since harvest in the baseline are calculated as:

$$\Delta C_{NET|BSL(2-10)} = \sum_{i,p} A_{2-10,i,p} * \sum_{i=1}^{M} (C_{DWSLASH,i,p\backslash BSL}/10) + (C_{WP100,i,p\backslash BSL}/20) \quad (12)$$

Where:

$\Delta C_{NET\|BSL(2\text{-}10)}$	net change in carbon stock across all parcels in the baseline scenario in years 2-10 since harvest in the baseline scenario, in tC;
$\Delta C_{DWSLASH,i,p\backslash BSL}$	change in carbon stock of dead wood as logging slash resulting from timber harvest per unit area in stratum i in land parcel p, in tC ha^{-1};
$\Delta C_{WP100,i,p\backslash BSL}$	Amount of carbon stored in wood products that is assumed to be retired between 3-100 years after harvest from stratum i in land parcel p, tC ha^{-1};
$A_{2\text{-}10,i,p}$	the area of stratum i in land parcel p that was harvested 2 and 10 years ago, ha;
i	1, 2, 3 …M strata; and
p	1, 2, 3 ...P land parcels harvested within the project crediting period.

The net change in carbon stock from wood products across all parcels the years 11-20 since harvest in the baseline are calculated as:

$$\Delta C_{NET|BSL(11-20)} = \sum_{i,p} A_{11-20,i,p} * \sum_{i=1}^{M} (C_{WP100,i,p\backslash BSL}/20) \quad (13)$$

Where:

$\Delta C_{NET\|BSL(11\text{-}20)}$	net change in carbon stock across all parcels in the baseline scenario in years 11-20 since the start of the project activity, in tC;
$\Delta C_{WP100,i,p\backslash BSL}$	Amount of carbon stored in wood products that is assumed to be retired between 3-100 years after harvest from stratum i in land parcel p, tC ha^{-1};
$A_{11\text{-}20,i,p}$	the area of stratum i in land parcel p that was harvested 11 and 20 years ago, ha;
i	1, 2, 3 …M strata; and
p	1, 2, 3 ...P land parcels harvested within the project crediting period.

The net change (sequestration) in carbon stock due to forest regrowth across all parcels in all years since harvest in the baseline scenario is calculated according to equation 14 below. Note that there will be no more emissions quantified from decay of logging slash or wood products.

$$\Delta C_{NET|BSL(1+)} = \sum_i A_{t*} * \sum_{i=1}^{M} (-\Delta C_{RG,i,p\backslash BSL}) \quad (14)$$

Where:

$\Delta C_{NET\|BSL(1+)}$	net change in carbon stock due to forest regrowth in all parcels that have been harvested in the baseline scenario, in tC;
$\Delta C_{RG,i,p\BSL}$	carbon sequestration resulting from forest regrowth after timber harvest in stratum i in land parcel p, tC ha^{-1}
A_{t*}	Cumulative area harvested until time t*, ha;
i	1, 2, 3 …M strata; and
p	1, 2, 3 ...P land parcels harvested within the project crediting period.

Therefore, net change in carbon stock across all parcels harvested over each year of the project crediting period in the baseline scenario since the start of the project activity is calculated as:

$$\Delta C_{NET|BSL,t*} = \sum_{p=1}^{P} \Delta C_{NET|BSL(1)} + \Delta C_{NET|BSL(2-10)} + \Delta C_{NET|BSL(11-20)} + \Delta C_{NET|BSL(1+)} \quad (15)$$

Where:

$\Delta C_{NET\|BSL,t*}$	net change in carbon stock across all parcels in the baseline scenario in the year t* since the start of the project activity, in tC;
$\Delta C_{NET\|BSL(1)}$	net change in carbon stock in the baseline scenario for all parcels p that are within 1 year of harvest in the baseline scenario, in tC;
$\Delta C_{NET\|BSL(2\text{-}10)}$	net change in carbon stock in the baseline scenario for all parcels p, that were harvested between 2-10 years ago in the baseline scenario, in tC;
$\Delta C_{NET\|BSL(11\text{-}20)}$	net change in carbon stock in the baseline scenario in parcel p, that were harvested between 11-20 years ago in the baseline scenario, in tC;
$\Delta C_{NET\|BSL(1+)}$	net change in carbon stock due to forest regrowth in the baseline scenario for all parcels p that have been harvested in the baseline scenario, in tC;
t*	time elapsed since the start of the project, in years; and
p	1, 2, 3 ...P land parcels harvested within the project crediting period.

The net carbon stock change in the baseline scenario must be converted to net greenhouse gas emissions and is calculated as:

$$GHG_{NET|BSL,t*} = \Delta C_{NET|BSL,t*} * \frac{44}{12} \quad (16)$$

Where:

$GHG_{NET\|BSL,t^*}$	net greenhouse gas emissions in the baseline scenario in the year t* since the start of the project activity, tCO_2e;
$\Delta C_{NET\|BSL}$	net change in carbon stock across all parcels in the baseline scenario in the year t* since the start of the project activity, tC; and
44/12	ratio of molecular weights of carbon dioxide and carbon, tCO_2-e tC^{-1}.

Project Emissions

Ongoing forest growth in the project scenario

This section calculates $\Delta C_{AB,t|PRJ}$ annual carbon stock change in aboveground biomass of trees in the project scenario, in tCO_2^e.

Allometry

Select the appropriate allometric equation for forest type/group of species j (e.g. tropical humid forest or tropical dry forest) or for each species or family j (group of species) found in the inventory (hereafter referred to as species group) that converts tree dimensions from field timber inventories on sample plots to aboveground biomass of trees.

Measurements

Only the individual trees, species and strata which were to be harvested in the baseline scenario are to be measured. Any minimum values employed in inventories are held constant for the duration of the project.

Determining Sample Plot Carbon Stocks

The carbon stock in aboveground biomass for each individual tree of species group j in the sample plot located in stratum i will be estimated using the selected allometric equation applied to the tree dimensions resulting from section 3.2.1.2.

Therefore, the sum of the carbon stock in each sample plot will be calculated as:

$$C_{AB,j,i,t,sp|PRJ} = \sum_{i=1}^{t_{j,i,sp,t}} f_j(X, Y \ldots) * CF_j \quad (17)$$

Where:

$C_{AB,j,i,t,sp\|PRJ}$	carbon stock in aboveground biomass of trees of species j in plot sp in stratum i at time t in the project scenario, tC

CF_j	carbon fraction of biomass for tree group j, tC t d.m.$^{-1}$;
$f_j(X,Y...)$	aboveground biomass of trees based on allometric equation for species group j based on measured tree variable(s), t. d.m. tree-1;
i	1, 2, 3, …M strata;
j	1, 2, 3 … J tree species;
l	1, 2, 3, … $L_{j,i,t,sp}$ sequence number of individual trees of species group j in stratum i at time t in sample plot sp;
t	0, 1, 2, 3, …t* years elapsed since start of the project activity; and
sp	1, 2, 3 …SP sample plots.

Determining Stratum Carbon Stocks

The total carbon stock in the aboveground biomass of all trees present in sample plot sp in stratum i at time t, must be calculated as:

$$C_{AB,i,t,sp|PRJ} = \sum_{j=1}^{J} C_{AB,j,i,t,sp|PRJ} \quad (18)$$

Where:

$C_{AB,i,t,sp|PRJ}$	aboveground biomass carbon stock of all trees of stratum i at time t in sample plot sp in the project scenario, tC;
$C_{AB,j,i,t,sp|PRJ}$	carbon stock in aboveground biomass of trees of species j in stratum i at time t in plot sp in the project scenario, tC;
i	1, 2, 3, …M strata;
j	1, 2, 3 … J tree species; and
t	0, 1, 2, 3 …t* years elapsed since the start of the project activity.

Determining Mean Carbon Stocks

Therefore, the mean carbon stock in aboveground biomass for each stratum per unit area is calculated as:

$$C_{AB,i,t|PRJ} = \frac{1}{SP} * \sum_{SP=1}^{SP} \left(\frac{C_{AB,i,t,sp|PRJ}}{A_{sp}}\right) \quad (19)$$

Where:

$C_{AB,i,t\|PRJ}$	mean aboveground biomass carbon stock of trees in stratum i at time t, tC□ ha^{-1};
$C_{AB,i,t,sp\|PRJ}$	aboveground biomass carbon stock of trees in stratum i at time t in sample plot sp, tC;
$A_{,sp}$	area of sample plot sp, ha;
sp	1, 2, 3 … SP sample plots;
i	1, 2, 3 … M strata; and
t	0, 1, 2, 3 … t* years elapsed since the start of the project activity.

Determining Carbon Stock Changes

The annual carbon stock change in aboveground biomass of trees in year t is the difference in mean carbon stock in aboveground biomass between sampling events and, when expressed in tCO_2e, is calculated as:

$$\Delta C_{AB,t|PRJ} = \left(\sum_{i=1}^{M} \left(A_i * \frac{C_{AB,i,t2|PRJ} - C_{AB,i,t1|PRJ}}{T}\right)\right) * \frac{44}{12} \quad (20)$$

Where:

$\Delta C_{AB,t\|PRJ}$	annual carbon stock change in aboveground biomass of trees in year t, tCO_2^e yr^{-1};
$C_{AB,i,t\|PRJ}$	mean aboveground biomass carbon stock of trees in stratum i at time t, tC□ ha^{-1};
$A_{,i}$	area covered by stratum i, ha;
sp	1, 2, 3 … SP sample plots;
T	number of years between monitoring time t1 and t2 ($T=t_2 - t_1$); years;
i	1, 2, 3 … M strata; and
t	0, 1, 2, 3 … t* years elapsed since the start of the project activity; and
44/12	ratio of molecular weights of carbon dioxide divided carbon, tCO_2^e tC^{-1}.

The carbon stock change in aboveground biomass of trees ($\Delta C_{AB,t|PRJ}$) is the output of this section and is necessary to calculate net greenhouse gas emissions in the project scenario.

Forest disturbance in the project scenario

This section calculates $\Delta C_{DIST\_FR,t|PRJ}$, carbon stock change due to fire disturbance in the project scenario; tCO_2-e, $\Delta C_{DIST,t|PRJ}$, carbon stock change due to non-fire natural disturbance in the project scenario; tCO_2-e

Natural disturbance

a. Natural Disturbance - Fire

Where fires occur ex post in the project area, the area burned shall be delineated. Therefore, based on the IPCC 2006 Inventory Guidelines, estimation of greenhouse gas emissions from biomass burning shall be calculated as:

$$\Delta C_{DIST_{FR},t|PRJ} = \sum_{i=1}^{M} A_{burn,i,t} * B_{i,t|PRJ} * COMF_i * G_{g,i} * 10^{-3}.GWP_{CH4} \quad (21)$$

Where:

$\Delta C_{DIST\_FR,t\|PRJ}$	net greenhouse gas emissions resulting from fire disturbance in year *t*, tCO_2^e ;
$A_{burn,i,t}$	area burnt for stratum *i* at time *t*, ha;
$B_{i,t\|PRJ}$	average aboveground biomass stock present in the project scenario but absent in the baseline scenario before burning stratum *i*, time *t*; t d. m. ha^{-1};
$COMF_i$	combustion factor for stratum *i*, dimensionless;
$G_{g,i}$	emission factor for stratum *i* for methane, g kg^{-1} dry matter burnt;
GWP_{CH4}	global warming potential for CH_4 (IPCC default: 21), tCO_2^e tCH_4^{-1};
i	1, 2, 3 …*M* strata; and
t	1, 2, 3, … *t** years elapsed since the start of the IFM project activity.

The average aboveground biomass stock present in the project scenario but absent in the baseline scenario before burning for a particular stratum shall be calculated as:

$$B_{i,t|PRJ} = \sum_{j=1}^{J}\{V_{EX,i,j|BSL} * BCEF_R\} \quad (22)$$

Where:

$B_{i,t\|PRJ}$	average aboveground biomass stock present in the project scenario but absent in the baseline before burning for stratum *i*, time *t*, t d. m. ha^{-1};
$V_{EX,j,i\|BSL}$	mean volume of extracted timber per unit area for species *j* in stratum *i*, $m3 \cdot ha^{-1}$;

$BCEF_R$	biomass conversion and expansion factor applicable to wood removals in the project area, t.d.m m^{-3};
i	1, 2, 3 …*M* strata;
j	1, 2, 3 …*J* tree species; and
t	1, 2, 3, … *t** years elapsed since the start of the IFM project activity.

b. Natural Disturbance – Non-Fire

There are no fire disturbance occurred in the project area, therefore, $\Delta C_{DIST\_FR,t|PRJ}=0$

Where non-fire natural disturbances occur ex post in the project area, the area disturbed must be delineated.

$$\Delta C_{DIST,t|PRJ} = \sum_{i=1}^{M}\left(A_{dist,i,t} * \sum_{j=1}^{J}\{C_{AB,j,i|BSL}\}\right) * \frac{44}{12} \quad (23)$$

Where:

$\Delta C_{DIST,t\|PRJ}$	net greenhouse gas emissions resulting from non-fire natural disturbance in year *t*, tCO_2^e ;
$A_{dist,i,t}$	area disturbed for stratum *i* at time *t*, ha;
$C_{AB,i\|BSL}$	carbon stock in aboveground biomass per unit area in stratum *i*, $tC \cdot ha^{-1}$;
44/12	ratio of molecular weights of carbon dioxide and carbon, $tCO_2^e\ tC^{-1}$;
i	1, 2, 3 …*M* strata;
j	1, 2, 3 …*J* tree species; and
t	1, 2, 3, … *t** years elapsed since the start of the IFM project activity.

There are non-fire natural disturbances occur ex post in the project area, therefore, $\Delta C_{DIST,t|PRJ}=0$

Illegal logging

Where the PRA and the limited sampling indicate degradation is occurring, net carbon stock changes as a result of illegal logging shall be calculated as:

$$\Delta C_{DIST-IL,t|PRJ} = \sum_{i=1}^{M}\left(A_{DIST-IL,j} * \frac{C_{DIST-IL,i,t|PRJ}}{AP_i}\right) \quad (24)$$

Where:

$\Delta C_{DIST\_IL,t\|PRJ}$	net carbon stock changes as a result of illegal logging at time *t*, tCO_2^e;
$A_{DIST\_IL,}i$	area potentially impacted by illegal logging in stratum *I*, ha;
$C_{DIST\_IL,i,t\|PRJ}$	biomass carbon of trees cut and removed through illegal logging in stratum i at time t, tCO_2^e;
APi	total area of illegal logging sample plots in stratum *i*, ha;
i	1, 2, 3 …*M* strata in the in the project case; and
t	1, 2, 3, … *t* years elapsed since the projected start of the project activity.

There are no degradation occurred indicated in PRA and limited sampling, therefore, $\Delta_{CDIST\_IL,t|PRJ}$ =0

Net greenhouse gas emissions in the project scenario

This section calculates $\Delta C_{NET,t|PRJ}$, the net greenhouse gas emissions in the project scenario in year t, in tCO_2e.

The net greenhouse gas emissions in the project scenario are the sum of net greenhouse gas emissions resulting from fire and non-fire forest disturbance, plus any carbon stock changes that occur as a result of illegal logging, minus the annual carbon stock change in the aboveground biomass of trees due to forest growth.

Therefore, net greenhouse gas emissions in the project scenario in year t, is calculated as:

$$\Delta C_{NET,t|PRJ} = \left(\Delta C_{DIST-FR\ \ ,t|PRJ} + \Delta C_{DIST,t|PRJ} + \Delta C_{DIST-IL\ \ ,t|PRJ}\right) - \Delta C_{AB,t|PRJ} \quad (25)$$

Where:

$\Delta C_{NET,t\|PRJ}$	net greenhouse gas emissions in the project scenario in year t, tCO_2^{-e}
$\Delta C_{DIST\_FR,t\|PRJ}$	net greenhouse gas emissions resulting from fire disturbance in year t, tCO_2^e
$\Delta C_{DIST,t\|PRJ}$	net greenhouse gas emissions resulting from non-fire natural disturbance in year t, tCO_2^e
$\Delta C_{DIST\_IL,t\|PRJ}$	Net carbon stock changes as a result of illegal logging at time t, tCO_2^e
$\Delta C_{AB,t\|PRJ}$	annual carbon stock change in aboveground biomass of trees in year t, tCO_2^e□ yr^{-1}; and

t	1, 2, 3, t* years elapsed since start of the project activity.

The net greenhouse gas emissions across in the project scenario since the start of the project activity is calculated as:

$$GHG_{NET|PRJ} = \sum_{t=1}^{t^*} \Delta C_{NET,t|PRJ} \quad (26)$$

Where:

$GHG_{NET\|PRJ}$	net greenhouse gas emissions in the project scenario since the start of the project activity, tCO_2^e
$\Delta C_{NET,t\|PRJ}$	net greenhouse gas emissions in the project scenario in year t, tCO_2^e; and
t	1, 2, 3, t* years elapsed since start of the project activity.

Leakage

Activity shifting leakage

The project does not involve in the activity shifting leakage .In China, the forest timber harvest is strictly controlled by the authority. Also, the China Forest Law also clearly stipulates the punishment for the illegal logging, which not only requires 5-10 times compensation of replanting, but also 2-10 times economic penalty. in China, the timber harvest is tightly controlled by the forestry authority, the illegal logging is severely punished.

Therefore, for the project activity, the PP have no right to harvest more in other parcels outside the project activity and the project does not involve in the activity shifting leakage .

Market leakage

Leakage due to market effects is equal to the net emissions from planned timber harvest activities in the baseline scenario multiplied by an appropriate leakage factor:

$$GHG_{LK|LtPF} = LF_{me} * GHG_{NET|BSL,t*} \quad (27)$$

Where:

$GHG_{LK\|LtPF}$	is total market leakage as a result of IFM LtPF activities, tCO_2^e;
LF_{ME}	is the dimensionless leakage factor for market-effects calculations;

$GHG_{NET\|BSL,t^*}$	net greenhouse gas emissions in the baseline scenario in the year t* since the start of the project activity, tCO_2^e.

The leakage factor is determined by considering where in the country logging will be increased as a result of the decreased timber supply caused by the project.

Leakage factor calculation

The leakage factor is determined by considering where in the country logging will be increased as a result of the decreased supply of the timber caused by the project. If the areas liable to be logged have a higher ratio of merchantable biomass to total biomass higher than the project area it is likely that the proportional leakage is higher and vice versa.

Therefore,

$LF_{ME} = 0$

If it can be demonstrated that no market-effects leakage will occur within national boundaries, that is if no new concessions are being assigned AND annual extracted volumes cannot be increased within existing national concessions AND illegal logging is absent (or de minimis) in the host country.

For the project,

- According to the 13th Five-year Forest Harvest Limit issued by State Council (Guohan [2016] No.32)[1], the total harvest volume limit from 2016 to 2020 is 25,403.6*10^4 m^3, and the planned harvest volume of the project is196.6*10^4 m^3, accounting 0.77% of the national harvest volume, which will not result in the significant national concession and illegal logging;

- The annual extracted volume is unlikely increase within existing national concessions AND illegal logging is strictly forbidden and will be severely punished by the law.

In summary,

$LF_{ME} = 0$

The actual value will be monitored when verification.

Net GHG Emission Reductions and Removals

Net Project Greenhouse Gas Emission Reductions

[1] http://www.gov.cn/zhengce/content/2016-02/16/content_5041486.html

According to VM0010 version 1.3, the Net Project Greenhouse Gas Emission Reductions are calculated as:

$$GHG_{CREDITS|LtPF,t*} = GHG_{NET|BSL,t*} - GHG_{NET|PRJ,t*} - GHG_{LK|LtPF,t*} \quad (28)$$

Where:

$GHG_{CREDITS\|LtPF,t*}$	project greenhouse gas credits associated with the implementation of improved forest management (IFM) activities in the year t* since the start of the project activity, in the project scenario, tCO_2^e
$GHG_{NET\|BSL,t*}$	net greenhouse gas emissions in the baseline scenario in the year t* since the start of the project activity, tCO_2^e
$GHG_{NET\|PRJ,t*}$	net greenhouse gas emissions in the project scenario in the year t* since the start of the project activity, tCO_2^e; and
$GHG_{LK\|LtPF,t*}$	total greenhouse gas emissions due to leakage arising outside the project boundary as a result of the implementation of improved forest management (IFM) activities in the year t* since the start of the project activity, in the project scenario, tCO_2^e

Project Verified Carbon Units

The number of Verified Carbon Units (VCUs) for each year t in the project crediting period is the greenhouse gas emission reductions and removals adjusted for uncertainty and risk.

Adjustment for uncertainty

Estimated greenhouse gas emissions and emission reductions from IFM activities have uncertainties associated with parameters and coefficients including estimates of area, carbon stocks, regrowth and expansion factors. It is assumed that the uncertainties associated with input data are available, either as default uncertainty values given in most recent IPCC guidelines, or as statistical estimates based on sampling.

Uncertainty at all times is defined at the 95% confidence interval where the estimated variance exceeds +/- 15 percent from the mean. Procedures including stratification and the allocation of sufficient measurement plots will help ensure that low uncertainty results and ultimately full crediting can result.

Uncertainties arising from the measurement and monitoring of carbon pools and greenhouse gases shall always be quantified. Errors in each pool shall be weighted by the size of the pool so that projects may reasonably target a lower precision level in pools that only form a small proportion of the total stock.

For both the baseline and the with-project case the total uncertainty is equal to the square root of the sum of the squares of each component uncertainty and is calculated at the time of reporting through propagating the error in the baseline stocks and the error in the project stocks.

Therefore, total uncertainty for LtPF project is calculated as:

$$U_{TOTAL|LtPF} = \sqrt{U_{|PRJ}^2 + U_{|BSL}^2} \quad (29)$$

Where:

$U_{total\|LtPF}$	total uncertainty for LtPF Project, dimensionless;
$U_{\|PRJ}$	total uncertainty for the improved forest management activities in the project scenario, dimensionless; and
$U_{\|BSL}$	total uncertainty for the baseline scenario, dimensionless.

Project proponents must justify the selection of uncertainty propagation in the VCS-PD.

If $U_{total|LtPF} \leq 0.15$ then no deduction will result for uncertainty.

If $U_{total|LtPF} > 0.15$ then the amount of greenhouse gas emission credits associated with IFM activities will be deducted as follows:

$$Credits_{total|LtPF} = GHG_{credits|LtPF} \cdot (1 - U_{total|LtPF}) \quad (30)$$

Where:

$Credits_{total\|LtPF}$	total greenhouse gas credits adjusted for uncertainty for each year t in the project crediting period;
$GHG_{credits\|LtPF}$	project greenhouse gas credits associated with the implementation of improved forest management (IFM) activities in the project scenario, $tCO_2^e \cdot year^{-1}$; and
$U_{total\|LtPF}$	total uncertainty for LtPF Project, dimensionless.

Calculation of verified carbon units

The amount of greenhouse gas credits estimated at section 3.4.2.1 above shall be adjusted to account for risk.

They shall be subject to deductions based on application of the most recent version of the VCS Tool for AFOLU Non-Permanence Risk Analysis and Buffer Determination.

Therefore, the amount of VCU's that can be issued at time $t=t_2$ (the date of verification) for monitoring period $T=t_2-t_1$, is calculated as:

$$VCU_{net|LtPF} = \left(Credits_{total,t2|LtPF} - Credits_{total,t1|LtPF}\right) - Bu_{|IFM-VCS} \quad (31)$$

Where:

$VCU_{net\|LtPF}$	number of verified carbon units; dimensionless;
$Credits_{total.t1\|LtPF}$	net anthroprogenic greenhouse gas removals by sinks, as estimated for $t^*=t_1$ in tCO_2^e;
$Credits_{total.t2\|LtPF}$	net anthroprogenic greenhouse gas removals by sinks, as estimated for $t^*=t_2$ in tCO_2^e; and
$Bu_{\|IFM-VCS}$	total number of credits withheld in VCS buffer account

The calculation process

The calculation process of baseline emission

Therefore, for the calculation of $GHG_{NET|BSL}$, according to section above, the process is shown below:

Basic Parameter		Value	Data Unit	Data Source
Total Area of Stratum	*Oak*	7415.59	ha	Timber harvest plan issued by local forestry bureau, and calculated from Forest second class investigation issued by *local forestry bureau*
	Masson Pine	3087.63	ha	
	Broad-Leaved Mixed	744.29	ha	
	Coniferous and Broad-Leaved Mixed	6021.91	ha	
$V_{,j,l,BSL}$	*Oak*	11.57	m^3/ha	
	Masson Pine	33.87	m^3/ha	
	Broad-Leaved	33.61	m^3/ha	

	Mixed			
	Coniferous and Broad-Leaved Mixed	12.06	m^3/ha	
$V_{EX,j,i\|BSL,y}$	Refer to ER sheet		m^3/ha	
$A_{i,p,y}$	Refer to ER sheet		ha	
D_j	*Oak*	0.676	t d.m. m^{-3}	"Land Use Change and Forestry GHG Inventory(2013)" of "Second National Information Notification on China Climate Change"
	Masson Pine	0.38	t d.m. m^{-3}	
	Broad-Leaved Mixed	0.482	t d.m. m^{-3}	
	Coniferous and Broad-Leaved Mixed	0.486	t d.m. m^{-3}	
BEF	*Oak*	1.355	dimensionless	
	Masson Pine	1.472	dimensionless	
	Broad-Leaved Mixed	1.514	dimensionless	
	Coniferous and Broad-Leaved Mixed	1.656	dimensionless	
$BCEF_R$	*Oak*	0.916	t d.m. m^{-3}	calculated by BEF and D
	Masson Pine	0.559	t d.m. m^{-3}	

	Broad-Leaved Mixed	0.73	t d.m. m^{-3}	
	Coniferous and Broad-Leaved Mixed	0.805	t d.m. m^{-3}	
CF_j	Oak/Masson Pine/Broad-Leaved Mixed/Coniferous and Broad-Leaved Mixed	0.5	tC t d.m.$^{-1}$	VM0010 version 1.3
WW	Oak/Masson Pine/Broad-Leaved Mixed/Coniferous and Broad-Leaved Mixed	24%	kg kg^{-1}	
SLF	Oak/Masson Pine/Broad-Leaved Mixed/Coniferous and Broad-Leaved Mixed	0.12	kg kg^{-1}	
OF	Oak/Masson Pine/Broad-Leaved Mixed/Coniferous and Broad-Leaved	0.62	kg kg^{-1}	

	Mixed			
Regrowth rate in baseline scenario	Oak/Masson Pine/Broad-Leaved Mixed/Coniferous and Broad-Leaved Mixed	1.5	$m^3.ha^{-1}.yr^{-1}$ $m^3.ha^{-1}.yr^{-1}$ $m^3.ha^{-1}.yr^{-1}$ $m^3.ha^{-1}.yr^{-1}$	The statement on the growth volume in Hongshan issued by local forest bureau

*However, **CL 06** were raised and successfully closed, Refer to Appendix 2 for details.*

The baseline emission during the crediting period

Year	$\Delta C_{NET\|BSL}$	$GHG_{NET\|BSL}$
01/01/2015-31/12/2015	30	110
01/01/2016-31/12/2016	-3	-11
01/01/2017-31/12/2017	92	337
01/01/2018-31/12/2018	6	22
01/01/2019-31/12/2019	91	333
01/01/2020-31/12/2020	73	267
01/01/2021-31/12/2021	153	561
01/01/2022-31/12/2022	519	1,903
01/01/2023-31/12/2023	857	3,142
01/01/2024-31/12/2024	971	3,560
01/01/2025-31/12/2025	1,548	5,676
01/01/2026-31/12/2026	2,030	7,443
01/01/2027-31/12/2027	2,401	8,803

01/01/2028-31/12/2028	1,247	4,572
01/01/2029-31/12/2029	4,013	14,714
01/01/2030-31/12/2030	3,316	12,158
01/01/2031-31/12/2031	4,821	17,677
01/01/2032-31/12/2032	6,450	23,650
01/01/2033-31/12/2033	8,741	32,050
01/01/2034-31/12/2034	19,098	70,026
01/01/2035-31/12/2035	34,734	127,358
01/01/2036-31/12/2036	51,841	190,083
01/01/2037-31/12/2037	63,573	233,101
01/01/2038-31/12/2038	42,732	156,684
01/01/2039-31/12/2039	25,346	92,935
01/01/2040-31/12/2040	16,665	61,105
01/01/2041-31/12/2041	19,966	73,208
01/01/2042-31/12/2042	18,304	67,114
01/01/2043-31/12/2043	18,994	69,644
01/01/2044-31/12/2044	18,738	68,706
Total	367,347	1,346,931
Average	12,244	44,897

The calculation of project emission

The ex-ante estimation of project emission of the proposed project is as follows:

Basic Parameter		Value	Data Unit	Data Source
Total Area of Stratum	*Oak*	7415.59	ha	Timber harvest plan
	Masson Pine	3087.63	ha	
	Broad-Leaved Mixed	7244.29	ha	
	Coniferous and Broad-Leaved Mixed	6021.91	ha	
D_j	*Oak*	0.676	t d.m. m^{-3}	"Land Use Change and Forestry GHG Inventory(2013)" of "Second National Information Notification on China Climate Change"
	Masson Pine	0.38	t d.m. m^{-3}	
	Broad-Leaved Mixed	0.482	t d.m. m^{-3}	
	Coniferous and Broad-Leaved Mixed	0.486	t d.m. m^{-3}	
BEF	*Oak*	1.355	dimensionless	
	Masson Pine	1.472	dimensionless	
	Broad-Leaved Mixed	1.514	dimensionless	
	Coniferous and Broad-Leaved Mixed	1.656	dimensionless	
$BCEF_R$	*Oak*	0.916	t d.m. m^{-3}	calculated by BEF and D

	Masson Pine	0.559	t d.m. m^{-3}	
	Broad-Leaved Mixed	0.73	t d.m. m^{-3}	
	Coniferous and Broad-Leaved Mixed	0.805	t d.m. m^{-3}	
CF_j	Oak/Masson Pine/Broad-Leaved Mixed/Coniferous and Broad-Leaved Mixed	0.5	tC t d.m.$^{-1}$	VM0010 version 1.3
Ongoing growth rate in project scenario	*Oak*	7.5	$m^3.ha^{-1}.yr^{-1}$	The statement on the growth volume in Hongshan issued by local forest bureau
	Masson Pine	4.5	$m^3.ha^{-1}.yr^{-1}$	
	Broad-Leaved Mixed	8	$m^3.ha^{-1}.yr^{-1}$	
	Coniferous and Broad-Leaved Mixed	7	$m^3.ha^{-1}.yr^{-1}$	

Because the forest inventory conducted by a forestry survey company and local forest bureau didn't include the detail of each tree in the subcompartment, so we didn't use allometric equation to estimate the project emission here. And according to the methodology, it is acceptable to use pre-existing forest inventory data for this purpose, so we use the ongoing growth rate to predict the project emission.

On-going growth rate is predicted by the local forest bureau based on the historical data, so the emissions of each year during the whole crediting period are same. In the monitoring report, the actual stock volume will be measured, then re-calculate the emission within the crediting period.

Year	$\Delta C_{AB,t\|PRJ}$	$\Delta C_{DIST\_FR,t\|PRJ}$	$\Delta C_{DIST,t\|PRJ}$	$\Delta C_{DIST\_IL,t\|PRJ}$	$\Delta C_{NET,t\|PRJ}$
01/01/2015-31/12/2015	247,412	0	0	0	-247,412
01/01/2016-31/12/2016	247,412	0	0	0	-247,412
01/01/2017-31/12/2017	247,412	0	0	0	-247,412
01/01/2018-31/12/2018	247,412	0	0	0	-247,412
01/01/2019-31/12/2019	247,412	0	0	0	-247,412
01/01/2020-31/12/2020	247,412	0	0	0	-247,412
01/01/2021-31/12/2021	247,412	0	0	0	-247,412
01/01/2022-31/12/2022	247,412	0	0	0	-247,412
01/01/2023-31/12/2023	247,412	0	0	0	-247,412
01/01/2024-31/12/2024	247,412	0	0	0	-247,412
01/01/2025-31/12/2025	247,412	0	0	0	-247,412
01/01/2026-31/12/2026	247,412	0	0	0	-247,412
01/01/2027-31/12/2027	247,412	0	0	0	-247,412
01/01/2028-31/12/2028	247,412	0	0	0	-247,412
01/01/2029-31/12/2029	247,412	0	0	0	-247,412
01/01/2030-31/12/2030	247,412	0	0	0	-247,412
01/01/2031-31/12/2031	247,412	0	0	0	-247,412
01/01/2032-31/12/2032	247,412	0	0	0	-247,412
01/01/2033-31/12/2033	247,412	0	0	0	-247,412
01/01/2034-31/12/2034	247,412	0	0	0	-247,412
01/01/2035-31/12/2035	247,412	0	0	0	-247,412

01/01/2036-31/12/2036	247,412	0	0	0	-247,412
01/01/2037-31/12/2037	247,412	0	0	0	-247,412
01/01/2038-31/12/2038	247,412	0	0	0	-247,412
01/01/2039-31/12/2039	247,412	0	0	0	-247,412
01/01/2040-31/12/2040	247,412	0	0	0	-247,412
01/01/2041-31/12/2041	247,412	0	0	0	-247,412
01/01/2042-31/12/2042	247,412	0	0	0	-247,412
01/01/2043-31/12/2043	247,412	0	0	0	-247,412
01/01/2044-31/12/2044	247,412	0	0	0	-247,412
Total	7,422,360	0	0	0	-7,422,360
Average	247,412	0	0	0	-247,412

Forest disturbance in the project scenario:

According to the analysis in section 3.2, $\Delta C_{DIST\_FR,t|PRJ}$, $\Delta C_{DIST,t|PRJ}$ and $\Delta C_{DIST\_IL,i,t|PRJ}$ are all = 0.

Therefore,

$GHG_{LK|LtPF}$ =0

Uncertainty for the baseline scenario

According to *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, the uncertainty in the baseline scenario is associated with parameters and coefficients including estimates of area, carbon stocks, regrowth and expansion factors, the calculation process follows the two rules below:

Rule A: Where uncertainties are to be combined by addition, the standard deviation of the sum will be the square root of the sum of the squares of the standard deviations of the quantities that are added with the standard deviations all expressed in absolute terms (this rule is exact for uncorrelated variables).

Using this interpretation, a simple equation can be derived for the uncertainty of the sum, that when expressed in percentage terms becomes:

$$U_{total} = \frac{\sqrt{(U_1 \times E_1)^2 + (U_2 \times E_2)^2 + \cdots + (U_n \times E_n)^2}}{E_1 + E_2 + \cdots + E_n} \quad (32)$$

Where:

U_{total}	is the percentage uncertainty in the sum of the quantities (half the 95% confidence interval divided by the total (i.e. mean) and expressed as a percentage);
E_i and U_i	are the uncertain quantities and the percentage uncertainties associated with them, respectively
Rule B	Where uncertain quantities are to be combined by multiplication, the same rule applies except that the standard deviations must all be expressed as fractions of the appropriate mean values (this rule is approximate for all random variables).

A simple equation can also be derived for the uncertainty of the product, expressed in percentage terms:

$$U_{total} = \sqrt{U_1^2 + U_2^2 + \cdots + U_n^2} \quad (33)$$

Where:

U_{total}	is the percentage uncertainty in the product of the quantities (half the 95% confidence interval divided by the total and expressed as a percentage);
U_i	are the percentage uncertainties associated with each of the quantities.

The uncertainty is calculated per stratum by dividing the 95% confidence interval by the mean value of the uncertainty quantities. The corresponding standard deviation is calculated over the measured plot values of the uncertainty quantities. The 95% confidence interval is calculated based on the standard deviation and the t-value for n-1 degree of freedom of plots per stratum.

As the uncertainty in the baseline scenario is associated with parameters and coefficients including estimates of area, carbon stocks, regrowth and expansion factors, the calculation of the 4 parameters and coefficients are shown below:

1) Uncertainty of Area:

In the baseline scenario, the area of every stratum are quoted from the field survey inventory data and legal right of harvest, so no data are from measurement and monitoring. Therefore, it is deemed as 0 in the period of validation. It will be monitored in the period of verification.

2) The Sample size, Sample mean and Standard Uncertainty of expansion factors:

rd error of expansion factors are quoted from Forestry Part of China's greenhouse gas emissions list divided as tree species, and the uncertainty of expansion factors are calculated as below:

For Oak:

Uncertainty of BCEF-Oak		7.63%	
Uncertainty of BEF-Oak	6.77%	Uncertainty of D-Oak	3.53%
BEF		D	
Sample size	73	Sample size	82
Sample mean (BEF)	1.36	Sample mean (D)	0.68
Standard deviation	0.39	Standard deviation	0.11
Average error	0.05	Average error	0.01
Confidence level	0.95	Confidence level	0.95
Degree of freedom	72	Degree of freedom	81
Two-sided Student's t-value	1.99	Two-sided Student's t-value	1.99
Allowable error	0.09	Allowable error	0.02
Lower confidence limit	1.26	Lower confidence limit	0.65
Upper confidence limit	1.45	Upper confidence limit	0.70
Confidence interval	0.09	Confidence interval	0.02

For Masson Pine*:*

Uncertainty of BCEF-*Masson Pine*		11.91%	
Uncertainty of BEF-*Masson Pine*	6.33%	Uncertainty of D-*Masson Pine*	10.09%
BEF		D	
Sample size	103	Sample size	43
Sample mean (BEF)	1.47	Sample mean (D)	0.38
Standard deviation	0.48	Standard deviation	0.12
Average error	0.05	Average error	0.02
Confidence level	0.95	Confidence level	0.95
Degree of freedom	102	Degree of freedom	42
Two-sided Student's t-value	1.98	Two-sided Student's t-value	2.02
Allowable error	0.09	Allowable error	0.04
Lower confidence limit	1.38	Lower confidence limit	0.34
Upper confidence limit	1.57	Upper confidence limit	0.42
Confidence interval	0.09	Confidence interval	0.04

For Broad-Leaved Mixed:

Uncertainty of BCEF-*Broad-Leaved Mixed*		6.33%	
Uncertainty of BEF-*Broad-Leaved Mixed*	3.94%	Uncertainty of D-*Broad-Leaved Mixed*	4.95%
BEF		D	
Sample size	84	Sample size	82

Sample mean (BEF)	1.51	Sample mean (D)	0.48
Standard deviation	0.27	Standard deviation	0.11
Average error	0.03	Average error	0.01
Confidence level	0.95	Confidence level	0.95
Degree of freedom	83	Degree of freedom	81
Two-sided Student's t-value	1.99	Two-sided Student's t-value	1.99
Allowable error	0.06	Allowable error	0.02
Lower confidence limit	1.45	Lower confidence limit	0.46
Upper confidence limit	1.57	Upper confidence limit	0.51
Confidence interval	0.06	Confidence interval	0.02

For Coniferous and Broad-Leaved Mixed*:*

Uncertainty of BCEF-*Coniferous and Broad-Leaved Mixed*		9.91%	
Uncertainty of BEF-*Coniferous and Broad-Leaved Mixed*	5.99%	Uncertainty of D-*Coniferous and Broad-Leaved Mixed*	7.89%
BEF		D	
Sample size	103	Sample size	43
Sample mean (BEF)	1.66	Sample mean (D)	0.49
Standard deviation	0.51	Standard deviation	0.12
Average error	0.05	Average error	0.02
Confidence level	0.95	Confidence level	0.95

Degree of freedom	102	Degree of freedom	42
Two-sided Student's t-value	1.98	Two-sided Student's t-value	2.02
Allowable error	0.10	Allowable error	0.04
Lower confidence limit	1.56	Lower confidence limit	0.45
Upper confidence limit	1.76	Upper confidence limit	0.52
Confidence interval	0.10	Confidence interval	0.04

3) Uncertainty of carbon stock:

The calculation of uncertainty of carbon stock is based on the uncertainty of volume in every stratum multiply by the uncertainty of expansion factors using formula (32):

Uncertainty of carbon stock-Oak	7.64%	Uncertainty of carbon stock-*Masson Pine*	11.95%
Uncertainty of volume-Oak	0.17%	Uncertainty of volume-*Masson Pine*	0.96%
carbon stock-Oak	802557.61	carbon stock-*Masson Pine*	144881.36
Area(ha)	7415.59	Area(ha)	3087.63
Sample size	1407	Sample size	583
Sample mean (m^3/ha)	236.30	Sample mean (m^3/ha)	167.88
Standard deviation	7.69	Standard deviation	19.80
Average error	0.20	Average error	0.82
Confidence level	0.95	Confidence level	0.95
Degree of freedom	1406	Degree of freedom	582
Two-sided Student's t-value	1.96	Two-sided Student's t-value	1.96
Allowable error	0.40	Allowable error	1.61

Lower confidence limit	235.90	Lower confidence limit	166.27
Upper confidence limit	236.70	Upper confidence limit	169.49
Confidence interval	0.40	Confidence interval	1.61

Uncertainty of carbon stock-*Broad-Leaved Mixed*	6.37%	Uncertainty of carbon stock-*Coniferous and Broad-Leaved Mixed*	9.91%
Uncertainty of volume-*Broad-Leaved Mixed*	0.29%	Uncertainty of volume-*Coniferous and Broad-Leaved Mixed*	0.24%
carbon stock-*Broad-Leaved Mixed*	677868.81	carbon stock-*Coniferous and Broad-Leaved Mixed*	520787.01
Area(ha)	7244.29	Area(ha)	6021.91
Sample size	2469	Sample size	1103
Sample mean (m^3/ha)	256.36	Sample mean (m^3/ha)	214.86
Standard deviation	18.90	Standard deviation	8.67
Average error	0.38	Average error	0.26
Confidence level	0.95	Confidence level	0.95
Degree of freedom	2468	Degree of freedom	1102
Two-sided Student's t-value	1.96	Two-sided Student's t-value	1.96
Allowable error	0.75	Allowable error	0.51
Lower confidence limit	255.62	Lower confidence limit	214.35
Upper confidence limit	257.11	Upper confidence limit	215.37
Confidence interval	0.75	Confidence interval	0.51

4) Uncertainty of regrowth

The uncertainty of regrowth is only associated with the parameter RGR_i, as for the value quoted from the expertise of the local forest authority, the uncertainty of 10% is adopted from the National Forest Resource Continuous Investigation Technical Regulation issued by the State Forestry Bureau . And this uncertainty is adopted for the project for conservative.

Based on the calculation of the 4 parameters and coefficients above, the calculation of $U_{Oak|BSL}$,$U_{Masson\ Pine|BSL}$,$U_{Broad\text{-}Leaved\ Mixed\ |BSL}$ and $U_{Coniferous\ and\ Broad\text{-}Leaved\ Mixed|BSL}$ are shown below:

Stratum	Parameter	A_{rea}(Ha)	$V_{EX,j,i\|BSL}$ (m3/ha)	BEF	D(tdm/m^3)	$BCEF_R$ (tdm/m^3)	CFj(tc/tdm)	$C_{HB,j,i\|BSL}$ (tC/ha)	$C_{EX,j,i\|BSL}$ (tC ha^{-1})	$\Delta C_{DW,i,p\|BSL}$
		a	b	c	d	e=c*d	f	g=b*e*f	h=b*d*f	i=g-h
								$U_g=\sqrt{U_b^2+U_e^2}$	$U_h=\sqrt{U_b^2+U_d^2}$	$U_i=\frac{\sqrt{(E_g*U_g)^2+(E_h*U_h)^2}}{(E_g+E_h)}$
Oak	E	7415.59	174.06	1.355	0.676	0.916	0.5	79.72	58.83	20.89
	U		0.17%	6.77%	3.53%	7.63%		7.64%	3.54%	4.64%
Masson Pine	E	3087.63	97.98	1.472	0.380	0.559	0.5	27.39	18.62	8.77
	U		0.96%	6.33%	10.09%	11.91%		11.95%	10.14%	8.21%
Broad-Leaved Mixed	E	7244.29	209.42	1.514	0.482	0.730	0.5	76.44	50.47	25.97
	U		0.29%	3.94%	4.95%	6.33%		6.34%	4.96%	4.30%
Coniferous and Broad-Leaved Mixed	E	6021.91	154.68	1.656	0.486	0.805	0.5	62.26	37.59	24.67
	U		0.24%	5.99%	7.89%	9.91%		9.91%	7.89%	6.86%

Stratum	Parameter	WW_k	SLF_k	$C_{wp,0\|BSL}$ (tc/ha)	$C_{WP,i\|BSL}$(tc/ha)	OF_k	$\Delta C_{WP,100\|BSL}$ (tc/ha)	Ai,p(ha)	$\Delta C_{NET\|BSL(1)}$(tC)
		j	k	l=h*(j+k)	m=h-l	n	o=m*n	p	q=(i/10+l+o/20)*p

				$U_l=U_h$	$U_m=\frac{\sqrt{(E_h*U_h)^2+(E_l*U_l)^2}}{(E_h+E_l)}$		$U_o=U_m$	$U_p=0$	$U_m=\frac{\sqrt{(E_l*U_l)^2+(E_l*U_l)^2+(E_o*U_o)^2}}{(E_l+E_l+E_o)}$
Oak	E	24%	0.12	21.18	37.65	0.62	23.34	688.70	16828.60
	U			3.54%	2.76%		2.76%		2.12%
Masson Pine	E	24%	0.12	6.70	11.91	0.62	7.39	1078.24	8569.88
	U			10.14%	7.92%		7.92%		5.03%
Broad-Leaved Mixed	E	24%	0.12	18.17	32.30	0.62	20.03	645.81	14057.54
	U			4.96%	3.88%		3.88%		2.54%
Coniferous and Broad-Leaved Mixed	E	24%	0.12	13.53	24.06	0.62	14.91	644.04	10783.94
	U			7.89%	6.17%		6.17%		4.15%

Stratum	Parameter	$\Delta C_{NET\|BSL(2-10)}$(tC)	$\Delta C_{NET\|BSL(11-20)}$(tC)	regrowth rate (m3/ha/yr)	$\Delta C_{NET\|BSL,t*}$(tC)	ΔCNET, i,P|BSL
		r=(i/10+o/20)*p	s=o/20*p	t	v=e*f*p*t	w=q+r+s-v
		$U_r=\frac{\sqrt{(E_i*U_i)^2+(E_o*U_o)^2}}{(E_i+E_o)}$	$U_s=U_o$	$U_t=10\%$	$U_v=\sqrt{U_e^2+U_f^2}$	$U_n=\frac{\sqrt{(E_q*U_q)^2+(E_r*U_r)^2+(E_s*U_s)^2+(E_v*U_v)^2}}{(E_q+E_r+E_s+E_v)}$

Oak	E	2242.35	803.86	1.50	473.14	19401.68
	U	2.63%	2.76%	10.00%	12.58%	1.80%
Masson Pine	E	1343.76	398.24	1.50	452.05	9859.83
	U	5.74%	7.92%	10.00%	15.55%	4.13%
Broad-Leaved Mixed	E	2323.70	646.66	1.50	353.58	16674.32
	U	2.96%	3.88%	10.00%	11.84%	2.11%
Coniferous and Broad-Leaved Mixed	E	2069.21	480.28	1.50	388.84	12944.59
	U	4.86%	6.17%	10.00%	14.08%	3.37%
					U_{BSL}	1.32%

Therefore, as there are 4 strata in the project activity, the uncertainty across combined strata for is calculated with the revised equation below:

$$U_{|BSL} = \frac{\sqrt{(U_{1|BSL} * E_{1|BSL})^2 + (U_{2|BSL} * E_{2|BSL})^2 + (U_{3|BSL} * E_{3|BSL})^2 + (U_{4|BSL} * E_{4|BSL})^2}}{E_{1|BSL} + E_{2|BSL} + E_{3|BSL} + E_{4|BSL}} \quad (34)$$

Where:

$U_{\|BSL}$	Total uncertainty in baseline scenario; %
$U_{1\|BSL}$	Uncertainty in baseline scenario in stratum Oak; %;

$U_{2\|BSL}$	Uncertainty in baseline scenario in stratum *Masson Pine*; %;
$U_{3\|BSL}$	Uncertainty in baseline scenario in stratum *Broad-Leaved Mixed*; %;
$U_{4\|BSL}$	Uncertainty in baseline scenario in stratum *Coniferous and Broad-Leaved Mixed*; %;
$E_{1\|BSL}$	Sum of net change in carbon stock in the baseline scenario in stratum Oak in the baseline case; t CO_2e
$E_{2\|BSL}$	Sum of net change in carbon stock in the baseline scenario in stratum *Masson Pine* in the baseline case; t CO_2e
$E_{3\|BSL}$	Sum of net change in carbon stock in the baseline scenario in stratum *Broad-Leaved Mixed* in the baseline case; t CO_2e
$E_{4\|BSL}$	Sum of net change in carbon stock in the baseline scenario in stratum *Coniferous and Broad-Leaved Mixed* in the baseline case; t CO_2e

After calculation, U_{BSL} is 1.32% for the baseline scenario.

Uncertainty for the project scenario:

uncertainty of project

Stratum	Parameter	A_{rea}(Ha)	BEF	D(tdm/m3)	$BCEF_R$ (tdm/m3)	CFj (tc/tdm)	Ongoing growth rate(m3.ha-1.yr-1)	$\Delta C_{AB,t\|PRJ}$(tCO2)
		a	b	c	d=b*c	e	f	g=a*d*e*f*44/12
							U_f=10%	$U_g = \sqrt{U_d^2 + U_f^2}$

Oak	E	7415.59	1.355	0.676	0.916	0.5	7.50	93399.36
	U		6.77%	3.53%	7.63%		10.00%	12.58%
Masson Pine	E	3087.63	1.472	0.380	0.559	0.5	4.50	14239.38
	U		6.33%	10.09%	11.91%		10.00%	15.55%
Broad-Leaved Mixed	E	7244.29	1.514	0.482	0.730	0.5	8.00	77562.20
	U		3.94%	4.95%	6.33%		10.00%	11.84%
Coniferous and Broad-Leaved Mixed	E	6021.91	1.656	0.486	0.805	0.5	7.00	62211.35
	U		5.99%	7.89%	9.91%		10.00%	14.08%
							U|PRJ	7.05%

Total uncertainty

Total uncertainty for LtPF project is calculated according to the follow equation:

$$U_{Totall|LtPF} = \sqrt{U_{|PRJ}^2 + U_{|BSL}^2} = \sqrt{1.32^2 + 7.05\%^2} = 7.17\% = 0.0717$$

According to the methodology, if $U_{total,LtPF} \leq 0.15$ then no deduction will result for uncertainty, as $U_{total}<0.15$, then no deduction will result from uncertainty.

Calculation of verified carbon units

Based on the analysis in NON-PERMANENCE RISK REPORT, the overall risk rating is 22, then 22% of the total emission reductions should be deducted .

Therefore, the emission reduction detail is listed:

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)	Estimated net GHG emission reductions or removals with buffer deduction (tCO_2e)
01/01/2015-31/12/2015	110	-247,412	0	247,522	193,067
01/01/2016-31/12/2016	-11	-247,412	0	247,401	192,972
01/01/2017-31/12/2017	337	-247,412	0	247,749	193,244
01/01/2018-31/12/2018	22	-247,412	0	247,434	192,998
01/01/2019-31/12/2019	333	-247,412	0	247,745	193,241
01/01/2020-31/12/2020	267	-247,412	0	247,679	193,189
01/01/2021-31/12/2021	561	-247,412	0	247,973	193,418
01/01/2022-31/12/2022	1,903	-247,412	0	249,315	194,465
01/01/2023-31/12/2023	3,142	-247,412	0	250,554	195,432

01/01/2024-31/12/2024	3,560	-247,412	0	250,972	195,758
01/01/2025-31/12/2025	5,676	-247,412	0	253,088	197,408
01/01/2026-31/12/2026	7,443	-247,412	0	254,855	198,786
01/01/2027-31/12/2027	8,803	-247,412	0	256,215	199,847
01/01/2028-31/12/2028	4,572	-247,412	0	251,984	196,547
01/01/2029-31/12/2029	14,714	-247,412	0	262,126	204,458
01/01/2030-31/12/2030	12,158	-247,412	0	259,570	202,464
01/01/2031-31/12/2031	17,677	-247,412	0	265,089	206,769
01/01/2032-31/12/2032	23,650	-247,412	0	271,062	211,428
01/01/2033-31/12/2033	32,050	-247,412	0	279,462	217,980
01/01/2034-31/12/2034	70,026	-247,412	0	317,438	247,601
01/01/2035-31/12/2035	127,358	-247,412	0	374,770	292,320
01/01/2036-31/12/2036	190,083	-247,412	0	437,495	341,246
01/01/2037-31/12/2037	233,101	-247,412	0	480,513	374,800
01/01/2038-31/12/2038	156,684	-247,412	0	404,096	315,194
01/01/2039-31/12/2039	92,935	-247,412	0	340,347	265,470

01/01/2040-31/12/2040	61,105	-247,412	0	308,517	240,643
01/01/2041-31/12/2041	73,208	-247,412	0	320,620	250,083
01/01/2042-31/12/2042	67,114	-247,412	0	314,526	245,330
01/01/2043-31/12/2043	69,644	-247,412	0	317,056	247,303
01/01/2044-31/12/2044	68,706	-247,412	0	316,118	246,572
Total	1,346,931	-7,422,360	0	8,769,291	6,840,033
Average	44,897	-247,412	0	292,309	228,001

However,CL06 was raised and successfully closed, Refer to Appendix 2 for details.

3.2.7 Methodology Deviations

No deviations from the procedures indicated by the methodology have been made.

3.2.8 Monitoring Plan

The monitoring plan presented in the PD(version 03) complies with the requirement of the methodology.

The following data and parameters has been available at validation:

Data / Parameter:	$V_{l,j,i,sp}$
Data unit:	m^3
Description:	Merchantable volume for tree l of species j in sample plot sp in stratum i
Source of data:	Calculated from volume tables or equations linking diameter at breast height (DBH, at typically 1.3 m aboveground level), and merchantable height (MH), to commercial (merchantable) volume of trees in the sample plots above the minimum DBH set in the timber harvest plan. If locally derived equations or yield tables are not available use relevant regional, national or default equations from IPCC literature, national inventory reports or published peer-reviewed studies– such as those provided in Tables 4.A.1 to 4.A.3 of the GPG-LULUCF (IPCC 2003).
Value applied:	See the detailed excel spreadsheet
Justification of choice of data or description of measurement methods and procedures applied:	It is necessary to verify the applicability of equations used. Allometric equations can be verified by both: 1. Verification of equation conditions Justification should be provided for the applicability of the equation to the project locations. Such justification should include identification of climatic, edaphic, geographical and taxonomic similarities between the project location and the location in which the equation was derived. Any equation used should have an r2 value of greater than 0.5 (50%) and a p value that is significant (<0.05 at the 95% confidence level). 2. Additional field verification The following limited measures method must be used for field verification: select at least 10 trees per species distributed across the age range (but excluding trees less than 15 years old for which there is rarely a great relative inaccuracy in equations) ; measure DBH, and height to a 10 cm diameter top or to the first

	branch; calculate stem volume from measurements; and plot the estimated volume of all the measured trees along with the curve of volume against diameter as predicted by the allometric equation. If the estimated volume of the measured trees are distributed both above and below the curve (as predicted by the allometric equation) the equation may be used. The equation may also be used if the measured individuals have a volume consistently higher than predicted by the equation. The equation may not be used if >75% of the measured trees have a volume lower than the predicted curve. In this instance another equation must be selected.
Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	CF_j
Data unit:	$tC \cdot td.m.^{-1}$
Description:	Carbon fraction of dry matter for species j
Source of data:	According to VM0010 version 1.3, the default value 0.5 $tC \cdot t\ d.m.^{-1}$ is used and the same value is used in all instances where this parameter is used.
Value applied:	0.5
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	D_j
Data unit:	$t\ d.m.\ m^{-3}$
Description:	Basic wood density of species j in $t\ d.m.\ m^{-3}$
Source of data:	According to VM0010 version 1.3, it must be chosen with priority from higher to lower preference as follows: National species-specific or group of species-specific values (eg, from National GHG inventory); Species-specific or group of species-specific values from neighboring countries with similar conditions. When species-specific data from neighboring countries is of higher quality, being more representative of the species in the project scenario, it may be preferable to use these values than lower quality national data; Global species-specific or group of species-specific (eg, IPCC 2006 AFOLU Chapter 4 Tables 4.13 and 4.14). Species-specific wood densities may not always be available, and

	may be difficult to apply with certainty in the typically species rich forests of the humid tropics, hence it is acceptable practice to use wood densities developed for forest types or plant families or species groups. "Land Use Change and Forestry GHG Inventory(2013)" of "Second National Information Notification on China Climate Change" matches the first choice.
Value applied:	<table><tr><th>Tree species</th><th>D_j</th></tr><tr><td>Oak</td><td>0.676</td></tr><tr><td>Masson Pine</td><td>0.38</td></tr><tr><td>Broad-Leaved Mixed</td><td>0.482</td></tr><tr><td>Coniferous and Broad-Leaved Mixed</td><td>0.486</td></tr></table>
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	$f_j(X, Y…)$
Data unit:	t d.m. $tree^{-1}$
Description:	Allometric equation(s) for species j linking measured tree variable(s) to aboveground biomass of living trees
Source of data:	Equations must have been derived using a wide range of measured variables (eg, DBH, Height, etc.) based on datasets that comprise at least 30 trees. Equations must be based on statistically significant regressions and must have an r2 that is ≥ 0.8. The source of equation(s) must be chosen with priority from higher to lower preference, as available, as follows: a) National species-, genus-, family-specific; b) Species-, genus-, family-specific from neighbouring countries with similar conditions (ie, broad continental regions); c) National forest-type specific; d) Forest-type specific from neighbouring countries with similar conditions (ie, broad continental regions); e) Forest type-specific such as those provided Tables 4.A.1 to 4.A.3 of the GPG-LULUCF (IPCC 2003); or in Pearson, T., Walker, S. and Brown, S. 2005. Sourcebook for Land Use, Land-Use Change and Forestry Projects. Winrock International and the World Bank Biocarbon Fund. 57pp.; or in Chave, J., C. Andalo, S. Brown, M. A. Cairns, J. Q. Chambers, D. Eamus, H. Folster, F. Fromard, N. Higuchi, T. Kira, J.-P. Lescure, B. W. Nelson, H. Ogawa, H. Puig, B.

	Riera, T. Yamakura. 2005. Tree allometry and improved estimation of carbon stocks and balance in tropical forests. Oecologia 145: 87-99. Species-, genus- and family-specific allometric equations may not always be available, and may be difficult to apply with certainty in the typically species rich forests of the humid tropics. Hence it is acceptable practice to use equations developed for regional forest types, provided that their accuracy has been validated with direct site-specific data following guidance given below. If a forest-type specific equation is used, it should not be used in combination with species-specific equation(s) (ie, it must be used for all tree species).
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	It is necessary to validate the applicability of equations used. Source data from which equation(s) was derived should be reviewed and confirmed to be representative of the forest type/species and conditions in the project and covering the range of potential independent variable values. Allometric equations can be validated either by: 1. Limited Measurements select at least 30 trees (if validating forest type-specific equation, selection should be representative of the species composition in the project area, ie, species representation in roughly in proportion to relative basal area). Minimum diameter of measured trees must be 20cm and maximum diameter must reflect the largest trees present or potentially present in the future in the project area (and/or leakage belt); measure DBH, and height to a 10 cm diameter top or to the first branch; calculate stem volume from measurements and multiplying by species-specific density to gain biomass of bole; apply a biomass expansion factor to estimate total aboveground biomass from stem biomass37; and plot the estimated biomass of all the measured trees along with the curve of biomass against diameter as predicted by the allometric equation. If the estimated volume of the measured trees are distributed both above and below the curve (as predicted by the allometric equation) the equation may be used. The equation may also be used if the measured individuals have a biomass consistently higher than predicted by the equation. If >75% of the measured trees have a biomass lower than the predicted curve, destructive sampling must be undertaken or another equation must be selected.

	2. Destructive Sampling select at least 5 trees (if validating forest type-specific equation, selection should be representative of the species composition in the project area, ie, species representation in roughly in proportion to relative basal area) at the upper end of the range of independent variable values existing in the project area; measure DBH and commercial height and calculate volume using the same procedures/equations used to generate commercial volumes to which BCEFs will be applied; fell and weigh the aboveground biomass to determine the total (wet) mass of the stem, branch, twig, leaves, etc. Extract and immediately weigh subsamples from each of the wet stem and branch components, followed by oven drying at 70 degrees C to determine dry biomass; determine the total dry weight of each tree from the wet weights and the averaged ratios of wet and dry weights of the stem and branch components; and plot the estimated biomass of all the measured trees along with the curve of biomass against diameter as predicted by the allometric equation. If the estimated volume of the measured trees are distributed both above and below the curve (as predicted by the allometric equation) the equation may be used. The equation may also be used if the measured individuals have a biomass consistently higher than predicted by the equation. If >75% of the measured trees have a biomass lower than the predicted curve another equation must be selected. Details of destructive sampling measurements are given in: Brown, S. 1997. Estimating biomass and biomass change of tropical forests: a primer. FAO Forestry Paper 134, Rome, Italy. Available at http://www.fao.org/docrep/W4095E/W4095E00.htm If using species-specific equations, and new species are encountered in the course of monitoring, new allometric equations must be sourced from the literature and validated, if necessary, as per requirements and procedures above. Default values must be updated whenever new guidelines are produced by the IPCC

Data / Parameter:	$BCEF_R$
Data unit:	t d.m. m^{-3}
Description:	Biomass conversion and expansion factor applicable to wood removals in the project area
Source of data:	The source of data must be chosen with priority from higher to lower preference as follows:

<table>
<tr><td></td><td>Existing local forest type-specific;
National forest type-specific or eco-region-specific (eg, from national GHG inventory);
Forest type-specific or eco-region-specific from neighboring countries with similar conditions. Sometimes (c) might be preferable to (b);
Global forest type or eco-region-specific (eg, IPCC 2006 INV GLs AFOLU Chapter 4 Table 4.5).
Alternatively:
BCEFR = BEFR * D
Where BCEF values are not directly available, they can be calculated as Biomass Expansion Factor (BEF)* basic wood density (D).
Application of this equation requires caution because basic wood density and biomass expansion factors tend to be correlated. If the same sample of trees was used to determine D, BEF or BCEF, conversion will not introduce error, therefore, it is acceptable to use this equation. If, however, basic wood density is not known with certainty, transforming one into the other might introduce error, as BCEF implies a specific but unknown basic wood density, therefore, all conversion and expansion factors must be derived or their applicability checked locally.
"Land Use Change and Forestry GHG Inventory(2013)" of "Second National Information Notification on China Climate Change" matches the second choice.</td></tr>
<tr><td>Value applied:</td><td><table><tr><th>Tree species</th><th>$BCEF_R$</th></tr><tr><td>Oak</td><td>0.916</td></tr><tr><td>Masson Pine</td><td>0.559</td></tr><tr><td>Broad-Leaved Mixed</td><td>0.73</td></tr><tr><td>Coniferous and Broad-Leaved Mixed</td><td>0.805</td></tr></table></td></tr>
<tr><td>Justification of choice of data or description of measurement methods and procedures applied:</td><td>N/A</td></tr>
<tr><td>Purpose of Data</td><td>Calculation of baseline emissions</td></tr>
<tr><td>Comments:</td><td>The combustion factor is a measure of the proportion of the fuel that is actually combusted, which varies as a function of the size and architecture of the fuel lcad (ie, a smaller proportion of large, coarse fuel such as tree stems will be burnt compared to fine fuels, such as grass leaves), the moisture content of the fuel and the type of fire (ie, intensity and rate of spread).</td></tr>
</table>

	Default values must be updated whenever new guidelines are produced by the IPCC

Data / Parameter:	G_{gi}
Data unit:	g kg^{-1} dry matter burnt
Description:	Emission factor for stratum i for gas g
Source of data:	Defaults can be found in Volume 4, Chapter 2, of the IPCC 2006 Inventory Guidelines in table 2.5
Value applied:	Please refer to the spreadsheet
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	Default values shall be updated whenever new guidelines are produced by the IPCC

Data / Parameter:	OF, SLF,WW
Data unit:	Kg kg^{-1}
Description:	OF = Fraction of wood products that will be emitted to the atmosphere between 3 and 100 years after production; SLF = Fraction of wood products that will be emitted to the atmosphere within 3 years of production; and WW = Fraction of extracted biomass effectively emitted to the atmosphere during production Wood waste fraction(WW): Winjum et al. 1998indicatethattheproportionofextracted biomass that is oxidized (burning or decaying) from the production of commodities to be equal to19%fordevelopedcountries, 24% for developing countries. Short-lived fraction (SLF) Winjumetal1998 give decay rates for proportions of wood products, which were converted to with short-term (<3yr) uses (applicable internationally) as below: Sawnwood 0.12 Woodbase panels 0.06 Other industrial roundwood 0.18 Paper and Paperboard 0.24 Additional oxidized fraction (OF) Winjum et al 1998 gives annual oxidation fractions for each class of wood products split by forest region (boreal, temperate and tropical). This methodology projects these fractions over 95 years to give the additional proportion that is oxidized between the 3rd and the 100th year after initial harvest:

	<table><tr><th rowspan="2">Wood Product Class</th><th colspan="3">OF</th></tr><tr><th>Boreal</th><th>Temperate</th><th>Tropical</th></tr><tr><td>Sawnwood</td><td>0.39</td><td>0.62</td><td>0.86</td></tr><tr><td>Woodbase panels</td><td>0.62</td><td>0.86</td><td>0.98</td></tr><tr><td>Other industrial roundwood</td><td>0.86</td><td>0.98</td><td>0.99</td></tr><tr><td>Paper and paperboard</td><td>0.39</td><td>0.62</td><td>0.99</td></tr></table>
Source of data:	According to VM0010 version 1.3, the default values are chosen.
Value applied:	<table><tr><th>Parameters</th><th>Species</th><th>Value</th></tr><tr><td>OF</td><td>Oak/Masson Pine/Broad-Leaved Mixed/Coniferous and Broad-Leaved Mixed</td><td>0.62</td></tr><tr><td>SLF</td><td>Oak/Masson Pine/Broad-Leaved Mixed/Coniferous and Broad-Leaved Mixed</td><td>0.12</td></tr><tr><td>WW</td><td>Oak/Masson Pine/Broad-Leaved Mixed/Coniferous and Broad-Leaved Mixed</td><td>24%</td></tr></table>
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	RGR_i

Data unit:	$tC.ha^{-1}.yr^{-1}$
Description:	Forest regrowth rate post timber harvest for stratum i
Source of data:	Regrowth rate must be calculated from either a) data generated in a reference area using measurements of timber volume in a chronosequence of replicated sample plots; or b) published data on forest growth after timber harvest of the same forest type within the same region as the project; or c) the IPCC default values for aboveground net biomass growth in natural forests.
Value applied:	

Species	Value	Uint
Oak	1.5	$m^3.ha^{-1}.yr^{-1}$
Masson Pine	1.5	$m^3.ha^{-1}.yr^{-1}$
Broad-Leaved Mixed	1.5	$m^3.ha^{-1}.yr^{-1}$
Coniferous and Broad-Leaved Mixed	1.5	$m^3.ha^{-1}.yr^{-1}$

Justification of choice of data or description of measurement methods and procedures applied:	Method b is applied. The average annual regrowth is confirmed by local forest bureau . And the RGRi can therefore be calculated by the biomass expansion factor, density and carbon fraction of the separate species.
Purpose of Data	Calculation of baseline emissions
Comments:	Default values must be updated whenever new guidelines are produced by the IPCC

Data / Parameter:	$V_{EX,j,i\|BSL}$
Data unit:	$m^3.ha^{-1}$
Description:	Mean volume of extracted timber per unit area for species j in stratum i
Source of data:	The timber harvest plan sets the allowable mean extracted volume is equal to the merchantable volume of timber in the forest inventory ($V_{j,i\|BSL}$), based on legal limits.
Value applied:	please refer to ER sheet
Justification of choice of data or description of measurement methods and procedures applied:	The measurement method is from academic paper and equations developed for regional forest types. Please refer to ER sheet

Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	$A_{i,p}$
Data unit:	Ha
Description:	Area covered by stratum i over land parcel p
Source of data:	Geodetic coordinates and/or Remote Sensing data and/or legal parcel records
Value applied:	See the detailed Project Land Form
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions-
Comments:	It must be assumed ex-ante that land parcel boundaries and strata areas must not change through time

Data / Parameter:	$A_{1,i,p}$
Data unit:	Ha
Description:	The area of stratum i in land parcel p that was harvested 1 year ago
Source of data:	Geodetic coordinates, GIS Files or legal parcel records
Value applied:	See the detailed Project Land Form
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	$A_{2\text{-}10,i,p}$
Data unit:	Ha
Description:	The area of stratum i in land parcel p that was harvested between 2 and 10 year ago
Source of data:	Geodetic coordinates, GIS Files or legal parcel records
Value applied:	See the detailed Project Land Form
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions

Comments:	N/A

Data / Parameter:	$A_{11\text{-}20,i,p}$
Data unit:	Ha
Description:	The area of stratum i in land parcel p that was harvested between 11 and 20 year ago
Source of data:	Geodetic coordinates, GIS Files or legal parcel records
Value applied:	See the detailed Project Land Form
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	A_{t^*}
Data unit:	Ha
Description:	Cumulative area harvested until time t*
Source of data:	Geodetic coordinates, GIS Files or legal parcel records
Value applied:	See the detailed Project Land Form
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	$A_{s,p}$
Data unit:	Ha
Description:	Area of sample plot sp
Source of data:	Recording and archiving of size of sample plots
Justification of choice of data or description of measurement methods and procedures applied:	Standard procedures for plot delineation in forest timber inventory surveys shall be used
Purpose of Data	Calculation of baseline emissions
Comments:	Ex-ante the size of the plots shall be defined and recorded in the monitoring plan.

The following data and parameters will be monitored in accordance with the applied methodology:

Data / Parameter:	Illegal Logging PRA Results
Data unit:	Dimensionless
Description:	N/A
Source of data:	PRA
Description of measurement methods and procedures to be applied:	The PRA must evaluate whether timber harvest may be occurring in the project area and shall consist of semi-structured interviews / questionnaires. If ≥ 10% of those interviewed/surveyed believe that illegal logging may be occurring within the project boundary then the limited on-the-ground illegal logging survey shall be triggered. An additional output of the PRA shall be a depth of penetration of illegal logging pressure. A maximum distance shall be recorded for penetration into the forest from access points (such as roads, rivers, already cleared areas) for the purpose of harvesting timber.
Frequency of monitoring/recording:	Every two years
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of Data	Calculation of project emissions
Calculation method:	N/A
Comments:	Ex ante estimation shall be made of illegal logging in the with-project case. If the belief is that zero illegal logging will occur within the project boundaries then this parameter may be set to zero if clear infrastructure, hiring and policies are in place to prevent illegal logging.

Data / Parameter:	Result of Limited Illegal Logging Survey
Data unit:	Dimensionless
Description:	N/A
Source of data:	Limited on-the-ground illegal logging survey
Description of measurement methods and procedures to be applied:	Sampled by surveying multiple transects of known length and width across the access-buffer area to check whether new tree stumps are evident or not. The access-buffer area shall be equal in area to at least 1% of $A_{DIST\_IL,i}$
Frequency of monitoring/recording:	Must to be repeated each time the PRA indicates a potential for illegal logging.
Value applied:	N/A
Monitoring equipment:	N/A

QA/QC procedures to be applied:	N/A
Purpose of Data	Calculation of project emissions
Calculation method:	N/A
Comments:	Ex ante an estimation shall be made of illegal logging in the with-project case. If the belief is that zero illegal logging will occur within the project boundaries then this parameter may be set to zero if clear infrastructure, hiring and policies are in place to prevent illegal logging.

Data / Parameter:	$A_{burn,i,t}$
Data unit:	Ha
Description:	Area burnt in stratum i at time t
Source of data:	Geodetic coordinates and / or Remote Sensing data
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	Areas burnt must be monitored at least every five years
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Standard quality control/quality assurance (QA/QC) procedures for forest inventory including field data collection and data management shall be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.
Purpose of Data	Calculation of project emissions
Calculation method:	N/A
Comments:	Ex ante estimations of areas burned shall be based on historic incidence of fire in the Project region

Data / Parameter:	$A_{dist,i,t}$
Data unit:	Ha
Description:	Area disturbed in stratum i at time t
Source of data:	Geodetic coordinates and / or Remote Sensing data
Description of measurement methods and procedures to be applied:	N/A

Frequency of monitoring/recording:	Areas disturbed shall be monitored at least every five years
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Standard quality control/quality assurance (QA/QC) procedures for forest inventory including field data collection and data management shall be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.
Purpose of Data	Calculation of project emissions
Calculation method:	N/A
Comments:	Ex ante estimations of areas burned must be based on historic incidence of fire in the Project region

Data / Parameter:	$A_{DIST\_IL,i}$
Data unit:	Ha
Description:	Area potentially impacted by illegal logging in stratum i
Source of data:	GIS delineation and ground truthing
Description of measurement methods and procedures to be applied:	Must be composed of a buffer from all access points (access buffer), such as roads and rivers or previously cleared areas. The width of the buffer shall be determined by the depth of degradation penetration as defined as a PRA output
Frequency of monitoring/recording:	Repeated each time the PRA indicates a potential for degradation
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of Data	Calculation of project emissions
Calculation method:	N/A
Comments:	Ex ante a limited survey can be used to determine a likely depth of degradation penetration

Data / Parameter:	$C_{DIST\_IL,i,t\|PRJ}$
Data unit:	tCO_2e
Description:	biomass carbon of trees cut and removed through illegal logging in stratum i at time t
Source of data:	Field measurements in sample plots
Description of measurement methods	The sampling plan must be designed using plots systematically placed over the buffer zone so that they sample at least 3% of the

and procedures to be applied:	area of the buffer zone ($A_{DIST\_IL,i}$). The diameter of all tree stumps will be measured and conservatively assumed to be the same as the DBH. Where the stump is a large buttress, several individuals of the same species nearby shall be located and a ratio of the diameter at DBH to the diameter of buttress at the same height above ground as the measured stumps shall be determined. This ratio will be applied to the measured stumps to estimate the likely DBH of the cut tree.The aboveground carbon stock of each harvested tree will be estimated using the allometric regression equations chosen for forest growth in the project scenario. The mean aboveground carbon stock of the harvested trees is conservatively estimated to be the total emissions and to all enter the atmosphere
Frequency of monitoring/recording:	Repeated each time limited sampling of A_{DIST_IL}, indicates illegal logging
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Standard quality control/quality assurance (QA/QC) procedures for forest inventory including field data collection and data management shall be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.
Purpose of Data	Calculation of project emissions
Calculation method:	N/A
Comments:	If species-specific equations are used and species cannot be identified from stumps then it shall be assumed that the harvested species is the species most commonly harvested. A PRA shall be used to determine the most commonly harvested species.

Data / Parameter:	AP_i
Data unit:	Ha
Description:	Total area of illegal logging sample plots in stratum i
Source of data:	Ground measurement
Description of measurement methods and procedures to be applied:	A sampling plan must be designed using multiple sample plots systematically placed across the buffer zone so that they sample at least 3% of the area of the buffer zone.
Frequency of monitoring/recording:	Not more than five years
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Standard quality control/quality assurance (QA/QC) procedures for forest inventory including field data collection and data management shall be applied. Use or adaptation of QA/QCs

	already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.
Purpose of Data	Calculation of project emissions
Calculation method:	N/A
Comments:	Ex ante estimation should be made of area of plots. This should be set to exactly 3% of the buffer zone $A_{DIST\_IL,i}$

Data / Parameter:	PMP_i
Data unit:	%
Description:	Merchantable biomass as a proportion of total aboveground tree biomass for stratum i within the project boundaries
Source of data:	Within each stratum divide the summed merchantable biomass (defined as total gross biomass of a tree 15cm DBH or larger) by the summed total of aboveground tree biomass.
Description of measurement methods and procedures to be applied:	A sampling plan must be designed using multiple sample plots systematically placed across the buffer zone so that they sample at least 3% of the area of the buffer zone.
Frequency of monitoring/recording:	Not more than five years
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Standard quality control/quality assurance (QA/QC) procedures for forest inventory including field data collection and data management shall be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.
Purpose of Data	Calculation of project emissions
Calculation method:	N/A
Comments:	Ex-ante a time zero measurement shall be made of this factor. The timber harvest plan sets the allowable mean extracted volume from the merchantable volume of timber in the forest inventory ($V_{j,i\|BSL}$), based on legal limits.

Data / Parameter:	Ai
Data unit:	Ha
Description	Area covered by stratum i

<table>
<tr><td>Source of data</td><td>Geodetic coordinates and/or Remote Sensing data and/or legal parcel records</td></tr>
<tr><td>Description of measurement methods and procedures to be applied</td><td>The stratum is from the second class forestry inventory</td></tr>
<tr><td>Frequency of monitoring/recording:</td><td>Every ten years.</td></tr>
<tr><td>Value applied:</td><td>
<table>
<tr><th>Serial number of strata</th><th>Area (ha)</th><th>Tree species</th></tr>
<tr><td>1</td><td>7415.59</td><td>Oak</td></tr>
<tr><td>2</td><td>3087.63</td><td>Masson Pine</td></tr>
<tr><td>3</td><td>7244.29</td><td>Broad-Leaved Mixed</td></tr>
<tr><td>4</td><td>6021.91</td><td>Coniferous and Broad-Leaved Mixed</td></tr>
<tr><td>Total</td><td>23769.42</td><td></td></tr>
</table>
</td></tr>
<tr><td>Monitoring Equipment:</td><td>Tape Measure</td></tr>
<tr><td>QA/QC procedures to be applied:</td><td>Standard quality control / quality assurance (QA/QC) procedures for forest inventory including field data collection and data management shall be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.</td></tr>
<tr><td>Purpose of Data</td><td>For the calculation of the baseline and project emissions.</td></tr>
<tr><td>Calculation method:</td><td>N/A</td></tr>
<tr><td>Comments</td><td>In the baseline scenario strata areas must not change through time.

In the project scenario it must be assumed ex-ante that stand</td></tr>
</table>

	boundaries and strata areas must not change through time. Ex post adjustments of the project scenario strata may be needed if unexpected disturbances occur during the project crediting period, severely affecting different parts of an originally homogenous stratum. This disturbance will be delineate as a separate stratum for the purpose of monitoring the carbon stock changes.

Data / Parameter:	DBH
Data unit:	cm
Description	Diameter at breast height of tree
Source of data	On site measuring on the sample spot.
Description of measurement methods and procedures to be applied	The National Forest Resource Continuous Investigation Technical Regulation issued by the State Forestry Bureau has detailed requirement of the measurement method.
Frequency of monitoring/recording:	Not more than five years
Value applied:	N/A
Monitoring Equipment:	Tape Measure
QA/QC procedures to be applied:	Standard quality control / quality assurance (QA/QC) procedures for forest inventory including field data collection and data management shall be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.
Purpose of Data	Calculation of tree volume, then to carbon stock change further to the project emissions.
Calculation method:	N/A
Comments	As for the project tree species, there are no allometric equation applied in the project area, the average annual growth and biomass expansion method is adopted for the estimated calculation of carbon stock change. Based on the DBH.and local volume table, the volume can be calculated, combined by the BCEF and CF, the carbon stock can be obtained.

Monitoring plan

The monitoring plan with monitoring parameters can determine changes in forest carbon stocks and greenhouse gas emissions from project activity; and determine changes in forest carbon stocks and greenhouse gas emissions from disturbance and illegal logging. Commonly accepted principles of forest inventory and management are implemented;

Commonly accepted principles of forest inventory and management are implemented;

The ante stratification of the project area in the project scenario maybe adjust based sample because of:

a) unexpected disturbances occurring during the project crediting period affecting differently various parts of an originally homogeneous stratum and/or

b) forest management activities that are implemented in a way that affects the existing stratification in the project scenario.

Sample method

To monitoring the actual carbon stock changes of the Project, field sample method will be adopted with 1) adequate forest stratification, sample size estimation methods and consider uncertainty, 2)a sampling framework including sample size, plot size, plot shape and information to determine plot location according to the latest version of " Tool for calculation of the number of sample plots formeasurements within A/R CDM project activity"

QA/QC

Standard operating procedures (SOPs) and quality control/quality assurance (QA/QC) procedures for forest inventory including field data collection and data management will be applied. SOPs already applied in national forest monitoring or available from published handbooks or from the IPCC GPG LULUCF 2003 will be used.

All data collected as part of monitoring will be archived electronically and be kept at least for 2 years after the end of the project crediting period. All measurements will be conducted according to relevant standards. Data archiving shall take both electronic and paper forms, and copies of all data shall be provided to each project participant.

The archives shall include:

- Copies of all original field measurement data, laboratory data, data analysis spreadsheets;
- Estimates of the carbon stock changes in all pools and non-CO2 GHG and corresponding

calculation spreadsheets;

- GIS products; and
- Copies of the measuring and monitoring reports.

- Conservative approach and uncertainty

Project proponents will also apply all relevant equations for the ex-ante calculation of net anthropogenic GHG removals by sinks with care and provide transparent estimations for the parameters that are monitored during the project crediting period. These estimates shall be based on measured or existing published data where possible and project proponents should retain a conservative approach; that is, if different values for a parameter are equally plausible, a value that does not lead to over-estimation of net anthropogenic GHG removals by sinks must be selected.

An uncertainty analysis is required for all estimates from monitoring related to change in area, change in carbon stocks and emissions for both the baseline and project case.

CQC validation team concludes that the PP will be able to implement the monitoring plan to report ex-post GHG net anthropogenic removals, which can also be verified.

3.3 Non-Permanence Risk Analysis

The non-performance risk report and Risk Calculation Sheet are provided by PP, the risk assessment was conducted according to the VCS Procedural Document "AFOLU Non-Permanence Risk Tool" (version 3.3) . PP adopted the Risk Report Short template and combining with the Risk-Report Calculation-Tool excel sheet.

Each risk category was calculated based on the VCS guidance and the input provided by the PP. The information was validated and cross-checked through document and literature review on site visits of the project area and interviews conducted. Details of the assessment are provided as follow.

Internal Risk

Project Management		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	Species planted (where applicable) associated with more than 25% of the stocks on which GHG credits have previously been issued are not native or proven to be adapted to the same or similar agro-ecological zone(s) in which the project is located.	Not applicable
b)	Ongoing enforcement to prevent encroachment by outside actors is required to protect more than 50% of stocks on which GHG credits have previously been issued.	Not applicable
c)	Management team does not include individuals with significant experience in all skills necessary to successfully undertake all project activities (ie, any area of required experience is not covered by at least one individual with at least 5 years' experience in the area).	Not applicable
d)	Management team does not maintain a presence in the country or is located more than a day of travel from the project site, considering all parcels or polygons in the project area.	Not applicable
e)	**Mitigation:** Management team includes individuals with significant experience in AFOLU project design and implementation, carbon accounting and reporting (eg, individuals who have successfully managed projects through validation, verification and issuance of GHG credits) under the VCS Program or other	Not applicable

	approved GHG programs.	
f)	**Mitigation:** Adaptive management plan in place.	-2
Total Project Management (PM) [as applicable, (a + b + c + d + e + f)] Total may be less than zero.		**-2**

Financial Viability		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	Project cash flow breakeven point is greater than 10 years from the current risk assessment	3
b)	Project cash flow breakeven point is greater than 7 and up to 10 years from the current risk assessment	Not applicable
c)	Project cash flow breakeven point greater than 4 and up to 7 years from the current risk assessment	Not applicable
d)	Project cash flow breakeven point is 4 years or less from the current risk assessment	Not applicable
e)	Project has secured less than 15% of funding needed to cover the total cash out before the project reaches breakeven	Not applicable
f)	Project has secured 15% to less than 40% of funding needed to cover the total cash out required before the project reaches breakeven	Not applicable
g)	Project has secured 40% to less than 80% of funding needed to cover the total cash out required before the project reaches breakeven	Not applicable
h)	Project has secured 80% or more of funding needed to cover the total cash out before the project reaches breakeven	Not applicable
i)	**Mitigation**: Project has available as callable financial resources at least 50% of total cash out before project reaches breakeven	Not applicable
Total Financial Viability (FV) [as applicable, ((a, b, c or d) + (e, f, g or h) + i)] Total may not be less than zero.		**3**

Opportunity Cost		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	NPV from the most profitable alternative land use activity is expected to be at least 100% more than that associated with project activities; or where baseline activities are subsistence-driven, net positive community impacts are not demonstrated	8
b)	NPV from the most profitable alternative land use activity is expected to be between 50% and up to100% more than from project activities	Not applicable
c)	NPV from the most profitable alternative land use activity is expected to be between 20% and up to 50% more than from project activities	Not applicable
d)	NPV from the most profitable alternative land use activity is expected to be between 20% more than and up to 20% less than from project activities; or where baseline activities are subsistence-driven, net positive community impacts are demonstrated	Not applicable
e)	NPV from project activities is expected to be between 20% and up to 50% more profitable than the most profitable alternative land use activity	Not applicable
f)	NPV from project activities is expected to be at least 50% more profitable than	Not

	the most profitable alternative land use activity	applicable
g)	**Mitigation**: Project proponent is a non-profit organization	Not applicable
h)	**Mitigation**: Project is protected by legally binding commitment (see Section 2.2.4) to continue management practices that protect the credited carbon stocks over the length of the project crediting period	-2
i)	**Mitigation**: Project is protected by legally binding commitment (see Section 2.2.4) to continue management practices that protect the credited carbon stocks over at least 100 years	Not applicable
Total Opportunity Cost (OC) [as applicable, (a, b, c, d, e or f) + (g + h or i)] Total may be less than 0.		**6**

Project Longevity		
a)	Without legal agreement or requirement to continue the management practice	Not applicable
b)	With legal agreement or requirement to continue the management practice	= 30 - (30/2)=15
Total Project Longevity (PL) May not be less than zero		**15**

Internal Risk	
Total Internal Risk (PM + FV + OC + PL) Total may not be less than zero.	**22**

External Risks

Land Tenure and Resource Access/Impacts		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	Ownership and resource access/use rights are held by same entity(s)	Not applicable
b)	Ownership and resource access/use rights are held by different entity(s) (eg, land is government owned and the project proponent holds a lease or concession)	2
c)	In more than 5% of the project area, there exist disputes over land tenure or ownership	Not applicable
d)	There exist disputes over access/use rights (or overlapping rights)	Not applicable
e)	WRC projects unable to demonstrate that potential upstream and sea impacts that could undermine issued credits in the next 10 years are irrelevant or expected to be insignificant, or that there is a plan in place for effectively mitigating such impacts.	Not applicable
f)	**Mitigation**: Project area is protected by legally binding commitment (eg, a conservation easement or protected area) to continue management practices that protect carbon stocks over the length of the project crediting period	-2
g)	**Mitigation**: Where disputes over land tenure, ownership or access/use rights	Not

	exist, documented evidence is provided that projects have implemented activities to resolve the disputes or clarify overlapping claims	applicable
Total Land Tenure (LT) [as applicable, ((a or b) + c + d + e + f + g)] Total may not be less than zero.		**0**

Community Engagement		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	Less than 50 percent of households living within the project area who are reliant on the project area, have been consulted	Not applicable
b)	Less than 20 percent of households living within 20 km of the project boundary outside the project area, and who are reliant on the project area, have been consulted	Not applicable
c)	**Mitigation**: The project generates net positive impacts on the social and economic well-being of the local communities who derive livelihoods from the project area	-5
Total Community Engagement (CE) [where applicable, (a + b + c)] Total may be less than zero.		**-5**

Political Risk		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	Governance score of less than -0.79	Not applicable
b)	Governance score of -0.79 to less than -0.32	4
c)	Governance score of -0.32 to less than 0.19	Not applicable
d)	Governance score of 0.19 to less than 0.82	Not applicable
e)	Governance score of 0.82 or higher	Not applicable
f)	**Mitigation**: Country is implementing REDD+ Readiness or other activities, as set out in this Section 2.3.3.	-2
Total Political (PC) [as applicable ((a, b, c, d or e) + f)] Total may not be less than zero.		**2**

External Risk	
Total External Risk (LT + CE + PC) Total may not be less than zero.	**0**

Natural Risks

Natural Risk					
Significance	Likelihood				
	Less than every 10 years	Every 10 to less than 25 years	Every 25 to less than 50 years	Every 50 to less than 100 years	Once every 100 years or more, or risk is not applicable to the project area
Catastrophic (70% or more loss of carbon stocks)	Not applicable	Not applicable	Not applicable	Not applicable	0
Devastating (50% to less than 70% loss of carbon stocks)	Not applicable	Not applicable	Not applicable	Not applicable	0
Major (25% to less than 50% loss of carbon stocks)	Not applicable	Not applicable	Not applicable	Not applicable	0
Minor (5% to less than 25% loss of carbon stocks)	Not applicable	Not applicable	Not applicable	Not applicable	0
Insignificant (less than 5% loss of carbon stocks) or transient (full recovery of lost carbon stocks expected within 10 years of any event)	Not applicable	Not applicable	Not applicable	Not applicable	0
No Loss	Not applicable	Not applicable	Not applicable	Not applicable	0
LS Score					
Mitigation					
Prevention measures applicable to the risk factor are implemented					0.50
Project proponent has proven history of effectively containing natural risk					0.50
Both of the above					0.25
None of the above					Not applicable

Score for each natural risk applicable to the project (Determined by (LS × M))	
Fire (F)	0
Pest and Disease Outbreaks (PD)	0
Extreme Weather (W)	0
Geological Risk (G)	0
Other natural risk (ON)	0
Total Natural Risk (as applicable, F + PD + W + G + ON)	**0**

Overall Risk Rating

Risk Category	Rating
a) Internal Risk	22
b) External Risk	0
c) Natural Risk	0
Overall Risk Rating (a + b + c)	**22**

Based on the above assessment, CQC validation team concludes that this risk rating is purely based on the tool cited above, according to VCS requirements.

The risk rating should not be used for any other purpose than retiring VCUs according to the VCS permanence rules. The risk will be reassessed at time of the first verification and with that prior to any issuance of VCUs. The current buffer is subject to change at verification also in line with further guidance from the VCS on this matter.

4 SAFEGUARDS

4.1 No Net Harm

During the visit, CQC team has interviewed the PP, the consultant and project stakeholders and confirms the project activity is compliance with National and Local Laws and Regulations and no negative environmental and socio-economic impacts identified.

4.2 Environmental Impact

An Environmental Impact Assessment (EIA) is not required for logged to protected forest projects according to Construction project classification management of environmental impact assessment list . The key mitigation action of the project activity is avoiding the illegal harvest of the forest, which can protect and improve the surviving environment, keep the ecological balance, save the species resources and enhance homeland security.

4.3 Local Stakeholder Consultation

In order to make the potential stakeholders receive information of the meeting,40 questionnaires were distributed to local stakeholders, received 100% (40 questionnaires returned out of 40). And there were no adverse comments on the project activity.

During on-site visit, local resident representatives from the local community were interviewed. In general, the interviewees think this project can bring benefit for the local social, economic and environmental development and express the opinion on supporting this project.

Through interviewing local stakeholders, CQC validation team confirms that mechanisms for ongoing communication with local stakeholder has been established by PP, including the download of project information published on Verra website, the routine villager meeting in which the local stakeholders could raise opinions, and the available contact information with phone numbers of PP published in case any stakeholders or local forest bureau to contact the PP and raise opinions.

Furthermore, CQC validation team confirms that the measures to minimize the air pollution and noise have been done by PP.

4.4 Public Comments

According VCS requirements the Project Description was submitted for public comment period. The public comment period started on 19/08/2019 and ended on 18/09/2019 (https://www.vcsprojectdatabase.org/#/pipeline_details/PL1935). No comments were received during this period.

5 VALIDATION CONCLUSION

Zhong Che (Beijing) Environmental Energy Technology Development Co.,Ltd has commissioned China Quality Certification Centre (CQC) to carry out the validation of the “Hubei Hongshan IFM(Conversion of

Logged to Projected Forest) Project" in P. R. China. The validation was performed based on VCS Version 4.0 and VM0010/Version 1.3.requirements as well as criteria given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation and the subsequent follow-up interviews have provided CQC with sufficient evidence to determine the fulfilment of stated criteria. The proposed VCS project activity conducts an improved Forest Management (IFM) of the forests in the conversion of logged to protected forest of 23,769.42ha in Hongshan County, Suizhou City, Hubei Province of China with local tree species. The approved VCS methodology VM0010 (version 1.3) is applied to quantify the GHG removals achieved in this project.

In the course of the validation 1 Corrective Action Requests (CARs), 6 Clarification Requests (CLs) were raised and successfully closed.

The review of the project design documentation and additional documents related to baseline and monitoring methodology and subsequent background investigation have provided the CQC with sufficient evidence to validate the fulfilment of the stated criteria.

In detail the conclusions can be summarised as follows:

- A reasonable level of assurance has been applied.

- All data and information used for ex-ante calculation of emission reductions is of projected and/or hypothetical nature.

- The project is in line with all relevant host country legislation incl. its GHG assertions, where applicable.

- The project additionality is sufficiently justified in the VCS-PD.

- The monitoring plan is transparent and adequate.

- The calculation of the project emission removals is carried out in a transparent and conservative manner. The calculated emission removals is 8,769,291 tCO2e in 30 years, the average annual emission reduction is 292,309 tCO2e and Verified Carbon Units with buffer deduction is about 6,840,033 tCO2e in 30 years, the average annual VCUs with buffer deduction is 228,001 tCO2e..

The conclusions of this report show, that the project, as it was described in the project description, is in line with all criteria applicable for the validation against the VCS standard Version 4.0 without any qualifications or limitations. Also CQC confirms all validation activities, including objectives, scope and criteria, level of assurance and the PD adherence to the VCS standard Version 4.0, as documented in this report are complete. It concludes without any qualifications or limiting conditions that the project "Hubei Hongshan IFM(Conversion of Logged to Projected Forest) Project" in P. R. China meets the requirements of the VCS standard Version 4.0.

APPENDIX 1: DOCUMENTS REVIEWED OR REFERENCED

No.	Author	Title	References to the document	Provider
/1/.	Zhong Che (Beijing) Environment Energy Technology Development Co., Ltd.	Project description for "Hubei Hongshan IFM(Conversion of Logged to Projected Forest) Project" (Version 01) dated 06/06/2019	https://www.vcsprojectdatabase.org/#/pipeline_details/PL1935	Zhong Che (Beijing) Environment Energy Technology Development Co., Ltd.
/2/.	Zhong Che (Beijing) Environment Energy Technology Development Co., Ltd.	Project description for "Hubei Hongshan IFM(Conversion of Logged to Projected Forest) Project" (Version 02) dated 09/10/2019	/	Zhong Che (Beijing) Environment Energy Technology Development Co., Ltd.
/3/.	Zhong Che (Beijing) Environment Energy Technology Development Co., Ltd.	Project description for "Hubei Hongshan IFM(Conversion of Logged to Projected Forest) Project" (Version 03) dated 01/05/2020	/	Zhong Che (Beijing) Environment Energy Technology Development Co., Ltd.
/4/.	VERRA	VCS standard version 4.0	https://verra.org/project/vcs-program/rules-and-requirements/	VERRA websites
/5/.	VERRA	VCS Program Definitions, version 4.0	https://verra.org/project/vcs-program/rules-and-requirements/	VERRA websites
/6/.	VERRA	VCS Program Guide, version 4.0	https://verra.org/project/vcs-program/rules-and-requirements/	VERRA websites

/7/.	VERRA	VM0010 Methodology for Improved Forest Management: Conversion from Logged to Protected Forest, v1.3	https://verra.org/methodology/vm0010-methodology-for-improved-forest-management-conversion-from-logged-to-protected-forest-v1-3/	VERRA websites
/8/.	VERRA	VT0001 Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities, v3.0	https://verra.org/methodology/vt0001-tool-for-the-demonstration-and-assessment-of-additionality-in-vcs-agriculture-forestry-and-other-land-use-afolu-project-activities-v3-0/	VERRA websites
/9/.	VERRA	AFOLU Non-Permanence Risk Tool, v4.0	https://verra.org/wp-content/uploads/2019/09/AFOLU_Non-Permanence_Risk-Tool_v4.0.pdf	VERRA websites
/10/.	Local Administration for Industry and Commerce	Business License of the participant of the project	Business License of the participant of the project	Project participant
/11/.	Project participant and Local village committee	Project Lifetime evidence	Project Lifetime evidence is Tripartite Project Cooperation Development Agreement signed by local village committee, project participate and project consultant dated 15/02/2019.	Project participant
/12/.	Hongshan County Forest Management Station of	Project Starting Date	Project Starting Date evidence (Approval of	

	Local Forest Bureau		application for logging suspension showed that the IFM start date is 01/01/2015 based on the date when the logging suspended	
/13/.	Local Forestry Bureau	Logging Plan	Logging plan from local forestry bureau	Project participant
/14/.	Local Forestry Bureau	Certificate of Forest Rights issued by local Forestry Bureau.	Certificate of Forest Rights issued by local Forestry Bureau	Project participant
/15/.	Local bureau of land resources	Certification of land rights issued by local bureau of land resources	Local bureau of land resources	Project participant
/16/.	Google	Google Earth	Google Earth Map	Public software
/17/.	The State Council of China	Grain for Green Program	Grain for Green Program issued by the State Council of China	Public websites
/18/.	Zhong Che (Beijing) Environment Energy Technology Development Co., Ltd.	Monitoring Manual for the proposed project	Monitoring Manual for the proposed project	Project participant
/19/.	Zhong Che (Beijing) Environment Energy Technology Development Co., Ltd.	Management and operation Manual for the proposed project	Management and operation Manual for the proposed project	Project participant
/20/.	/	The evidence to demonstrate the present and prior environmental conditions of the project	https://baike.baidu.com	Public websites

		area		
/21/.	Zhong Che (Beijing) Environment Energy Technology Development Co., Ltd.	Consultant Agreement	Consultant Agreement signed between Zhong Che (Beijing) Environment Energy Technology Development Co., Ltd. and local village committee on 06/01/2015	Project participant
/22/.	NDRC	Climate Change Index	The People's Republic of China Second National Communication on Climate Change, issued by NDRC, 2013	Project participants
/23/.	Forestry survey from Hongshan Forest management station	Geographic coordinates of each polygon vertex	Project Layout including the GIS system and other geographic data	Project participant
/24/.	village committee	Meeting minutes	Meeting minutes on decision for development of the proposed project	Project participant
/25/.	Zhong Che (Beijing) Environment Energy Technology Development Co., Ltd.	Non performance risk report	Non-performance risk report dated 24/09/2019 version 02	Zhong Che (Beijing) Environment Energy Technology Development Co., Ltd.
/26/.	Zhong Che (Beijing) Environment Energy Technology Development Co., Ltd.	Participatory Rural Appraisal (PRA) report of the project	Participatory Rural Appraisal (PRA) report of the project dated 01/2015,updating once every two years	Project participant

/27/.	PRC Government	Laws related to forestry	<PRC Forest aw>, <PRC Forest Law implementing Regulations>, <PRC Wildlife Protection Law>, <Forest Fire Prevention Regulations>, <Insect Control Regulation>, <PRC Production Safety Law>	Public website
/28/.	PRC Government	Programs on Forestry In China	Natural Forest Conservation Program launched in 1998), the Nature Reserve Development and Wild Conservation Program (started in 2000), Intensively Managed Commercial Timber Plantation Base Program (started in 2000), Poverty lleviation Program	Public website
/29/.	PRC Government	Administrative regulations related to forestry	<Regulations for Implementing the Forest Law>, the<Regulations for Grain for Green>, the Regulations for the Protection of Wild Plants and Animals>, the <Regulation for Nature Reserve>, the <Regulation for Forest Fire Control>, and the <Regulation for Forest Diseases	Public website

			and Pests Control>	
/30/.	Zhong Che (Beijing) Environment Energy Technology Development Co., Ltd.	Risk Calculation Sheet	Risk Calculation Sheet	Zhong Che (Beijing) Environment Energy Technology Development Co., Ltd.
/31/.	Project participant	Technical Training Record	Technical Training Record and safety, carbon sink training held by PP and local Forestry Bureau, and Local village committee in project area in year 2014~2019	Project participant
/32/.	Zhong Che (Beijing) Environment Energy Technology Development Co., Ltd.	Net anthropogenic GHG removals by sinks calculation spreadsheets	Calculation spreadsheets of Hubei Hongshan IFM(Conversion of Logged to Projected Forest) Project dated 08/07/2019.	Zhong Che (Beijing) Environment Energy Technology Development Co., Ltd.
/33/.	China Certified Emission Reduction Exchange Info-latform	China Certified Emission Reduction	http://cdm.ccchina.org.cn/ccer. aspx	Public website
/34/.	IPCC	IPCC publications	1、IPCC Good Practice Guidance & Uncertainty Management in National Greenhouse Gas Inventories, 2000 2、Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories:	Public website

			Reference Manual	
/35/.	UNFCCC	UNFCCC	http://cdm.unfccc.int	Public website
/36/.	Verra	VCS	http://www.verra.org/	Public website
/37/.	GS	GS	http://www.goldstandard.org/	Public website
/38/.	Verra	VCS Validation Verification Manual	https://verra.org/project/vcsprogram/rules-andrequirements	
/39/.	Local Administration for Industry and Commerce	Business License of Zhong Che (Beijing) Environment Energy Technology Development	Business License of Zhong Che (Beijing) Environment Energy Technology Development	Zhong Che (Beijing) Environment Energy Technology Development

APPENDIX 2: CLARIFICATION REQUESTS, CORRECTIVE ACTION REQUESTS AND FORWARD ACTION REQUESTS

Draft report clarifications and corrective action requests by validation team	Ref. to PD , ER calculation spreadsheet and Non-performance risk report	Summary of project owner response	Validation team conclusion
CL 01 There is no evidence to support the start date of the project in the PD(version 01).	PD version 01 Section 1.5	The evidence to support the start date of the project is "Approval of application for logging suspension" The evidence has been submitted to DOE.	OK. By checking the 'Approval of application for logging suspension', CQC validation team confirms that the start date is accepted, **CL 01** is successfully closed.
CL 02 Evidence should be provided to state the detailed information about the project such as the location of the project and statistics of the subcompartments.	PD version 01 Section 1.8	The section 1.8 have been further described, please see the revised PD.	OK. CQC validation team confirms that the location of the project and statistics of the subcompartments are provided and **CL 02** is successfully closed.
CL 03 The conditions prior to the project initiation, including soils, vegetation and ecosystems are	PD version 01 Section 1.10	The section 1.10 have been further described, please see the revised PD.	OK. By checking the revised PD,CQC validation team confirms that

Draft report clarifications and corrective action requests by validation team	Ref. to PD , ER calculation spreadsheet and Non-performance risk report	Summary of project owner response	Validation team conclusion
not described clearly.			information prior to the project initiation is provided. Accepted. **CL 03** is successfully closed.
CL 04 The compliance with all and any relevant local, regional and national laws, statutes and regulatory frameworks are not identified and demonstrated in PD(version 01).	PD version 01 Section 1.11	The section 1.11 have been further described, please see the revised PD.	OK. CQC validation team reviewed the Approval of application for cutting suspension which shows the project activity is compliance with laws, statutes and other Regulatory frameworks is provided. Accepted. **CL 04** is successfully closed.
CL 05 Evidence should be provide to prove the applicability conditions of the methodology(s), and tools	PD version 01 Section 2.2	The applicability conditions of the methodology(s), and tools applied by the project have been further described in Section 2.2,please see the revised PD.	OK. CQC validation team reviewed the revised PD (Version 02),and found that the vidence is provided and enough explanation is

Draft report clarifications and corrective action requests by validation team	Ref. to PD , ER calculation spreadsheet and Non-performance risk report	Summary of project owner response	Validation team conclusion
			supplemented. Accepted. **CL 05** is successfully closed.
CL 06 Public data sources should be provided to prove the accuracy of parameters in the baseline calculation,	PD version 01 Section 3.4.3	The section 3.4.3 have been further described, please see the revised PD.	OK. CQC validation team reviewed the PD (Version 02),and found enough explanation is supplemented. Accepted. **CL 06** is successfully closed.
CAR 01 Project scale should be 'Project', not 'Large project'	PD Version 01 Section 1.7	According to the applied Methodology, the annual emission reduction of the project is less than 300000 tCO2e, thus the project scale should be 'Project', please see the revised PD.	OK. CQC validation team reviewed the PD (Version 02),and found the project scale is corrected as 'Project'. Accepted. **CAR 01** is successfully closed.