INNER MONGOLIA WU'ERQIHAN IFM (CONVERSION OF LOGGED TO PROTECTED FOREST) PROJECT

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Project Title	Inner Mongolia Wu'erqihan IFM (conversion of logged to protected forest)Project
Version	02
Date of Issue	13/12/2017
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Table of Contents

1 PROJECT DETAILS

1.1 Summary Description of the Project

The **Inner Mongolia Wu'erqihan IFM (conversion of logged to protected forest) Project** (hereafter "the project activity") is implemented in Wu'erqihan Town, Yakeshi City, Inner Mongollia Autonomous Region of China by China Inner Mongolia Forest Industry Group Wu'erqihan Forest Industry Co., Ltd., the geo-coordinate of the project proponent is 121°12′25″E~122°50′43″E and 49°15′04″N~49°58′30″N, the total area is 576,006 ha, which includes the Improved Forest Management (IFM) of the forests in the conversion of logged to protected forest.

The area of the project activity is 43,167 ha, including 3,491 subcompartments spreading over Kukou department, Meitian department, Wushijiu department, Moguai department, Bolatu department, Wulikeqi department, Mendeli department, Kelihe department, Muyang department, Wenkutu Department, Ergenhe department , Nemen department , Xiriteqi department of China Inner Mongolia Forest Industry Group Wu'erqihan Forest Industry Co., Ltd. All these departments are state-owned forests and have the legal right to forest ownership. The species involved in the project are Birch (Betula platyphylla) and Larch (Larix gmelinii).

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 11,282,629 tCO_2e in 30 years, the average annual emission reduction is 376,087 tCO2e and Verified Carbon Units with buffer deduction is about 8,800,436 tCO_2e in 30 years, and average annual VCUs with buffer deduction is 293,347 tCO_2e.

The project activity will contribute to the environment (biodiversity conservation and soil erosion control), thus contribute to sustainable development.

1.2 Sectoral Scope and Project Type

Sectoral scope 14 (AFOLU)

Improved Forest Management: Logged to Protected Forest (LtPF)

1.3 Project Proponent

Organization name	China Inner Mongolia Forest Industry Group Wu'erqihan Forest Industry Co., Ltd.
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1.4 Other Entities Involved in the Project

N/A

1.5 Project Start Date

The project start date is 01/01/2013, which is announced by the Wu'erqihan Forestry Bureau. The document shows that commercial timber harvest was strictly forbidden since 01/01/2013 in China Inner Mongolia Forest Industry Group Wu'erqihan Forest Industry Co., Ltd.

1.6 Project Crediting Period

The project crediting period is from 01/01/2013 to 31/12/2042 with the total length of 30 years.

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	X
Large project	

Years	Estimated GHG emission reductions or removals (tCO_2e)	Estimated GHG emission reductions or removals with buffer deduction (tCO_2e)
01/01/2013-31/12/2013	245,695	191,642
01/01/2014-31/12/2014	377,893	294,756
01/01/2015-31/12/2015	258,932	201,966
01/01/2016-31/12/2016	338,752	264,226
01/01/2017-31/12/2017	317,910	247,969
01/01/2018-31/12/2018	324,807	253,349
01/01/2019-31/12/2019	993,134	774,644

01/01/2020-31/12/2020	364,602	284,389
01/01/2021-31/12/2021	414,710	323,473
01/01/2022-31/12/2022	440,377	343,494
01/01/2023-31/12/2023	456,650	356,187
01/01/2024-31/12/2024	521,337	406,642
01/01/2025-31/12/2025	557,787	435,073
01/01/2026-31/12/2026	530,962	414,150
01/01/2027-31/12/2027	450,127	351,099
01/01/2028-31/12/2028	435,519	339,704
01/01/2029-31/12/2029	509,710	397,573
01/01/2030-31/12/2030	391,368	305,267
01/01/2031-31/12/2031	381,479	297,553
01/01/2032-31/12/2032	336,387	262,381
01/01/2033-31/12/2033	355,618	277,382
01/01/2034-31/12/2034	365,386	285,001
01/01/2035-31/12/2035	291,228	227,157
01/01/2036-31/12/2036	281,753	219,767
01/01/2037-31/12/2037	236,782	184,689
01/01/2038-31/12/2038	213,657	166,652
01/01/2039-31/12/2039	239,568	186,863
01/01/2040-31/12/2040	242,813	189,394
01/01/2041-31/12/2041	190,465	148,562
01/01/2042-31/12/2042	217,221	169,432
Total estimated ERs	11,282,629	8,800,436
Total number of crediting years	30	
Average annual ERs	376,087	293,347

1.8 Description of the Project Activity

The Improved Forest Management (IFM) project activity is located in Wu'erqihan Town, Yakeshi CityCity, Inner Mongollia Autonomous Region of China. The annual mean temperature is -2.9℃ and the annual mean precipitation is 378.5 mm.

The project activity includes the Improved Forest Management (IFM) of the forests in 3,491 subcompartments spreading over Kukou department, Meitian department, Wushijiu department, Moguai department, Bolatu department, Wulikeqi department, Mendeli department, Kelihe department, Muyang department, Wenkutu Department, Ergenhe department , Nemen department , Xiriteqi department of China Inner Mongolia Forest Industry Group Wu'erqihan Forest Industry Co., Ltd. by the conversion of logged to protected forest. All the subcompartments had the legal right to harvest issued by local forest bureau before the implementation of the project activity. Before 2013, they were all forests which the trees could be logged and sold once

reached the cutting rotation age based on a timber harvest plan. After 2013, they are all converted to protected forests.

Table 1: Land parcels of the project

Parcel number	Department	Serial number	Area（ha）
1	Kukou department	KK	2197
2	Meitian department	MT	6461
3	Wushijiu department	WSJ	5624
4	Moguai department	MG	593
5	Bolatu department	BLT	1850
6	Wulikeqi department	WLKQ	2367
7	Mendeli department	MDL	3255
8	Kelihe department	KLH	8842
9	Muyang department	MY	1267
10	Wenkutu Department	WKT	1442
11	Ergenhe department	EGH	2268
12	Nemen department	NM	4416
13	Xiriteqi department	XRTQ	2585
Total			**43167**

The China Inner Mongolia Forest Industry Group Wu'erqihan Forest Industry Co., Ltd and Beijing Shengdahuitong Carbon Management Co., Ltd together have overall control responsibility for the project. The latter is also in charge of applying VCS project.

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.

All the subcompartments are divided into 2 strata based on the tree species.

Serial number of strata	Area (ha)	Tree species	Source
1	14,377	Birch	Forest second class investigation issued by Inner Mongolia autonomous region forestry survey and design institute
2	28,790	Larch	
Total	**43,167**		

The implementation of the project activity includes the conversion from logged to protected forests in the parcels mentioned above. After the activity, trees could be avoided to be logged and then the carbon stocks could be increased. Therefore, net GHG emission reductions/removals resulting from the implementation of IFM projects aimed at the protection of forests that would be logged in the absence of carbon finance could be earned by the project activity.

1.9 Project Location

The project is located in Wu'erqihan Town, Yakeshi City, Inner Mongollia Autonomous Region of P.R.China. The geo-coordinate range of the project proponent is 121°12'25"E~122°50'43"E and 49°15'04"N~49°58'30"N. There are 3,491 subcompartments spreading over Kukou department, Meitian department, Wushijiu department, Moguai department, Bolatu department, Wulikeqi department, Mendeli department, Kelihe department, Muyang department, Wenkutu Department, Ergenhe department , Nemen department , Xiriteqi department of China Inner Mongolia Forest Industry Group Wu'erqihan Forest Industry Co., Ltd.

The schematic diagram of the location of the project is shown in figure 1 below:

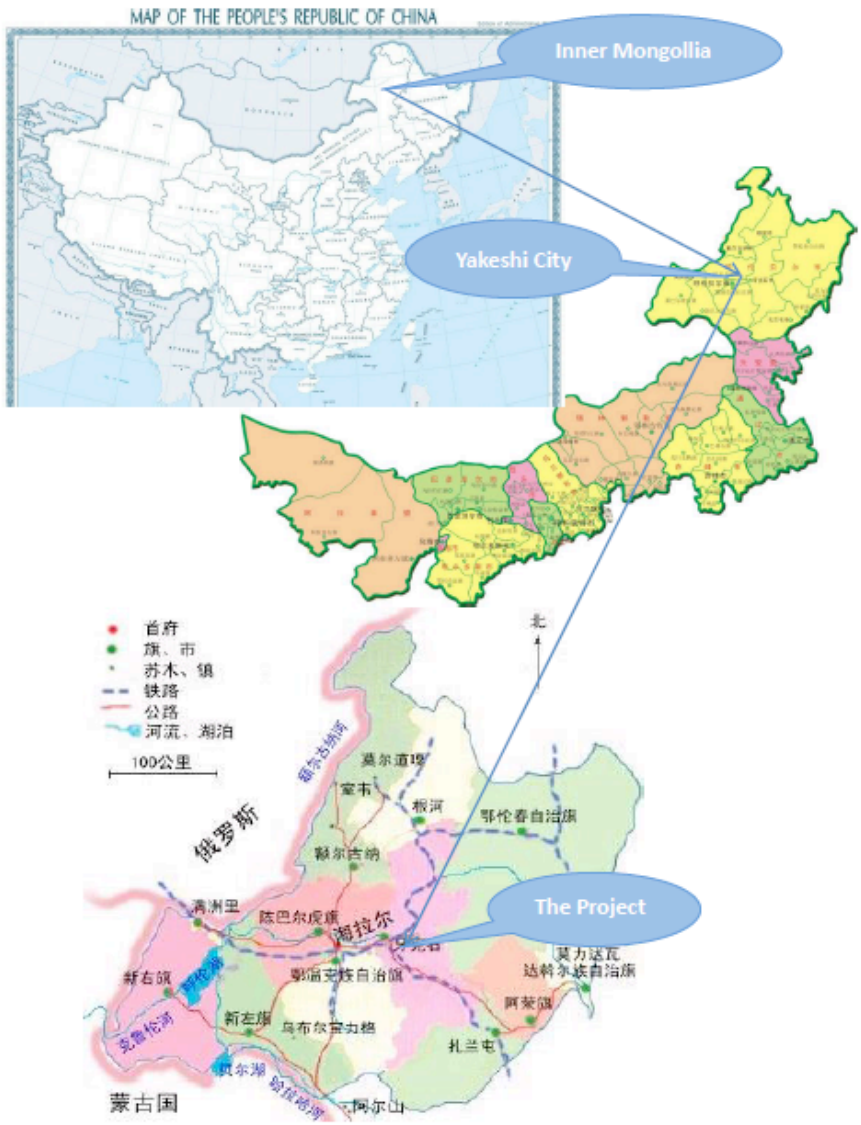


Figure 1: The project location

1.10 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.

1.11 Compliance with Laws, Statutes and Other Regulatory Frameworks

The project activity is in line with the Forest Law of People's Republic of China and Inner Mongolia Autonomous Region ecological public welfare forest management approach.

1.12 Ownership and Other Programs

1.12.1 Project Ownership

China Inner Mongolia Forest Industry Group Wu'erqihan Forest Industry Co., Ltd. (hereafter "the project proponent"), established in June 1998. The project proponent has the ownership and legal right of the forests and carbon sink credit of this project.

1.12.2 Emissions Trading Programs and Other Binding Limits

N/A

1.12.3 Other Forms of Environmental Credit

The project has neither intends to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program, nor any such credit has been or will be cancelled from the relevant program.

1.12.4 Participation under Other GHG Programs

The project has not been registered, or is seeking registration under any other GHG programs.

1.12.5 Projects Rejected by Other GHG Programs

The project has not been rejected by any other GHG programs.

1.13 Additional Information Relevant to the Project

Eligibility Criteria

N/A

Leakage Management

N/A

Commercially Sensitive Information

There are no commercially sensitive information been excluded from the public version of the project description.

Sustainable Development

As one of the most precious ecological resources, forest is the key to biodiversity and all life forms. The protection of local forest will enrich the biodiversity and provide more opportunity for adaptive response to natural challenges and economic development (e.g. climate change). The project activity will result in significant carbon sequestration and contribute to the environment (e.g. biodiversity conservation and soil erosion control), thus contribute to sustainable development.

Further Information

There is no additional relevant legislative, technical, economic, sectoral, social, environmental, geographic, site-specific and/or temporal information that may have a bearing on the eligibility of the project, the net GHG emission reductions or removals, or the quantification of the project's net GHG emission reductions or removals.

2 APPLICATION OF METHODOLOGY

2.1 Title and Reference of Methodology

VM0010 version 1.3: Methodology for Improved Forest Management: Conversion of Logged to Protected Forest

This methodology 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*

2.2 Applicability of Methodology

According to VM0010 version 1.3, Projects must fall within the AFOLU project category "IFM Logged to Protected Forest" as defined in the most recent version of the VCS AFOLU Guidance document. Therefore, specific conditions which can be applicable to the methodology are shown below:

- *Forest management in the baseline scenario must be planned timber harvest;*

  There is a planned timber harvest before the conversion of Logged to Protected Forest as the baseline scenario.

- *Under the project scenario, forest use is limited to activities that do not result in commercial timber harvest or forest degradation;*

  Under the project scenario, there is no forest use for commercial timber harvest or forest degradation. Only forest tending and managing are allowed in the timber harvest plan, which has been strictly carried out by the project proponent.

- *Planned timber harvest must be estimated using forest inventory methods that determine allowable offtake as volume of timber (m^3 ha^{-1});*

  There are regular forest inventory taken by Inner Mongolia autonomous region forestry survey and design institute who is qualified, experienced for the forestry investigation. Then local forestry bureau uses these data, based mainly on the stock volumeto estimate the planned timber harvest and then to determine allowable offtake as volume of timber (m^3 ha^{-1})

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

  The boundaries of the forest land could be clearly defined and documented through the maps and the forest inventory data. The location of forest is measured by GPS and draw map, then edit in GIS. Both the forest map and forest second class investigation will be monitored periodically by the government according to the local laws and regulations.

- *Baseline scenario cannot include conversion to managed plantations;*

  According to the previously issued timber harvest plan, the project baseline scenario is planned timber harvest within the project area, which doesn't include conversion to managed plantations.

- *Baseline scenario, project scenario and project case cannot include wetland or peatland*

  The project baseline scenario, project scenario and project case don't include wetland or peatland.

- *All applicability conditions of VCS and CDM tools used in conjunction with this methodology must be met.*

The project meets all applicability conditions of VCS and CDM tools used in conjunction with this methodology.

The applicability conditions of Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities are:

a) AFOLU activities the same or similar to the proposed project activity on the land within the proposed project boundary performed with or without being registered as the VCS AFOLU project shall not lead to violation of any applicable law even if the law is not enforced;

Yes, all projects are in conformity with law.

b) The use of this tool to determine additionality requires the baseline methodology to provide for a stepwise approach justifying the determination of the most plausible baseline scenario. Project proponent(s) proposing new baseline methodologies shall ensure consistency between the determination of a baseline scenario and the determination of additionality of a project activity.

Yes, the baseline methodology uses a stepwise approach justifying the determination of the most plausible baseline scenario. And project proponent proposing new baseline methodologies ensure consistency between the determination of a baseline scenario and the determination of additionality of a project activity.

2.3 Project Boundary

2.3.1 Geographical Boundaries

When describing physical project boundaries, the information is shown in Figure 1 above. The details of the subcompartments (e.g. area, age, species, stock volume and location) are shown in forest second class investigation as appendix submitted to DOE.

The geographic boundaries of the project activity are fixed and thus do not change over the project lifetime.

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

2.3.2 Temporal Boundaries

The following temporal boundaries shall be defined:

The temporal boundaries are defined by the project start date and length of the project crediting period

According to VCS standard version 3.7, the start date of the project activity is 01/01/2013. The length of the project crediting period is 30 years.

The minimum duration of a monitoring period is one year and the maximum duration is 10 years.

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

2.3.3 Carbon Pools

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

2.3.4 Greenhouse Gases

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 the23rdsessionoftheboard: 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

2.4 Baseline Scenario

2.4.1 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 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.

2.4.2 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.

Box 1. Timber Harvest Plan

The description of harvesting in the form of a timber harvest plan forms the basis of the baseline scenario for greenhouse gas accounting. The timber harvest plan describes the harvest of timber products: a) reference the forest volume inventory (see Section 8.1.1 – parameter $V_{j,i\|BSL}$) to identify the relative number of trees per hectare potentially available for harvest by

species in each stratum;

b) demarcate all non-harvest areas within the forest based on legally required exclusions for environmental features such as slope, swamp areas or conservation buffers;

c) divide the harvestable forest into annual operating areas (referred to throughout this methodology as land parcels) using common practice;

d) include a design and presentation of the forestry infrastructure to harvest, skid/haul, store and move harvested timber products from the land parcels to downstream processing or market entry points. Where the project proponent accounts for emissions from forestry infrastructure, the design and presentation must include all forest roads, skidtrails and log landings that would be established under the baseline scenario as a georeferenced layer (shapefile or equivalent), and must list necessary harvest and transport machinery.

e) the timber harvest plan must follow local best practice for timber harvest practices, including planning of roads, skidtrails and log landings-and the timber resource volume and extraction quotas defined in any legal requirements.

For the purpose of estimating the net annual changes in carbon stocks resulting from planned timber harvest in the baseline scenario a detailed planned timber harvesting schedule will be developed from the timber harvest plan, setting out details of harvest and forestry infrastructure establishment for each land parcel in the project area in terms of the following:

a) the species to be harvested;

b) the year (1,2,3...) in which timber harvest and/or forestry infrastructure establishment of each land parcel is scheduled to occur;

c) the number of years each land parcel is in a post-harvest and/or forestry infrastructure establishment 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 (clearfelling, specie/stratum-selective logging, area-selective logging);

f) the fraction of merchantable timber volume from clearing of forest roads, skidtrails and log landings that is to be processed into wood products ($F_{V,INF,HWP}$). Based on this fraction, as well as forest inventory and forestry infrastructure data, $V_{EX,INF,j,i|BSL}$ and $V_{notEX,INF,j,i|BSL}$ (see points 2 and 3 below) will be calculated.

g) technical specifications for the categories of wood products to be harvested; and

h) 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.

The planned timber harvest schedule is determined ex ante to reflect the timber harvesting plan as stipulated in the legal right to harvest. The planned timber harvesting schedule will be developed for the Project Area to include all land parcels within the project boundary for the proposed IFM activity.

The output of the timber harvest plan and timber harvesting schedule must be:

1) The mean extracted volume of extracted merchantable timber per unit area by species in each stratum in each year ($V_{EX,j,i|BSL}$).

2) Where the project proponent accounts for forestry infrastructure, the mean volume of merchantable timber extracted for wood processing that is harvested during the process of forestry infrastructure establishment per unit area by species in each stratum in each year ($V_{EX,INF,j,i|BSL}$).

3) Where the project proponent accounts for forestry infrastructure, the mean volume of merchantable timber that is cleared during the process of forestry infrastructure establishment and NOT extracted for wood processing per unit area by species in each stratum in each year ($V_{notEX,INF,j,i|BSL}$).

The planned timber harvesting schedule will be submitted by the project proponent as part of the project documents.

The timber harvest and management plan describes the harvest of timber products and includes:

<table>
<tr><th>Demands</th><th>The project activity</th></tr>
<tr><td>a) reference the forest volume inventory (see Section 8.1.1 – parameter $V_{j,i|BSL}$) to identify the relative number of trees per hectare potentially available for harvest by species in each stratum;</td><td>According to the forest volume inventroy, the $V_{j,i|BSL}$ is listed as follows:
<table>
<tr><th>Dominant Species</th><th>Area(ha)</th><th>Volume (m^3)</th><th>$V_{j,i|BSL}$ (m^3/ha)</th></tr>
<tr><td>Birch</td><td>14,377</td><td>1919353</td><td>133.50</td></tr>
<tr><td>Larch</td><td>28,790</td><td>4515752</td><td>156.85</td></tr>
</table></td></tr>
<tr><td>b) demarcate all non-harvest areas within the forest based on legally required exclusions for environmental features such as slope, swamp areas or conservation buffers;</td><td>The project area only includes commercial forests, the ecological forests are excluded from the project boundary. Therefore, the legally required exclusions for environmental features such as slope, swamp areas or conservation buffer are obviously non-harvest areas, which are also excluded from the project boundary.</td></tr>
</table>

c) divide the harvestable forest into annual operating areas (referred to throughout this methodology as land parcels) using common practice;	Yes, the harvestable forests are listed into annual operating areas using clear felling. The timber harvest plan is announced by Wu'erqihan Forestry Bureau in 2012 is a long-term plan of 30 years.
d) include a design and presentation of the forestry infrastructure to harvest, skid/haul, store and move harvested timber products from the land parcels to downstream processing or market entry points. Where the project proponent accounts for emissions from forestry infrastructure, the design and presentation must include all forest roads, skidtrails and log landings that would be established under the baseline scenario as a georeferenced layer (shapefile or equivalent), and must list necessary harvest and transport machinery.	Because the emission from forestry infrastructure is hard to calculate, and if it is accounted in the baseline scenario, the total emission reduction will be greater. Considering the cost effectiveness and conservative, the project proponent didn't account for emission from from forestry infrastructure.
e) the timber harvest plan must follow local best practice for timber harvest practices, including planning of roads, skidtrails and log landings-and the timber resource volume and extraction quotas defined in any legal requirements.	The timber harvest plan has followed local best practice for timber harvest practices. The planning of roads, skidtrails and log landings meet the related national regulations and standard. The timber resource volume and extraction quota is defined according to forest second investigation data, which comply with the legal requirements.

The timber harvest schedule：

Demands	The project activity
a) the species to be harvested;	The species within the project area are Birch and Larch.
b) the year (1,2,3...) in which timber harvest and/or forestry infrastructure establishment of each land parcel is scheduled to occur;	The harvest plan has demonstrated the year in which timber harvest is scheduled to occur. The forestry infrastructures of departments were established when the company was founded, so the timber harvest schedule doesn't include this part.
c) the number of years each land parcel is in a post-harvest and/or forestry infrastructure establishment state during the project crediting period;	According to the timber harvest plan, the land parcel will be regenerated after timber harvest occurred, the post-harvest state during the project crediting period will be not more than a year.
d) the maximum and minimum diameters at breast height (DBH), at stump and at top for	There is no specific requirement for the maximum and minimum diameters at breast

tree harvesting;	height (DBH), at stump and at top for tree harvesting, which is not applicable in China.
e) the planned harvesting regime (clearfelling, specie/stratum-selective logging, area-selective logging);	The planned harvesting regime is clearfelling for the project.
f) the fraction of merchantable timber volume from clearing of forest roads, skidtrails and log landings that is to be processed into wood products ($F_{V,INF,HWP}$). Based on this fraction, as well as forest inventory and forestry infrastructure data, $V_{EX,INF,j,i\|BSL}$ and $V_{notEX,INF,j,i\|BSL}$ (see points 2 and 3 below) will be calculated.	The fraction of merchantable timber volume from clearing of forest roads, skidtrails and log landings that is to be processed into wood products is very small and hard to calculate precisely, so we didn't take the $V_{EX,INF,j,i\|BSL}$ and $V_{notEX,INF,j,i\|BSL}$ into account for calculate the baseline scenario emission. As this is conservative for emission reduction of the project, so it is reasonable.
g) technical specifications for the categories of wood products to be harvested; and	There is no technical specifications for the categories of the wood products, they will be determined by the requirements of the customers
h) 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.	The wood products of the project is only sawnwood, there is no others such as wood-based panels, other industrial roundwood, paper and paper board, etc.

2.4.3 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 as appendix submitted to DOE.

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.

Table 2 shows the 2 strata specified based on the tree species.

Table 2: Tree strata

Serial number of strata	Area (ha)	Tree species	Source
1	14,377	Birch	Forest second class investigation issued by Inner Mongolia autonomous region forestry survey and design institute
2	28,790	Larch	
Total	**43,167**		

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 following four steps are applied for the project:

2.5.1 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, *Inner Mongolia Autonomous Region* ecological public welfare forest management approach[1]. 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.

[1] http://www.nmg.gov.cn/xxgkml/zzqzf/gkml/201509/t20150915_494403.html

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):

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	Birch Price	RMB/m^3	900	0	Financial statement
2	Larch Price	RMB/m^3	750	0	
3	Other timber product from tending and managing instead of commercial harvest	RMB/m^3	313	313	
Extracted Volume					
1	Birch	m^3	1919353	0	Timber Harvest Plan
2	Larch	m^3	4515752	0	
3	Other timber product from tending and managing instead of	m^3/year	17000	17000	

	commercial harvest				
4	Total Area	Mu	647505	647505	
Cost					
1	A/R cost	RMB/Mu	300	0	Financial statement
2	Harvest cost	RMB/m^3	180	0	
3	Management Fee	RMB/Mu	120	120	
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 ¥54,040*10^4 Yuan with the discount rate of 8%. However, the NPV under the scenario of protected forest is¥-16,815*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 ¥-9,711*10^4 Yuan. With revenue from VCS at the assumed price level, the project would be more financially attractive. Table 3 shows the comparison of the NPV between project and baseline scenario.

Table 3: Comparison of NPV at different scenarios

	NPV (10^4 Yuan)
Scenario of Logging	¥54,040
Scenario of protected	¥-16,815

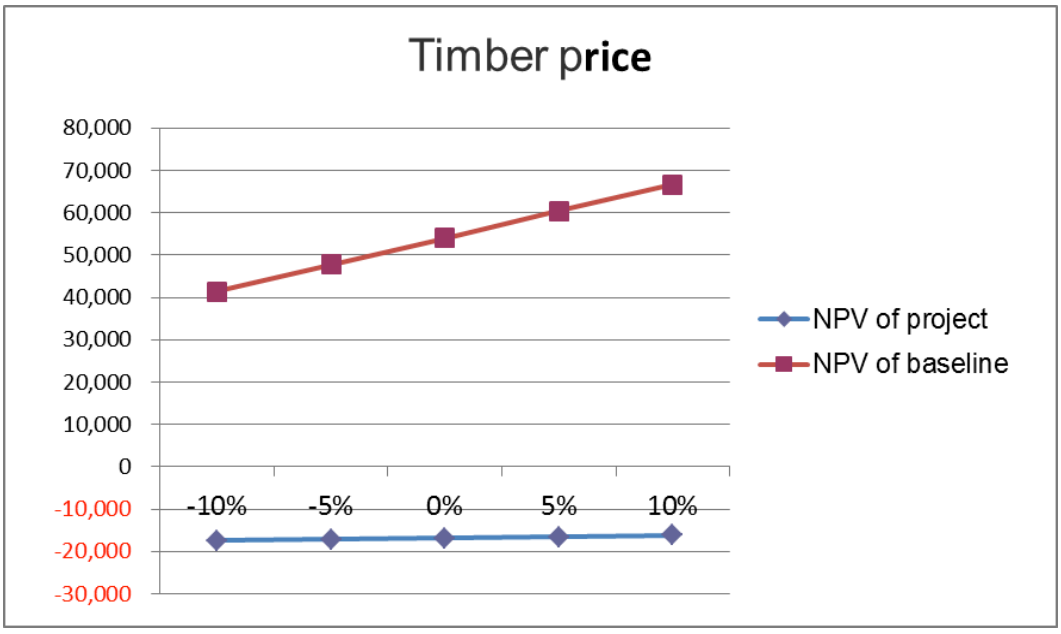
Sub-step 2d: Sensitivity analysis

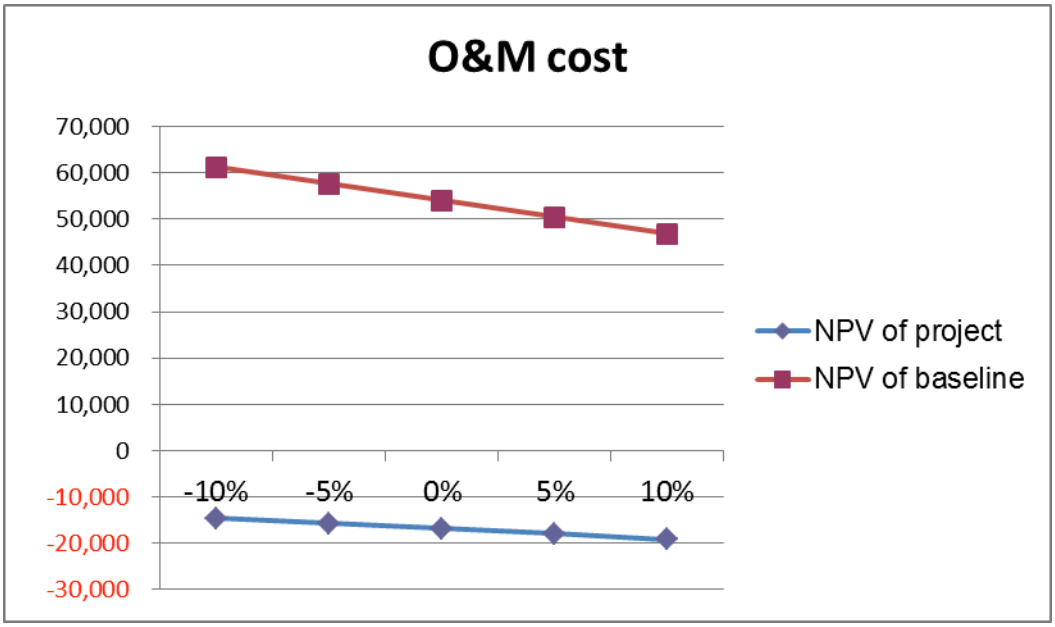
The objective of the sensitivity analysis is to show whether the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumptions. The investment analysis provides a valid argument in favour of additionality only if it consistently supports (for a realistic 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 Price of the trees, 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 4 and figure 2 below:

Table 4: NPV comparison sensitivity analysis of the project

Key parameters	NPV of project scenario (10^4 Yuan)					NPV of baseline scenario (10^4 Yuan)				
	-10%	-5%	0%	5%	10%	-10%	-5%	0%	5%	10%
Price of the trees	41,432	47,736	54,040	60,345	66,649	-17,414	-17,115	-16,815	-16,516	-16,216
O&M cost	61,245	57,643	54,040	50,438	46,836	-14,535	-15,675	-16,815	-17,956	-19,096
Volume of the extracted trees	59,896	56,968	54,040	51,112	48,185	-17,414	-17,115	-16,815	-16,516	-16,216





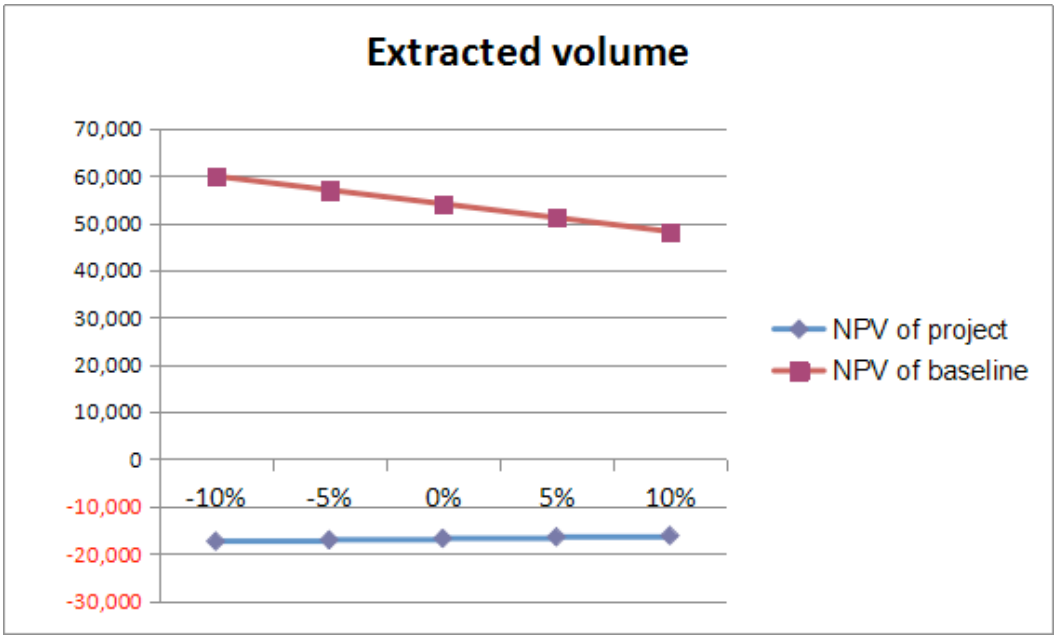


Figure 2: Sensitivity analysis of the project

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 both the commercial harvest and timber products derived from tending and managing. The latter covers a very small fraction. Under the project scenario, all the commercial harvest has been cancelled and only tending and managing is allowed, the only revenue of the project scenario is the very little income from the selling of the timber products from tending and managing, which remains the same amounts as the baseline scenario. It is obvious that the revenue of the project is only a small part of 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.

In order to show the opportunity of the NPV under protected scenario exceeding the baseline scenario is very little, the analysis of critical assumption is conducted as below. That is, for the three parameters, to what extent, the NPV of the project scenario can reach to that of the baseline scenario.

Parameters	Range Extent (When the NPV of the project scenario reached to the baseline scenario)
Timber price	1182.85%
O&M cost	-310.69%
Extracted Volume	1182.85%

1) Timber price

It is assumed that only when the timber product price for tending and managing increased 1182.85%, the nominal NPV of the project scenario could reach to $54,040*10^4$Yuan. Since the timber price for the project scenario and the baseline scenario remains the same. Therefore, the project scenario will not become equal to the baseline scenario.

2) O&M cost

The NPV of the Project will reach to $54,040*10^4$ Yuan if the O&M cost reduced by 310.69%, and it is obvious that when the O&M cost reduced by 100%, it would become zero, that is impossible to occur for the normal project operating, not even to mention the decrease of 310.69%. In fact, the cost of labor index has increased recently according to the data of National Bureau of Statistics of China[2].

3) Extracted Volume

It is assumed that only when the extracted volume for tending and managing increased 1182.85%, the nominal NPV of the project scenario could reach to $54,040*10^4$ Yuan. As the extracted volume of the project is determined in the timber production plan issued by the forestry authority based on the forest survey, it is also impossible to increase1182.85%. Therefore, it is impossible for the NPV of the project scenario to reach to the baseline scenario within the crediting period.

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).

[2] http://data.stats.gov.cn/easyquery.htm?cn=B01&zb=A0602&sj=2017B

2.5.2 Step 3. Barrier analysis

Not applicable.

2.5.3 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 climate varies considerably from province to province depending on the local conditions. The Project is located in Inner Mongolia Autonomous Region. However, the geographic and geomorphic conditions are totally different in the whole province. Therefore, only stated-owned activities in Inner Mongolia Autonomous Region are included in the analysis.

By searching the VCS, CDM websites and so on, we found that in Inner Mongolia Autonomous Region, the Inner Mongolia Chao'er Improved Forest Management Project has been registered as VCS project[3] and the Inner Mongolia Keyihe IFM (conversion of logged to protected forest) Project is under validation[4].And there is no similar project without applying the VCS, CDM[5] or other voluntary emission reduction project[6].

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

2.6 Methodology Deviations

N/A

3 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

3.1 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

[3] http://www.vcsprojectdatabase.org/#/project_details/1529
[4] http://www.vcsprojectdatabase.org/#/pipeline_details/PL1718
[5] http://cdm.unfccc.int/
[6] http://cdm.ccchina.gov.cn/ccer.aspx

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, so we exclude those from baseline emissions modelling considered of cost. 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:

3.1.1 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 2012 by Inner Mongolia autonomous region forestry survey and design institute who is qualified, experienced for the forestry investigation.. The project involves 2 strata and 3,491 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:

错误! 未找到引用源。	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:

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

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.

3.1.2 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 $C_{HB,j,i|BSL}$ as calculated in section 3.1.1.

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.

3.1.3 Calculation of baseline carbon sequestered in wood products

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

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

(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

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

(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 $tC \cdot ha^{-1}$;
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, $tC \cdot ha^{-1}$;
$C_{WP,i|BSL}$	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 $tC \cdot ha^{-1}$;
OFk	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

3.1.4 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

3.1.5 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;
$\Delta C_{RG,i,p\backslash BSL}$	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:

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

(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}.

3.2 Project Emissions

3.2.1 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_2e.

3.2.1.1 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.

3.2.1.2 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.

3.2.1.3 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:

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

(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.

3.2.1.4 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.

3.2.1.5 Determining Mean Carbon Stocks

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

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

(19)

Where:

$C_{AB,i,t|PRJ}$	mean aboveground biomass carbon stock of trees in stratum i at time t, $tC \cdot ha^{-1}$;
$C_{AB,i,t,sp|PRJ}$	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.

3.2.1.6 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:

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

(20)

Where:

$\Delta C_{AB,t|PRJ}$	annual carbon stock change in aboveground biomass of trees in year t, $tCO_2e\ yr^{-1}$;
$C_{AB,i,t|PRJ}$	mean aboveground biomass carbon stock of trees in stratum i at time t, $tC \cdot ha^{-1}$;

$A_{,i}$	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, $tCO_2e\ tC^{-1}$.

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.

3.2.2 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

3.2.2.1 Natural disturbance

3.2.2.1a 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_2e ;
$A_{burn,i,t}$	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), $tCO_2e\ tCH_4^{-1}$;
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.

3.2.2.1b 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_2e ;
$A_{dist,i,t}$	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, $tCO_2e\ tC^{-1}$;
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

3.2.2.2 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_2e;
$A_{DIST\_IL,}i$	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_2e;
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

3.2.3 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_2e
$\Delta C_{DIST,t\|PRJ}$	net greenhouse gas emissions resulting from non-fire natural disturbance in year t, tCO_2e
$\Delta C_{DIST\_IL,t\|PRJ}$	Net carbon stock changes as a result of illegal logging at time t, tCO_2e
$\Delta C_{AB,t\|PRJ}$	annual carbon stock change in aboveground biomass of trees in year t, $tCO_2e \cdot yr^{-1}$; 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_2e
$\Delta C_{NET,t\|PRJ}$	net greenhouse gas emissions in the project scenario in year t, tCO_2e; and
t	1, 2, 3, t* years elapsed since start of the project activity.

3.3 Leakage

3.3.1 Activity shifting leakage

There may be no leakage due to activity shifting. The project does not involve in the activity shifting leakage due to the following reasons:

In China, the forest timber harvest is strictly controlled by the authority. The stated council issued the annual timber harvest volume limit to each province at the beginning of every national 5-year plan. And the provincial forestry authority issued the timber harvest approval and restrictions to its subordinate based on its limit. And its subordinate forestry authority did the same way for the timber harvest and transportation approval as its superior issued.

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.

Definitely, in China, the timber harvest is tightly controlled by the forestry authority, the illegal logging is severely punished.

Therefore, for the project activity, even if the project proponent has more than one forest parcels, the timber harvest limit is planned in advance by the forestry authority; they have no right to harvest more in other parcels outside the project activity.

3.3.2 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_2e;
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_2e.

The leakage factor (see Box 2) 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)[7], 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 is 59.9*10^4 m^3, accounting 0.24% 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.

3.4 Net GHG Emission Reductions and Removals

3.4.1 Net Project Greenhouse Gas Emission Reductions

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_2e
$GHG_{NET\|BSL,t*}$	net greenhouse gas emissions in the baseline scenario in the year t* since the start of the project activity, tCO_2e
$GHG_{NET\|PRJ,t*}$	net greenhouse gas emissions in the project scenario in the year t* since the start of the project activity, tCO_2e; 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_2e

3.4.2 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.

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

3.4.2.1 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, $tCO_2e \cdot year^{-1}$; and
$U_{total\|LtPF}$	total uncertainty for LtPF Project, dimensionless.

3.4.2.2 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_2e;
$Credits_{total.t2\|LtPF}$	net anthroprogenic greenhouse gas removals by sinks, as estimated for $t^*=t_2$ in tCO_2e; and
$Bu_{\|IFM-VCS}$	total number of credits withheld in VCS buffer account

3.4.3 The calculation process

3.4.3.1 The calculation process of baseline emission

Therefore, for the calculation of $GHG_{NET|BSL}$, according to section 3.1, the process is shown below:

Table 5: Basic Parameter of Baseline Scenario

Basic Parameter	Value	Data Unit	Data Source

Total Area of Stratum	Birch	14,377	ha	Timber harvest plan issued by Inner Mongolia Wu'erqihan Forestry Bureau, and calculated from Forest second class investigation issued by Inner Mongolia autonomous region forestry survey and design institute
	Larch	28,790	ha	
$V_{j,l,BSL}$	Birch	133.50	m^3/ha	
	Larch	156.85	m^3/ha	
$V_{EX,j,l\|BSL,y}$	Refer to ER sheet		m^3/ha	
$A_{i,p,y}$	Refer to ER sheet		ha	
D_j	Birch	0.541	t d.m. m^{-3}	"Land Use Change and Forestry GHG Inventory(2013)" of "Second National Information Notification on China Climate Change"
	Larch	0.490	t d.m. m^{-3}	
BEF	Birch	1.424	dimensionless	
	Larch	1.416	dimensionless	
$BCEF_R$	Birch	0.770	t d.m. m^{-3}	calculated by BEF and D
	Larch	0.694	t d.m. m^{-3}	
CF_j	Birch/Larch	0.5	tC t d.m.$^{-1}$	VM0010 version 1.3
WW	Birch/Larch	24%	kg kg^{-1}	
SLF	Birch/Larch	0.12	kg kg^{-1}	
OF	Birch/Larch	0.62	kg kg^{-1}	
Regrowth rate in baseline scenario	Birch	1.56	$m^3.ha^{-1}.yr^{-1}$	The statement on the growth volume in Wu'erqihan issued by Wu'erqihan forest bureau
	Larch	2.54	$m^3.ha^{-1}.yr^{-1}$	
Ongoing growth rate in project scenario	Birch	2.80	$m^3.ha^{-1}.yr^{-1}$	
	Larch	4.68	$m^3.ha^{-1}.yr^{-1}$	

Table 6: The baseline emission during the crediting period

Year	$\Delta C_{NET\|BSL}$	$GHG_{NET\|BSL}$
01/01/2013-31/12/2013	4,759	17,449
01/01/2014-31/12/2014	40,813	149,647
01/01/2015-31/12/2015	8,369	30,686
01/01/2016-31/12/2016	30,138	110,506
01/01/2017-31/12/2017	24,454	89,664
01/01/2018-31/12/2018	26,335	96,561
01/01/2019-31/12/2019	208,606	764,888
01/01/2020-31/12/2020	37,188	136,356
01/01/2021-31/12/2021	50,854	186,464
01/01/2022-31/12/2022	57,854	212,131
01/01/2023-31/12/2023	62,292	228,404
01/01/2024-31/12/2024	79,934	293,091

01/01/2025-31/12/2025	89,875	329,541
01/01/2026-31/12/2026	82,559	302,716
01/01/2027-31/12/2027	60,513	221,881
01/01/2028-31/12/2028	56,529	207,273
01/01/2029-31/12/2029	76,763	281,464
01/01/2030-31/12/2030	44,488	163,122
01/01/2031-31/12/2031	41,791	153,233
01/01/2032-31/12/2032	29,493	108,141
01/01/2033-31/12/2033	34,738	127,372
01/01/2034-31/12/2034	37,402	137,140
01/01/2035-31/12/2035	17,177	62,982
01/01/2036-31/12/2036	14,593	53,507
01/01/2037-31/12/2037	2,328	8,536
01/01/2038-31/12/2038	-3,979	-14,589
01/01/2039-31/12/2039	3,088	11,322
01/01/2040-31/12/2040	3,973	14,567
01/01/2041-31/12/2041	-10,304	-37,781
01/01/2042-31/12/2042	-3,007	-11,025
Total	1,209,616	4,435,249
Average	40,320	147,841

3.4.3.2 The calculation of project emission

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

Table 7: Basic Parameter of Project Scenario

Basic Parameter		Value	Data Unit	Data Source
Total Area of Stratum	Birch	14,377	ha	Timber harvest plan
	Larch	28,790	ha	
D_j	Birch	0.541	t d.m. m^{-3}	"Land Use Change and Forestry GHG Inventory(2013)" of "Second National Information Notification on China Climate Change"
	Larch	0.490	t d.m. m^{-3}	
BEF	Birch	1.424	dimensionless	
	Larch	1.416	dimensionless	
$BCEF_R$	Birch	0.770	t d.m. m^{-3}	calculated by BEF and D
	Larch	0.694	t d.m. m^{-3}	
CF_j	Birch/Larch	0.5	tC t d.m.$^{-1}$	VM0010 version 1.3
Ongoing growth rate	Birch	2.80	$m^3.ha^{-1}.yr^{-1}$	The statement on the growth

in project scenario	Larch	4.68	$m^3.ha^{-1}.yr^{-1}$	volume in Wu'erqihan issued by Wu'erqihan forest bureau

Because the forest inventory conducted by Inner Mongolia autonomous region forestry survey and design institute 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 project owner 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.

Table 8: The project emission during the crediting period

Year	$\Delta C_{AB,t\|PRJ}$	$\Delta C_{DIST\ FR,t\|PRJ}$	$\Delta C_{DIST,t\|PRJ}$	$\Delta C_{DIST\ IL,t\|PRJ}$	$\Delta C_{NET,t\|PRJ}$
01/01/2013-31/12/2013	228,246	0	0	0	-228,246
01/01/2014-31/12/2014	228,246	0	0	0	-228,246
01/01/2015-31/12/2015	228,246	0	0	0	-228,246
01/01/2016-31/12/2016	228,246	0	0	0	-228,246
01/01/2017-31/12/2017	228,246	0	0	0	-228,246
01/01/2018-31/12/2018	228,246	0	0	0	-228,246
01/01/2019-31/12/2019	228,246	0	0	0	-228,246
01/01/2020-31/12/2020	228,246	0	0	0	-228,246
01/01/2021-31/12/2021	228,246	0	0	0	-228,246
01/01/2022-31/12/2022	228,246	0	0	0	-228,246
01/01/2023-31/12/2023	228,246	0	0	0	-228,246
01/01/2024-31/12/2024	228,246	0	0	0	-228,246
01/01/2025-31/12/2025	228,246	0	0	0	-228,246
01/01/2026-31/12/2026	228,246	0	0	0	-228,246
01/01/2027-31/12/2027	228,246	0	0	0	-228,246
01/01/2028-31/12/2028	228,246	0	0	0	-228,246

01/01/2029-31/12/2029	228,246	0	0	0	-228,246
01/01/2030-31/12/2030	228,246	0	0	0	-228,246
01/01/2031-31/12/2031	228,246	0	0	0	-228,246
01/01/2032-31/12/2032	228,246	0	0	0	-228,246
01/01/2033-31/12/2033	228,246	0	0	0	-228,246
01/01/2034-31/12/2034	228,246	0	0	0	-228,246
01/01/2035-31/12/2035	228,246	0	0	0	-228,246
01/01/2036-31/12/2036	228,246	0	0	0	-228,246
01/01/2037-31/12/2037	228,246	0	0	0	-228,246
01/01/2038-31/12/2038	228,246	0	0	0	-228,246
01/01/2039-31/12/2039	228,246	0	0	0	-228,246
01/01/2040-31/12/2040	228,246	0	0	0	-228,246
01/01/2041-31/12/2041	228,246	0	0	0	-228,246
01/01/2042-31/12/2042	228,246	0	0	0	-228,246
Total	6,847,380	0	0	0	-6,847,380
Average	228,246	0	0	0	-228,246

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*[8], 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:

[8] IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories, Chapter 6, Quantifying Uncertainties in Practice .

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) Uncertainty of expansion factors:

The Sample size, Sample mean and Standard 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 Birch:

Uncertainty of BCEF-Birch		5.95%	
Uncertainty of BEF-Birch	5.89%	Uncertainty of D-Birch	0.84%
BEF		D	
Sample size	55	Sample size	62
Sample mean (BEF)	1.180	Sample mean (D)	0.541
Standard deviation	0.257	Standard deviation	0.018
Average error	0.035	Average error	0.002
Confidence level	0.950	Confidence level	0.950
Degree of freedom	54	Degree of freedom	61
Two-sided Student's t-value	2.005	Two-sided Student's t-value	2.000
Allowable error	0.069	Allowable error	0.005
Lower confidence limit	1.111	Lower confidence limit	0.536
Upper confidence limit	1.249	Upper confidence limit	0.546
Confidence interval	0.069	Confidence interval	0.005

For Larch:

Uncertainty of BCEF-Larch		5.76%	
Uncertainty of BEF-Larch	3.16%	Uncertainty of D-Larch	4.81%
BEF		D	
Sample size	321	Sample size	13

Sample mean (BEF)	1.416	Sample mean (D)	0.490
Standard deviation	0.408	Standard deviation	0.039
Average error	0.023	Average error	0.011
Confidence level	0.950	Confidence level	0.950
Degree of freedom	320	Degree of freedom	12
Two-sided Student's t-value	1.967	Two-sided Student's t-value	2.179
Allowable error	0.045	Allowable error	0.024
Lower confidence limit	1.371	Lower confidence limit	0.466
Upper confidence limit	1.461	Upper confidence limit	0.514
Confidence interval	0.045	Confidence interval	0.024

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-Birch	6.14%	Uncertainty of carbon stock-Larch	5.80%
Uncertainty of volumn-Birch	1.51%	Uncertainty of volumn-Larch	0.74%
carbon stock-Birch	1048198.84	carbon stock-Larch	2541564.38
Area(ha)	14377.00	Area(ha)	28790.00
Sample size	1058	Sample size	2433
Sample mean (m3/ha)	189.28	Sample mean (m3/ha)	254.47
Standard deviation	47.53	Standard deviation	47.09
Average error	1.46	Average error	0.95
Confidence level	0.95	Confidence level	0.95
Degree of freedom	1057	Degree of freedom	2432
Two-sided Student's t-value	1.96	Two-sided Student's t-value	1.96
Allowable error	2.87	Allowable error	1.87
Lower confidence limit	186.41	Lower confidence limit	252.59
Upper confidence limit	192.14	Upper confidence limit	256.34
Confidence interval	2.87	Confidence interval	1.87

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 $U_{Birch|BSL}$ and $U_{Larch|BSL}$ are shown below:

Stratum	Parameter	A_{rea}(Ha)	$V_{EX,j,i\|BSL}$ (m3/ha)	BEF	D(tdm/m3)	$BCEF_R$ (tdm/m3)	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
								$U_g=\sqrt{U_b^2+U_e^2}$	$U_h=\sqrt{U_b^2+U_d^2}$	$U_i=\frac{\sqrt{(E_g*U_g)^2+(E_h*U_h)^2}}{(E_g+E_h)}$
Birch	E	14377.00	133.50	1.424	0.541	0.770	0.5	51.42	36.11	15.31
	U	0	1.51%	5.89%	0.84%	5.95%		6.14%	1.73%	3.68%
Larch	E	28790.00	156.85	1.416	0.490	0.694	0.5	54.41	38.43	15.99
	U	0	0.74%	3.16%	4.81%	5.76%		5.80%	4.87%	3.95%

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
				$U_l=U_h$	$U_m=\frac{\sqrt{(E_h*U_h)^2+(E_l*U_l)^2}}{(E_h+E_l)}$		$U_o=U_m$	$U_p=0$	$U_m=\frac{\sqrt{(E_i*U_i)^2+(E_l*U_l)^2+(E_o*U_o)^2}}{(E_i+E_l+E_o)}$
Birch	E	24%	0.12	13.00	23.11	0.62	14.33	2906.13	44312.71
	U			1.73%	1.36%		1.36%		1.49%
Larch	E	24%	0.12	13.83	24.59	0.62	15.25	5685.11	92072.33
	U			4.87%	3.80%		3.80%		2.42%

Stratum	Parameter	$\Delta C_{NET\|BSL(2\text{-}10)}$(tC)	$\Delta C_{NET\|BSL(11\text{-}20)}$(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%	$U_v=\sqrt{U_e^2+U_t^2}$	$U_m=\frac{\sqrt{(E_q*U_q)^2+(E_r*U_r)^2+(E_s*U_s)^2+(E_v*U_v)^2}}{(E_q+E_r+E_s+E_v)}$
Birch	E	6531.89	2082.14	1.56	1746.29	51180.45
	U	2.01%	1.36%	10.00%	11.64%	1.29%
Larch	E	13422.85	4334.46	2.54	5009.59	104820.05
	U	2.75%	3.80%	10.00%	11.54%	2.03%
					U_{BSL}	1.43%

Therefore, as there are 2 strata in the project activity, the uncertainty across combined strata is calculated with the revised equation below:

$$U_{|BSL} = \frac{\sqrt{(U_{Birch|BSL} \times E_{Birch|BSL})^2 + (U_{Larch|BSL} \times E_{Larch|BSL})^2}}{E_{Birch|BSL} + E_{Larch|BSL}} \quad (34)$$

Where:

$U_{\|BSL}$	Total uncertainty in baseline scenario; %
$U_{Birch\|BSL}$	Uncertainty in baseline scenario in stratum Birch; %;
$U_{Larch\|BSL}$	Uncertainty in baseline scenario in stratum Larch; %;
$E_{Birch\|BSL}$	Sum of net change in carbon stock in the baseline scenario in stratum Birch in the baseline case; t CO_2e
$E_{Larch\|BSL}$	Sum of net change in carbon stock in the baseline scenario in stratum Larch in the baseline case; t CO_2e

After calculation, $U_{|BSL}$ is 1.43% for the baseline scenario.

Uncertainty for the project scenario:

Stratum	Parameter	A_{rea}(Ha)	BEF	D(tdm/m3)	$BCEF_R$ (tdm/m3)	CFj (tc/tdm)	ongoing growth rate (m3/ha/yr)	$\Delta C_{AB,t\|PRJ}$(tCO2)
		a	b	c	d=b*c	e	f	g=f*a*d*e*44/12
							U_f=10%	$U_g = \sqrt{U_d^2 + U_f^2}$
Birch	E	14377.00	1.424	0.541	0.770	0.5	2.80	56855.83
	U	0	5.89%	0.84%	5.95%		10.00%	11.64%
Larch	E	28790.00	1.416	0.490	0.694	0.5	4.68	171391.11
	U	0	3.16%	4.81%	5.76%		10.00%	11.54%
							U_{PRJ}	9.14%

Total uncertainty

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

$$U_{Totall|LtPF} = \sqrt{U^2_{|PRJ} + U^2_{|BSL}} = \sqrt{9.14^2 + 1.43\%^2} = 9.25\% = 0.0925$$

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.

3.4.4 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)
01/01/2013-31/12/2013	17,449	-228,246	0	245,695	191,642
01/01/2014-31/12/2014	149,647	-228,246	0	377,893	294,756
01/01/2015-31/12/2015	30,686	-228,246	0	258,932	201,966
01/01/2016-31/12/2016	110,506	-228,246	0	338,752	264,226
01/01/2017-31/12/2017	89,664	-228,246	0	317,910	247,969
01/01/2018-31/12/2018	96,561	-228,246	0	324,807	253,349
01/01/2019-31/12/2019	764,888	-228,246	0	993,134	774,644
01/01/2020-31/12/2020	136,356	-228,246	0	364,602	284,389
01/01/2021-31/12/2021	186,464	-228,246	0	414,710	323,473
01/01/2022-31/12/2022	212,131	-228,246	0	440,377	343,494
01/01/2023-31/12/2023	228,404	-228,246	0	456,650	356,187

01/01/2024-31/12/2024	293,091	-228,246	0	521,337	406,642
01/01/2025-31/12/2025	329,541	-228,246	0	557,787	435,073
01/01/2026-31/12/2026	302,716	-228,246	0	530,962	414,150
01/01/2027-31/12/2027	221,881	-228,246	0	450,127	351,099
01/01/2028-31/12/2028	207,273	-228,246	0	435,519	339,704
01/01/2029-31/12/2029	281,464	-228,246	0	509,710	397,573
01/01/2030-31/12/2030	163,122	-228,246	0	391,368	305,267
01/01/2031-31/12/2031	153,233	-228,246	0	381,479	297,553
01/01/2032-31/12/2032	108,141	-228,246	0	336,387	262,381
01/01/2033-31/12/2033	127,372	-228,246	0	355,618	277,382
01/01/2034-31/12/2034	137,140	-228,246	0	365,386	285,001
01/01/2035-31/12/2035	62,982	-228,246	0	291,228	227,157
01/01/2036-31/12/2036	53,507	-228,246	0	281,753	219,767
01/01/2037-31/12/2037	8,536	-228,246	0	236,782	184,689
01/01/2038-31/12/2038	-14,589	-228,246	0	213,657	166,652
01/01/2039-31/12/2039	11,322	-228,246	0	239,568	186,863
01/01/2040-31/12/2040	14,567	-228,246	0	242,813	189,394
01/01/2041-31/12/2041	-37,781	-228,246	0	190,465	148,562
01/01/2042-31/12/2042	-11,025	-228,246	0	217,221	169,432
Total	4,435,249	-6,847,380	0	11,282,629	8,800,436

Average	147,841	-228,246	0	376,087	293,347

4 MONITORING

4.1 Data and Parameters 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>Birch</td><td>0.541</td></tr><tr><td>Larch</td><td>0.490</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: Existing local forest type-specific;

<table>
<tr><td></td><td>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>Birch</td><td>0.770</td></tr><tr><td>Larch</td><td>0.694</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).
Default values must be updated whenever new guidelines are produced by the IPCC</td></tr>
</table>

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: **Wood Product Class** / ***OF*** — Boreal / Temperate / Tropical Sawnwood: 0.39 / 0.62 / 0.86 Woodbase panels: 0.62 / 0.86 / 0.98 Other industrial roundwood: 0.86 / 0.98 / 0.99 Paper and paperboard: 0.39 / 0.62 / 0.99
Source of data:	According to VM0010 version 1.3, the default values are chosen.
Value applied:	Parameters / Species / Value OF / Birch/Larch / 0.62 SLF / Birch/Larch / 0.12 WW / Birch/Larch / 24%
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:	According to VM0010 version 1.3, 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:	Birch / 1.56 / $m^3.ha^{-1}.yr^{-1}$ Larch / 2.54 / $m^3.ha^{-1}.yr^{-1}$
Justification of choice of data or description of measurement methods	Method b is applied. The average annual regrowth is confirmed by Inner Mongolia autonomous region forestry survey and design institute based on their expertise.

and procedures applied:	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.

4.2 Data and Parameters Monitored

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	Must be composed of a buffer from all access points (access

measurement methods and procedures to be applied:	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 and procedures to be applied:	The sampling plan must be designed using plots systematically placed over the buffer zone so that they sample at least 3% of the 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	A sampling plan must be designed using multiple sample plots systematically placed across the buffer zone so that they sample at

and procedures to be applied:	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
Source of data	Geodetic coordinates and/or Remote Sensing data and/or legal parcel records
Description of measurement methods and procedures to be applied	The stratum is from the second class forestry inventory
Frequency of monitoring/recording:	Every ten years.
Value applied:	<table><tr><th>Serial number of strata</th><th>Area (ha)</th><th>Tree species</th></tr><tr><td>1</td><td>14,377</td><td>Birch</td></tr><tr><td>2</td><td>28,790</td><td>Larch</td></tr><tr><td>Total</td><td>43,167</td><td></td></tr></table>
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	For the calculation of the baseline and project emissions.
Calculation method:	N/A
Comments	In the baseline scenario strata areas must not change through time. In the project scenario it must be assumed ex-ante that stand 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.

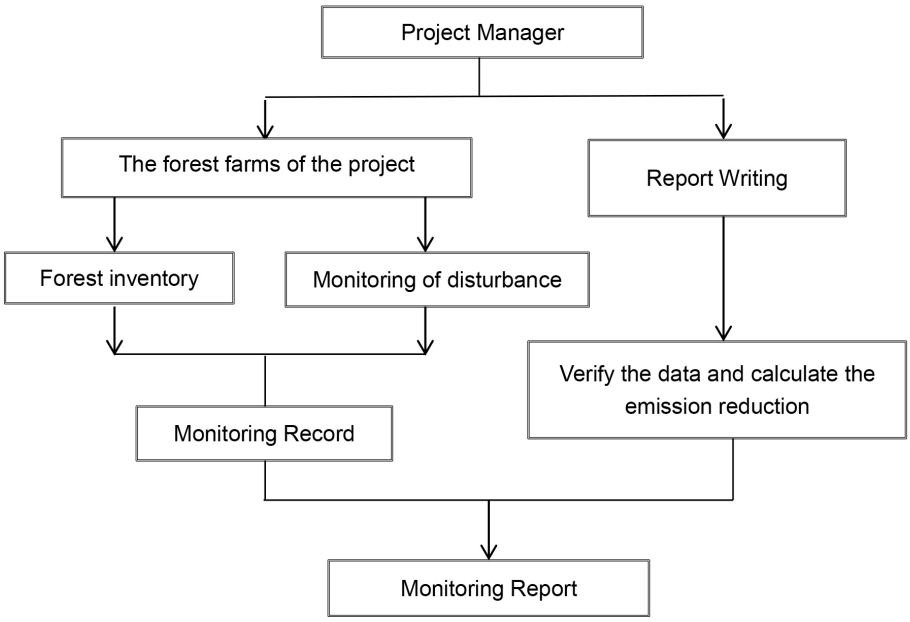
Data / Parameter:	DBH
Data unit:	cm
Description	Diameter at breast height of tree
Source of data	On site measuring on the sample spot.
Description of measurement methods and procedures to be applied	The National Forest Resource Continuous Investigation Technical Regulation issued by the State Forestry 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.

4.3 Monitoring Plan

4.3.1 Scope of monitoring and the monitoring plan

The project proponent and consultant will set up a team together to conduct the monitoring. The team is in charge of collecting, monitoring and verifying the data, while the project manager will

be assisted by the consultant company. The findings should be reported to the project manager and work out a solution. The operational and management structure is as follows:



Monitoring is required to

a) determine changes in forest carbon stocks and greenhouse gas emissions from project activity;

b) confirm project activity; and

c) determine changes in forest carbon stocks and greenhouse gas emissions from disturbance and illegal logging.

In some cases monitoring may also be implemented to update stratification.

The monitoring plan addresses the monitoring of project implementation, the monitoring of actual carbon stock changes from project activity, and estimation of ex-post net carbon stock changes from the conversion of logged to protected forest.

4.3.2 General requirements for monitoring

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.

All electronic data and reports shall also be copied on durable media such as CDs and copies of the CDs are to be stored in multiple locations.

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-CO_2 GHG and corresponding calculation spreadsheets;
- GIS products; and
- Copies of the measuring and monitoring reports.

4.3.3 Monitoring of project implementation

Information must be provided, and recorded in the VCS-PD, to establish that:

- The geographic position of the project boundary is recorded for all areas of land;
- The geographic coordinates of the project boundary (and any stratification inside the boundary) are established, recorded and archived. This will be achieved by field survey (e.g. using GPS) or by using geo-referenced spatial data (e.g. maps, GIS datasets, aerial photography, or geo-referenced remote sensing images);
- Commonly accepted principles of forest inventory and management are implemented;
- 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.
- The project plan, together with a record of the plan as actually implemented during the project, shall be available for validation or verification as appropriate.

4.3.4 Stratification

An ex ante stratification of the project area in the project scenario is developed by project proponents through sampling in the project area according to the species.

Sampling to adjust the number and boundaries of the strata defined ex ante where an update is required 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.

Established strata may also be merged if the reasons for their establishment have disappeared.

4.3.5 Monitoring of actual carbon stock changes

Carbon stocks will be measured according to the stock assessment equations with field sampling based on forest inventory methods. Various sources exist to assist with the design of a verifiable forest field inventory based on best practice for sampling, data management and analysis (Box 3).

In the project area the inventory plan is specified as below:

a) adequate forest stratification, sample size estimation methods and consider uncertainty:

The forest stratification is based on the species, which is adequate according to the methodology. The sample size estimation methods, allocation among strata and uncertainty consideration is according to the "Calculation of the number of sample plots for measurements within A/R CDM project activities" (version 02.1.0) approved by the CDM Executive Board.

b) a sampling framework including sample size, plot size, plot shape and information to determine plot location:

The design of a verifiable forest field inventory based on best practice for sampling, data management and analysis are selected from the Box 3 of the methodology. The sample size estimation methods, allocation among strata and uncertainty consideration is according to the most recent version of the tool for the "Calculation of the number of sample plots for measurements within A/R CDM project activities" (version 02.1.0) approved by the CDM Executive Board.

For the baseline scenario, the calculation process is shown below:

Parameter	Unit	Description
n	dimensionless	Number of sample plots required for estimation of biomass stocks within the project boundary
n_i	dimensionless	Number of sample plots allocated to stratum *i* for estimation of biomass stocks within the project boundary

In the baseline scenario:

n_{BSL} for n and $n_{BSL,i}$ for n_i.

In the project scenario:

N_{PROJ} for n and $n_{PROJ,i}$ for n_i

The sample plot will be 0.04 ha and at least 3 sample plots will be selected in 1 stratum. As the sample size should be less than 100, then the total sample plot area should be less than 4 ha, which is small than 5% of the total project are(43167*5%=2158.3 ha).

So we can conclude that the area sampled will be less than 5% of the project area, which means a small sampling fraction.

Therefore, the following simplified equation can be used for estimating the number of sample plots according to the CDM tool:

$$n = \left(\frac{t_{VAL}}{E}\right)^2 * \left(\sum_i \omega_i * S_i\right)^2 \quad (36)$$

where:

n	Number of sample plots required for estimation of biomass stocks within the project boundary; dimensionless
t_{VAL}	Two-sided Student's *t*-value at infinite degrees of freedom for the required confidence level; dimensionless
E	Acceptable margin of error (i.e. one-half the confidence interval) in estimation of biomass stock within the project boundary; t d.m. (or t d.m. ha^{-1}), i.e. in the units used for S_i
w_i	Relative weight of the area of stratum i (i.e. the area of the stratum i divided by the project area); dimensionless
S_i	Estimated standard deviation of biomass stock in stratum i; t d.m. (or t d.m. ha^{-1})
i	1, 2, 3, … biomass stock estimation strata within the project boundary

After the estimation of total number of sample plots (n), allocation of number of sample plots among strata is calculated as:

$$n_i = n * \frac{\omega_i * S_i}{\sum_i \omega_i * S_i} \quad (37)$$

where:

n_i	Number of sample plots allocated to stratum i; dimensionless
n	Number of sample plots required for estimation of biomass stocks within the project boundary; dimensionless
w_i	Relative weight of the area of stratum i (i.e. the area of the stratum i divided by the project area); dimensionless
S_i	Estimated standard deviation of biomass stock in stratum i; t d.m. (or t d.m. ha^{-1})
i	1, 2, 3, … biomass stock estimation strata within the project boundary

Based on the data of biomass stocks in a carbon pool in the baseline scenario, the estimation of number of sample plots required in shown in table 10 below:

Table 9: The estimation of number of sample plots required

Strata No	Stratum Name	Area (ha)	Mean tonnes C/ha	Standard Deviation (t C/ha)	Plot size (ha)	Wi	$W_i * Si$
Strata 1	Birch	14377.00	72.91	47.53	0.04	0.33	15.83
Strata 2	Larch	28790.00	88.28	47.09	0.04	0.67	31.41

		Number of Plots	
STRATA NO	Stratum Name	Plot Quantity	Rounded Plot Quantity
Total Sample Size		123.95	
Strata 1	Birch	41.54	42
Strata 2	Larch	82.41	83
TOTAL NUMBER OF PLOTS			**125**

* Where the confidence level is 95% as required in the methodology VM0010 version 1.3 and D_f is ∞. Therefore, t_{VAL} is 1.96.

Carbon stock changes over time shall be estimated by taking measurements in plots at each monitoring event. Monitoring events shall take place at intervals of 5, or preferably 3 years. Including monitoring all the parameters needed. Monitoring reports can use such extrapolated parameter values for the determination of net emissions by sources and removals resulting from the project.

The design of the sampling regime will be determined by the number of strata and timber harvest the baseline case.

4.3.6 Conservative approach and uncertainty

Project proponent 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.

5 SAFEGUARDS

5.1 No Net Harm

There is no potential negative environmental or socio-economic impact due to the project.

5.2 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[9]. 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.

5.3 Local Stakeholder Consultation

Questionnaires were distributed by the project proponent to the residents who lives in the community and closely related to the project. The questions aimed to find out their concerns and opinions about the project. The questionnaires covered areas of economic, social benefit and environmental effect etc. The content of the questionnaire includes the following information:

1. The purpose of the questionnaire

2. Basic information of the participants

3. Questions

1) Do you know the proposed project?

2) What do you think the proposed project will bring to you?

3) Do you support the implementation of the proposed project?

4) What is your concern about the proposed project?

5) What is your opinion and suggestion regarding the proposed project?

The Survey was conducted through distributing and collecting responses to a questionnaire in Dec 2012. Totally 40 questionnaires returned out of 40 with 100% response. The following is a summary of the key findings based on returned questionnaires.

1. The education background of the participants

[9] http://www.gov.cn/gongbao/content/2009/content_1265996.htm

The targets of this investigation are the people who will be affected by the project. A part of them finished the middle high school education, the rest of them graduated from college.

2. Attitude towards the proposed project

All of them support the implementation of the project, they think the protection of forest instead of cutting is good the environment, and will benefit the sustainable development.

3. The concern about the proposed project

The participants particularly hoping that the proposed project can improve local environmental situation and increase employment opportunities at the same time.

4. Conclusion

- The survey shows that the proposed project is 100% supported by local people. It is because they believe the implementation of the project will bring multiple benefits.

5.4 Public Comments

The survey shows that all of the stakeholders and the residents of the areas supported the conversion activity from logged to protected forest.

In conclusion, the survey indicates that the Project has few negative impacts on local environment.

APPENDIX 1: < GEOGRAPHICAL COORDINATES OF PROJECT >

GEOGRAPHICAL COORDINATES OF PROJECT

serial No.	Department	compartment	subcompartment	coordinate X	coordinate Y
1	WLKQ	16	8	412697	5496190
2	WLKQ	16	20	412866	5497460
3	WLKQ	16	21	412814	5496690
4	WLKQ	16	22	412392	5496330
5	WLKQ	16	23	412697	5496190
6	WLKQ	16	24	412383	5494600
7	WLKQ	16	25	412574	5494690
8	WLKQ	16	26	413927	5496620
9	WLKQ	16	28	413623	5496260
10	WLKQ	16	29	413298	5497040
11	WLKQ	20	5	409105	5498010
12	WLKQ	20	6	409471	5497690
13	WLKQ	20	7	408860	5497650
14	WLKQ	20	8	409022	5497590
15	WLKQ	20	10	408696	5496540
16	WLKQ	20	17	408846	5495670
17	WLKQ	20	23	408246	5494370
18	WLKQ	20	27	409016	5497070
19	WLKQ	20	43	407882	5494510
20	WLKQ	20	44	408246	5494370
21	WLKQ	20	45	407589	5494140
22	WLKQ	20	46	406885	5493430
23	WLKQ	20	47	407295	5493440
24	WLKQ	20	48	407532	5493560
25	WLKQ	20	49	408370	5493910
26	WLKQ	20	50	408435	5494310
27	WLKQ	20	51	408042	5495310
28	WLKQ	20	66	408665	5495330
29	WLKQ	20	68	408846	5495670
30	WLKQ	22	15	411706	5494620
31	WLKQ	22	23	410650	5495680
32	WLKQ	22	26	410909	5495040
33	WLKQ	22	29	411449	5494540
34	WLKQ	22	30	411706	5494620
35	WLKQ	22	33	411763	5495360
36	WLKQ	22	36	412175	5495170
37	WLKQ	22	41	412075	5494370
38	WLKQ	23	5	413549	5495180
39	WLKQ	23	13	413143	5494270
40	WLKQ	23	16	412562	5494110
41	WLKQ	23	17	412245	5493820
42	WLKQ	23	23	413555	5493660
43	WLKQ	23	25	413726	5493740

serial No.	Department	compartment	subcompartment	coordinate X	coordinate Y
1746	MDL	5	36	412395	5524490
1747	MDL	8	3	408575	5522390
1748	MDL	8	17	408799	5521660
1749	MDL	8	18	408846	5521150
1750	MDL	8	27	408575	5522390
1751	MDL	9	6	410050	5523820
1752	MDL	9	22	409608	5522690
1753	MDL	9	27	410039	5522570
1754	MDL	9	43	410149	5521700
1755	MDL	9	48	411345	5521770
1756	MDL	9	61	411215	5523490
1757	MDL	9	62	411312	5523260
1758	MDL	9	67	411396	5522880
1759	MDL	9	68	411244	5522840
1760	MDL	9	70	411497	5523230
1761	MDL	10	12	411643	5523240
1762	MDL	10	24	411827	5522360
1763	MDL	10	35	412799	5522370
1764	MDL	10	46	411643	5523240
1765	MDL	10	51	411950	5523040
1766	MDL	10	52	411987	5523190
1767	MDL	10	53	412253	5523080
1768	MDL	10	54	412454	5523020
1769	MDL	10	55	411850	5522820
1770	MDL	11	1	414343	5523300
1771	MDL	11	7	414496	5522560
1772	MDL	11	8	413646	5522810
1773	MDL	11	13	413972	5522040
1774	MDL	11	18	411720	5521380
1775	MDL	11	28	411894	5520780
1776	MDL	11	36	410732	5520490
1777	MDL	11	41	414443	5522780
1778	MDL	11	46	414496	5522560
1779	MDL	12	18	415221	5521870
1780	MDL	13	12	416253	5522790
1781	MDL	13	14	417317	5522430
1782	MDL	13	19	417129	5521720
1783	MDL	17	5	407217	5519300
1784	MDL	17	6	406721	5519250
1785	MDL	17	9	406884	5518560
1786	MDL	17	16	408203	5518740
1787	MDL	17	23	407612	5519110
1788	MDL	17	24	406721	5518780

44	WLKQ	26	8	415351	5494120
45	WLKQ	26	37	416312	5491300
46	WLKQ	26	41	416232	5491530
47	WLKQ	33	31	410266	5491600
48	WLKQ	33	34	410837	5491250
49	WLKQ	34	2	411579	5493320
50	WLKQ	34	3	411848	5493460
51	WLKQ	34	4	412245	5493410
52	WLKQ	34	9	411883	5492870
53	WLKQ	34	13	411642	5492260
54	WLKQ	34	23	412408	5491970
55	WLKQ	35	5	414353	5493050
56	WLKQ	35	9	414402	5492540
57	WLKQ	35	12	414527	5492080
58	WLKQ	35	13	414102	5491770
59	WLKQ	42	1	411251	5490990
60	WLKQ	42	2	411693	5490920
61	WLKQ	42	4	410940	5490630
62	WLKQ	42	14	410462	5488880
63	WLKQ	42	16	410836	5488570
64	WLKQ	43	2	413435	5491830
65	WLKQ	43	4	413245	5492100
66	WLKQ	43	5	413023	5491850
67	WLKQ	43	6	412824	5491400
68	WLKQ	43	7	411781	5491520
69	WLKQ	43	8	412310	5491300
70	WLKQ	43	9	411881	5491090
71	WLKQ	43	11	412256	5490640
72	WLKQ	44	2	413980	5491360
73	WLKQ	44	3	414431	5491400
74	WLKQ	44	6	415602	5491400
75	WLKQ	45	8	414648	5490300
76	WLKQ	45	9	414760	5490040
77	WSJ	2	7	382316	5487520
78	WSJ	2	16	382085	5486580
79	WSJ	2	27	382897	5488330
80	WSJ	2	35	382897	5488330
81	WSJ	3	3	383181	5485800
82	WSJ	9	18	395053	5483190
83	WSJ	9	28	395932	5481720
84	WSJ	9	32	396264	5481500
85	WSJ	10	4	396833	5484720
86	WSJ	11	10	397050	5482430
87	WSJ	11	12	396747	5482480
88	WSJ	11	17	398164	5482090
89	WSJ	11	31	397771	5481960
90	WSJ	12	2	396964	5483670
91	WSJ	12	13	399069	5481690
92	WSJ	12	15	399480	5481600
93	WSJ	13	22	400757	5482340
94	WSJ	13	28	401307	5482460
1789	MDL	17	34	407537	5518260
1790	MDL	17	35	408274	5519000
1791	MDL	17	36	408203	5518740
1792	MDL	17	47	408566	5518750
1793	MDL	17	52	408616	5518740
1794	MDL	17	53	407773	5519540
1795	MDL	17	55	407904	5519140
1796	MDL	17	56	407612	5519110
1797	MDL	18	4	408514	5520850
1798	MDL	18	11	408629	5519290
1799	MDL	18	18	407628	5520440
1800	MDL	18	19	408041	5520140
1801	MDL	18	20	407635	5520040
1802	MDL	18	41	408486	5520580
1803	MDL	18	46	407628	5520440
1804	MDL	18	53	408590	5521020
1805	MDL	22	3	397268	5516740
1806	MDL	22	23	397232	5515750
1807	MDL	22	26	397483	5515200
1808	MDL	22	27	397185	5514950
1809	MDL	22	29	397150	5514710
1810	MDL	22	30	397491	5514780
1811	MDL	22	31	397827	5514640
1812	MDL	22	32	397716	5514260
1813	MDL	22	33	397936	5514360
1814	MDL	23	22	398526	5515310
1815	MDL	27	1	404956	5518260
1816	MDL	27	2	404868	5519170
1817	MDL	27	4	405383	5519090
1818	MDL	27	7	404412	5518010
1819	MDL	27	11	404858	5519550
1820	MDL	27	12	405573	5517900
1821	MDL	27	13	405096	5518750
1822	MDL	27	14	405384	5518400
1823	MDL	27	19	404874	5517810
1824	MDL	27	23	405632	5518650
1825	MDL	27	24	405089	5519470
1826	MDL	27	25	404858	5519550
1827	MDL	27	26	404868	5519170
1828	MDL	27	28	405383	5519090
1829	MDL	27	29	405096	5518750
1830	MDL	27	30	404746	5518760
1831	MDL	27	32	405384	5518400
1832	MDL	28	2	407196	5517780
1833	MDL	28	3	407010	5517480
1834	MDL	28	6	407596	5517420
1835	MDL	28	7	407300	5517350
1836	MDL	28	8	406998	5517190
1837	MDL	28	9	406879	5517130
1838	MDL	28	13	407660	5516360
1839	MDL	34	1	398258	5513980

95	WSJ	13	34	403904	5477950
96	WSJ	19	15	389075	5478010
97	WSJ	19	24	389321	5477350
98	WSJ	19	27	388290	5478070
99	WSJ	22	10	394351	5479380
100	WSJ	22	11	394577	5479490
101	WSJ	22	12	394790	5479630
102	WSJ	22	13	395216	5479820
103	WSJ	22	27	396068	5478580
104	WSJ	23	9	399745	5477880
105	WSJ	23	19	399693	5478460
106	WSJ	23	29	398936	5477250
107	WSJ	24	3	400019	5481080
108	WSJ	25	1	401235	5482120
109	WSJ	25	8	401551	5481370
110	WSJ	26	21	385715	5475110
111	WSJ	27	7	387201	5475720
112	WSJ	27	9	388099	5475950
113	WSJ	27	11	388746	5475710
114	WSJ	27	13	387631	5475390
115	WSJ	27	14	388542	5475420
116	WSJ	27	17	387436	5476210
117	WSJ	27	18	387074	5475200
118	WSJ	27	19	387968	5475440
119	WSJ	27	20	387695	5474730
120	WSJ	27	21	388376	5475030
121	WSJ	27	22	387300	5474810
122	WSJ	27	26	387666	5476380
123	WSJ	27	27	387436	5476210
124	WSJ	27	28	387201	5475720
125	WSJ	27	29	387074	5475200
126	WSJ	27	35	387300	5474810
127	WSJ	27	36	387695	5474730
128	WSJ	27	37	388152	5474610
129	WSJ	27	38	387968	5475440
130	WSJ	27	39	387666	5476380
131	WSJ	27	40	387436	5476210
132	WSJ	27	41	387201	5475720
133	WSJ	27	42	387074	5475200
134	WSJ	27	43	387300	5474810
135	WSJ	27	44	387695	5474730
136	WSJ	27	45	388152	5474610
137	WSJ	27	46	387968	5475440
138	WSJ	28	11	389752	5477100
139	WSJ	28	12	391654	5476620
140	WSJ	28	13	391891	5476230
141	WSJ	28	16	389604	5475950
142	WSJ	28	17	390225	5476010
143	WSJ	28	18	391225	5475960
144	WSJ	28	20	389116	5475670
145	WSJ	28	21	389790	5475450

1840	MDL	34	3	398616	5513610
1841	MDL	34	4	398635	5513480
1842	MDL	34	5	399022	5513160
1843	MDL	34	6	399804	5512560
1844	MDL	34	7	399574	5512370
1845	MDL	34	8	399167	5513350
1846	MDL	34	13	400604	5512420
1847	MDL	34	14	400871	5511750
1848	MDL	34	15	401187	5511550
1849	MDL	34	16	401529	5511450
1850	MDL	34	17	401891	5511400
1851	MDL	34	18	402183	5511620
1852	MDL	34	20	401855	5511950
1853	MDL	34	21	402497	5511450
1854	MDL	34	22	402858	5511680
1855	MDL	34	26	402183	5511620
1856	MDL	34	32	402497	5511450
1857	MDL	35	5	398658	5514700
1858	MDL	35	6	398389	5514650
1859	MDL	35	10	398899	5514690
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1861	MDL	35	20	400695	5512880
1862	MDL	35	23	400459	5512670
1863	MDL	35	37	399385	5514390
1864	MDL	35	38	398389	5514650
1865	MDL	35	40	398530	5514730
1866	MDL	35	41	399213	5515200
1867	MDL	35	42	398915	5515240
1868	MDL	36	8	400307	5514520
1869	MDL	36	10	400701	5514820
1870	MDL	36	11	400332	5514730
1871	MDL	36	12	400119	5514340
1872	MDL	36	13	400512	5513900
1873	MDL	36	30	402654	5512520
1874	MDL	36	35	399612	5515370
1875	MDL	37	22	401231	5514810
1876	MDL	37	27	401596	5514510
1877	MDL	37	32	401455	5514240
1878	MDL	37	36	402049	5513900
1879	MDL	37	40	402645	5513510
1880	MDL	37	42	403070	5513440
1881	MDL	37	43	402654	5513110
1882	MDL	37	47	401231	5514810
1883	MDL	37	49	401054	5514670
1884	WKT	42	24	459995	5502920
1885	WKT	50	15	455929	5501480
1886	WKT	50	17	456008	5501570
1887	WKT	50	19	455719	5500930
1888	WKT	50	21	455483	5501050
1889	WKT	51	11	456316	5501870
1890	WKT	63	30	456630	5501210

146	WSJ	28	22	390068	5475600
147	WSJ	28	23	391078	5475580
148	WSJ	28	24	389118	5475340
149	WSJ	28	25	389640	5475120
150	WSJ	28	26	391082	5475190
151	WSJ	28	27	388662	5474530
152	WSJ	28	30	389552	5474370
153	WSJ	28	32	389832	5474580
154	WSJ	28	33	390071	5474420
155	WSJ	28	34	390435	5474410
156	WSJ	28	35	390649	5474680
157	WSJ	28	36	390960	5474870
158	WSJ	28	37	388971	5474100
159	WSJ	28	38	389146	5474110
160	WSJ	28	39	389238	5474300
161	WSJ	28	40	391195	5474500
162	WSJ	28	41	391431	5474320
163	WSJ	28	43	390733	5475910
164	WSJ	28	44	390323	5475210
165	WSJ	28	45	389001	5474890
166	WSJ	28	47	389752	5477100
167	WSJ	28	50	389017	5474510
168	WSJ	28	51	389001	5474890
169	WSJ	28	52	389118	5475340
170	WSJ	28	53	389116	5475670
171	WSJ	28	54	389178	5475970
172	WSJ	28	55	389604	5475950
173	WSJ	28	56	389640	5475120
174	WSJ	28	57	389790	5475450
175	WSJ	28	58	390068	5475600
176	WSJ	28	59	390225	5476010
177	WSJ	28	60	390733	5475910
178	WSJ	28	67	391078	5475580
179	WSJ	28	68	391082	5475190
180	WSJ	28	69	390323	5475210
181	WSJ	28	70	389636	5474730
182	WSJ	28	71	390960	5474870
183	WSJ	28	72	391225	5475960
184	WSJ	28	73	391254	5476420
185	WSJ	30	4	395628	5477770
186	WSJ	30	17	397643	5475910
187	WSJ	31	9	398186	5475520
188	WSJ	31	19	398416	5475930
189	WSJ	32	3	400981	5479370
190	WSJ	32	10	400692	5478200
191	WSJ	37	3	395128	5476000
192	WSJ	37	6	395544	5475390
193	WSJ	37	7	396019	5475490
194	WSJ	37	9	396507	5475920
195	WSJ	37	13	395341	5474950
196	WSJ	37	14	395908	5474950

1891	WKT	65	27	460990	5501240
1892	WKT	78	24	460979	5498140
1893	WKT	78	44	460979	5498140
1894	WKT	79	3	461485	5499030
1895	WKT	79	20	461696	5498280
1896	WKT	79	28	462493	5497060
1897	WKT	79	29	461069	5497510
1898	WKT	79	31	461343	5496610
1899	WKT	79	32	462713	5496940
1900	WKT	79	34	462479	5496490
1901	WKT	87	26	455357	5496470
1902	WKT	87	27	455538	5496050
1903	WKT	87	28	455604	5497400
1904	WKT	87	31	455761	5497130
1905	WKT	87	34	455954	5497100
1906	WKT	87	35	456083	5496760
1907	WKT	87	36	455876	5495700
1908	WKT	87	39	455811	5497920
1909	WKT	87	40	455875	5497500
1910	WKT	87	41	454777	5497130
1911	WKT	87	45	455088	5497420
1912	WKT	88	7	456604	5496660
1913	WKT	89	7	458373	5496470
1914	WKT	89	15	458409	5497880
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906	BLT	9	22	399980	5508110
907	BLT	9	32	398829	5506360
908	BLT	9	34	399177	5509440
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2611	KLH	41	19	424249	5499910
2612	KLH	41	20	424569	5499630
2613	KLH	43	2	431912	5502730
2614	KLH	43	3	432807	5502730
2615	KLH	43	5	431482	5501990
2616	KLH	43	10	431382	5501740
2617	KLH	43	25	423560	5499640
2618	KLH	43	26	422724	5498580
2619	KLH	43	27	423188	5498890
2620	KLH	43	28	423787	5498840
2621	KLH	43	29	422702	5498050
2622	KLH	43	30	422978	5497420
2623	KLH	43	31	422644	5497540
2624	KLH	44	2	433706	5502980
2625	KLH	44	3	433647	5502790
2626	KLH	44	11	434167	5501980
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2628	KLH	44	22	433706	5502980
2629	KLH	44	23	432848	5503540
2630	KLH	44	24	432809	5503170
2631	KLH	44	27	432270	5503200
2632	KLH	44	28	431321	5503270
2633	KLH	44	30	432051	5502530
2634	KLH	44	31	431912	5502730
2635	KLH	44	32	433820	5502390
2636	KLH	44	37	433202	5501910
2637	KLH	45	4	424004	5499620
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2639	KLH	45	19	424249	5499910
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2662	KLH	49	25	439502	5500570
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2665	KLH	49	28	440417	5500960
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2669	KLH	52	18	433426	5499290
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2675	KLH	52	32	440874	5499600
2676	KLH	52	33	440362	5499330
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971	BLT	20	3	397279	5504100
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977	BLT	20	15	398314	5503550
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988	BLT	38	25	403504	5494120
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1062	WLKQ	20	19	408435	5494310
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2770	KLH	62	24	431331	5498170
2771	KLH	77	6	427238	5493400
2772	KLH	77	16	427532	5495620
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2774	KLH	78	2	427607	5494680
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2793	KLH	93	5	434697	5490850
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2815	KLH	109	8	437939	5506380
2816	KLH	109	22	435838	5507030
2817	KLH	109	23	435934	5506620
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2819	KLH	109	25	435637	5506290
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1324	WSJ	26	46	386458	5474430
1325	WSJ	26	47	386590	5474270
1326	WSJ	26	48	385826	5476850
1327	WSJ	26	49	386889	5474900
1328	WSJ	26	50	386866	5474190
1329	WSJ	26	53	385389	5475100
1330	WSJ	27	12	387442	5475400
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1337	WSJ	28	64	388662	5474530
1338	WSJ	28	65	391431	5474320
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1360	WSJ	31	25	399349	5475260
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1369	WSJ	33	24	403430	5478340

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1511	XRTQ	114	26	416535	5465280
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1559	XRTQ	136	5	443242	5470490
1560	XRTQ	136	14	443817	5469960
1561	XRTQ	136	18	443532	5469600
1562	XRTQ	136	22	443073	5469630
1563	XRTQ	136	24	443239	5469470
1564	XRTQ	136	27	443442	5470270
1565	XRTQ	147	6	438045	5468100
1566	XRTQ	147	7	438516	5467930
1567	XRTQ	147	11	439426	5467910
1568	XRTQ	147	16	439936	5467480
1569	XRTQ	148	13	440405	5467800
1570	XRTQ	148	24	419804	5475900
1571	XRTQ	148	26	419961	5475800
1572	XRTQ	149	3	441991	5467570
1573	XRTQ	150	5	442545	5468590

3268	BLT	4	49	394249	5511720
3269	BLT	4	50	394412	5511500
3270	BLT	4	52	394137	5511430
3271	BLT	4	54	394476	5511110
3272	BLT	9	38	399371	5509230
3273	BLT	13	45	397269	5507090
3274	BLT	13	46	397331	5507050
3275	BLT	20	39	396961	5503390
3276	BLT	20	40	397279	5504100
3277	BLT	20	41	397162	5503640
3278	BLT	20	42	397363	5503640
3279	BLT	20	43	397442	5503730
3280	BLT	20	44	397635	5503370
3281	BLT	20	46	397698	5504570
3282	BLT	20	47	397361	5504990
3283	BLT	20	48	396628	5503930
3284	EGH	1	20	471139	5506700
3285	EGH	1	21	471188	5506360
3286	EGH	5	17	477215	5506240
3287	EGH	5	19	477009	5505640
3288	EGH	5	28	477350	5504430
3289	EGH	7	12	471381	5504520
3290	EGH	7	16	470506	5504430
3291	EGH	7	22	471039	5503930
3292	EGH	8	3	472019	5503750
3293	EGH	8	5	472208	5504180
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3295	EGH	8	17	472951	5503190
3296	EGH	9	19	473490	5503940
3297	EGH	9	20	473315	5504140
3298	EGH	9	21	473128	5504240
3299	EGH	11	11	476663	5503200
3300	EGH	11	13	476854	5502890
3301	EGH	11	14	476958	5502560
3302	EGH	11	19	475711	5504740
3303	EGH	11	20	476358	5504380
3304	EGH	11	21	475539	5504480
3305	EGH	11	23	475809	5504190
3306	EGH	11	24	476267	5504250
3307	EGH	11	25	477078	5503870
3308	EGH	11	26	476010	5503490
3309	EGH	11	28	476560	5503490
3310	EGH	11	29	476663	5503200
3311	EGH	11	30	476575	5503740
3312	EGH	11	31	476986	5503780
3313	EGH	15	18	473393	5502110
3314	EGH	17	9	476310	5502560
3315	EGH	17	10	475997	5501990
3316	EGH	17	13	475590	5501750
3317	EGH	18	10	468465	5500160
3318	EGH	18	19	468503	5499740

1574	XRTQ	150	15	442235	5468340
1575	XRTQ	150	18	420004	5475310
1576	XRTQ	151	8	443112	5469440
1577	XRTQ	166	2	438447	5466970
1578	XRTQ	166	3	438205	5466640
1579	XRTQ	166	5	437005	5466030
1580	XRTQ	166	13	435790	5465250
1581	XRTQ	166	19	417025	5472580
1582	XRTQ	166	21	417351	5472520
1583	XRTQ	166	22	417311	5473630
1584	XRTQ	167	2	438665	5467000
1585	XRTQ	167	3	438977	5466790
1586	XRTQ	168	2	441869	5466840
1587	XRTQ	168	9	441229	5465840
1588	XRTQ	169	2	442321	5466670
1589	XRTQ	169	7	442225	5465690
1590	XRTQ	170	4	442745	5467080
1591	XRTQ	170	6	442922	5466720
1592	XRTQ	170	8	443108	5466540
1593	XRTQ	170	10	443423	5466290
1594	XRTQ	170	13	443056	5465710
1595	XRTQ	170	18	443117	5464870
1596	XRTQ	171	2	443587	5466190
1597	XRTQ	171	3	443982	5466030
1598	XRTQ	171	7	444355	5465390
1599	XRTQ	171	8	444071	5465210
1600	XRTQ	171	10	444789	5465050
1601	XRTQ	171	12	443954	5464560
1602	XRTQ	172	6	444955	5465750
1603	XRTQ	172	25	417150	5473210
1604	XRTQ	172	27	417633	5473150
1605	XRTQ	172	32	417861	5473000
1606	XRTQ	172	33	417883	5473500
1607	XRTQ	172	34	418165	5473640
1608	XRTQ	186	2	438569	5466890
1609	XRTQ	186	3	438258	5466110
1610	XRTQ	186	10	437687	5464760
1611	XRTQ	188	3	440542	5465290
1612	XRTQ	188	5	439907	5464750
1613	XRTQ	188	17	418247	5473040
1614	MY	11	14	417118	5530280
1615	MY	11	20	416657	5529710
1616	MY	11	21	417149	5529690
1617	MY	11	23	417488	5529920
1618	MY	11	26	417472	5529540
1619	MY	12	21	418020	5529940
1620	MY	12	24	418772	5530310
1621	MY	24	11	419915	5528560
1622	MY	24	15	420384	5528260
1623	MY	24	31	420119	5528810
1624	MY	24	32	420251	5528840

3319	EGH	19	3	468761	5501290
3320	EGH	19	8	469071	5500880
3321	EGH	19	23	470777	5499120
3322	EGH	20	16	472637	5500120
3323	EGH	20	24	473370	5499700
3324	EGH	20	27	473482	5499320
3325	EGH	20	28	474160	5499260
3326	EGH	20	32	474814	5499100
3327	EGH	20	36	473736	5499650
3328	EGH	20	37	474160	5499260
3329	EGH	20	38	473877	5499170
3330	EGH	20	40	474539	5499320
3331	EGH	21	22	474781	5501380
3332	EGH	21	26	473548	5501000
3333	EGH	21	29	474301	5501310
3334	EGH	27	4	471567	5499240
3335	EGH	27	22	472648	5499620
3336	EGH	28	29	473414	5499170
3337	EGH	28	30	472443	5499550
3338	EGH	28	33	473414	5499170
3339	EGH	30	8	467978	5497510
3340	EGH	31	2	469193	5497540
3341	EGH	31	3	469980	5497440
3342	EGH	31	19	470367	5497190
3343	EGH	33	24	470808	5497680
3344	EGH	34	7	472632	5495680
3345	EGH	34	8	472997	5495590
3346	EGH	34	9	473196	5495640
3347	EGH	34	10	472855	5495490
3348	EGH	34	11	473313	5495430
3349	EGH	34	13	472232	5495840
3350	EGH	34	18	472632	5495680
3351	EGH	34	19	472997	5495590
3352	EGH	34	20	473313	5495430
3353	EGH	35	4	473671	5496720
3354	EGH	35	5	473486	5497610
3355	EGH	35	6	473700	5497370
3356	EGH	35	7	474167	5497180
3357	EGH	35	14	473486	5497610
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3360	EGH	41	11	471779	5495300
3361	EGH	49	1	465974	5493570
3362	EGH	49	18	466592	5492050
3363	EGH	49	43	466880	5493380
3364	EGH	49	45	467058	5493200
3365	EGH	49	46	467145	5492820
3366	EGH	50	6	466974	5491500
3367	EGH	50	13	466240	5490860
3368	EGH	50	14	465948	5490770
3369	EGH	50	15	466974	5491500

1625	MY	24	33	419915	5528560
1626	MY	25	23	421428	5528490
1627	MY	25	41	421595	5528680
1628	MY	25	42	421428	5528490
1629	MY	25	43	421261	5528290
1630	MY	26	5	425647	5528210
1631	MY	26	15	425995	5527360
1632	MY	26	16	426271	5527350
1633	MY	34	6	423116	5525370
1634	MY	35	4	427200	5526840
1635	MY	35	20	426345	5525710
1636	MY	44	25	417316	5524320
1637	MY	45	5	418382	5525650
1638	MY	46	14	423501	5524820
1639	MY	53	2	420033	5521760
1640	MY	53	10	418840	5520760
1641	MY	53	20	420079	5520800
1642	MY	53	21	420639	5520810
1643	MY	53	32	420033	5521760
1644	MY	53	33	420471	5521960
1645	MY	53	34	419536	5521500
1646	MY	53	38	419748	5521390
1647	MY	54	68	423025	5523110
1648	MY	54	69	422757	5522710
1649	MY	63	4	421085	5520690
1650	MY	63	8	421154	5520060
1651	MY	63	9	421770	5519960
1652	MY	63	12	422131	5519380
1653	MY	63	30	420909	5519370
1654	MY	63	31	421414	5519450
1655	MY	63	32	421154	5520060
1656	MY	63	33	421636	5519120
1657	MY	63	34	421420	5518980
1658	MY	63	35	421848	5518940
1659	MY	63	36	423082	5519440
1660	MY	63	37	422844	5519620
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1662	MY	63	39	421770	5519960
1663	MY	70	8	423636	5518380
1664	MY	70	11	424357	5518270
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1666	MY	70	35	423636	5518380
1667	MY	70	37	423166	5517980
1668	MY	70	39	423337	5517770
1669	MY	70	40	423701	5517710
1670	MY	70	41	423775	5518600
1671	MY	70	42	424030	5518280
1672	MY	70	43	424357	5518270
1673	MY	70	44	424388	5517950
1674	MY	70	45	424992	5517880
1675	MY	70	46	422303	5517940

3370	EGH	51	4	468979	5491250
3371	EGH	51	8	469230	5490940
3372	EGH	51	11	466371	5489420
3373	EGH	51	12	466019	5489460
3374	EGH	51	13	467096	5489390
3375	EGH	51	14	467987	5489340
3376	EGH	51	15	468219	5489100
3377	EGH	51	16	468296	5489320
3378	EGH	56	2	466664	5490230
3379	EGH	56	13	467143	5489790
3380	EGH	56	14	467748	5489790
3381	EGH	56	20	468296	5489320
3382	EGH	56	22	468608	5489300
3383	EGH	56	38	472390	5486390
3384	EGH	56	39	472524	5486100
3385	EGH	56	41	472130	5485090
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3387	EGH	56	43	474029	5487150
3388	EGH	56	44	474268	5486890
3389	EGH	56	45	474491	5487220
3390	EGH	56	52	474026	5486560
3391	EGH	56	53	473829	5486380
3392	EGH	56	54	474145	5486400
3393	EGH	56	56	474305	5486280
3394	EGH	56	57	473827	5486060
3395	EGH	57	6	468978	5488700
3396	EGH	57	9	469410	5488370
3397	EGH	57	10	469618	5488210
3398	EGH	57	16	469410	5488370
3399	EGH	57	17	469618	5488210
3400	EGH	57	18	470183	5488460
3401	EGH	57	19	470099	5487990
3402	EGH	57	23	470435	5488110
3403	EGH	57	24	470314	5487530
3404	EGH	59	9	470547	5490400
3405	EGH	59	10	470228	5489980
3406	EGH	59	14	471198	5490100
3407	EGH	59	15	471301	5489730
3408	EGH	59	25	475847	5491430
3409	EGH	59	26	475889	5491250
3410	EGH	59	29	475613	5490950
3411	EGH	59	30	474894	5490670
3412	EGH	59	31	475213	5490350
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3414	EGH	64	15	467346	5488380
3415	EGH	64	28	472208	5490660
3416	EGH	65	2	468280	5488580
3417	EGH	65	3	468540	5488580
3418	EGH	65	4	468478	5488400
3419	EGH	65	6	468098	5488260
3420	EGH	65	17	468059	5487630

1676	MY	70	48	422695	5517610
1677	MY	70	49	424476	5518420
1678	MY	70	50	425183	5518020
1679	MY	70	51	423092	5518300
1680	MY	70	54	423213	5518870
1681	MY	70	60	423461	5518700
1682	MY	70	61	423599	5519030
1683	MY	70	62	422706	5518260
1684	MY	70	63	422723	5518260
1685	MY	71	38	424307	5515780
1686	MY	71	45	424069	5515170
1687	MY	71	46	424235	5515270
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1690	MY	71	65	425631	5517360
1691	MY	71	66	425795	5517140
1692	MY	71	67	423331	5516130
1693	MY	71	68	423791	5516150
1694	MY	71	70	424101	5516480
1695	MY	77	10	425207	5515160
1696	MY	78	6	426385	5515780
1697	MY	79	9	427871	5515120
1698	MY	79	32	428203	5513980
1699	MY	79	33	428476	5514280
1700	MY	79	37	428781	5514280
1701	MY	79	39	429074	5514700
1702	MY	79	40	428749	5514820
1703	MY	79	41	428959	5514270
1704	MG	7	55	389415	5487530
1705	MG	7	61	387175	5489360
1706	MG	7	63	387437	5488890
1707	MG	7	64	386970	5489960
1708	MG	7	69	387619	5489650
1709	MG	7	71	388011	5490100
1710	MG	7	72	387570	5488080
1711	MG	7	73	387843	5488170
1712	MG	8	17	388011	5490100
1713	MG	8	18	388580	5489710
1714	MG	8	19	388186	5489670
1715	MG	12	39	384879	5490930
1716	MG	12	40	384855	5491020
1717	MG	12	41	385277	5490610
1718	MG	13	24	389631	5487650
1719	MG	14	26	392786	5486460
1720	MG	14	41	393136	5486160
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1722	MG	14	56	390290	5488940
1723	MG	14	59	392786	5486460
1724	MG	14	60	392391	5486630
1725	MG	14	61	392455	5486950
1726	MG	14	62	392926	5487480

3421	EGH	65	20	468798	5487550
3422	EGH	65	24	468098	5488260
3423	EGH	65	25	466826	5487680
3424	EGH	65	26	467182	5487950
3425	EGH	65	27	467445	5487910
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3431	EGH	66	3	470807	5487010
3432	EGH	66	7	471412	5486530
3433	EGH	66	20	468114	5487520
3434	EGH	67	2	472011	5489100
3435	EGH	67	3	471536	5489000
3436	EGH	67	11	472402	5488040
3437	EGH	67	21	472710	5487460
3438	EGH	74	5	468054	5486720
3439	EGH	74	9	468535	5486420
3440	EGH	74	10	468895	5486170
3441	EGH	74	11	469456	5486710
3442	EGH	74	13	469878	5486830
3443	EGH	74	14	469347	5486070
3444	EGH	74	16	465613	5487220
3445	EGH	74	17	465796	5487190
3446	EGH	74	19	466162	5487070
3447	EGH	74	20	465567	5487110
3448	EGH	74	22	465751	5486580
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3452	EGH	81	29	471550	5484440
3453	EGH	81	31	471377	5484450
3454	EGH	82	4	469210	5484390
3455	EGH	82	7	469806	5484200
3456	EGH	82	8	470122	5483800
3457	EGH	82	10	470440	5483840
3458	EGH	82	19	469429	5483670
3459	EGH	82	26	469210	5484390
3460	EGH	82	27	469520	5484270
3461	EGH	82	29	469058	5484130
3462	EGH	82	30	471928	5483150
3463	EGH	82	35	472038	5483160
3464	EGH	82	39	471311	5483310
3465	EGH	82	40	469765	5483640
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3467	EGH	91	2	470797	5482500
3468	EGH	91	38	470526	5482350
3469	EGH	91	39	470797	5482500
3470	EGH	91	44	471123	5482720
3471	EGH	91	45	471509	5482660

1727	MG	14	63	393193	5487580
1728	MG	14	64	393408	5487960
1729	MG	16	7	398326	5486090
1730	MG	16	9	398631	5486100
1731	MG	16	39	397880	5486480
1732	MG	16	55	393622	5487820
1733	MDL	1	5	413494	5526820
1734	MDL	1	11	415054	5526960
1735	MDL	1	27	413315	5524710
1736	MDL	1	30	413328	5524200
1737	MDL	1	34	413561	5523390
1738	MDL	5	3	412482	5526530
1739	MDL	5	4	411343	5526100
1740	MDL	5	14	411872	5525580
1741	MDL	5	20	411502	5525290
1742	MDL	5	23	413096	5525400
1743	MDL	5	28	412530	5524980
1744	MDL	5	29	413177	5525130
1745	MDL	5	34	411588	5524390

3472	EGH	91	47	471629	5482540
3473	EGH	109	3	479325	5477820
3474	EGH	109	4	479793	5477580
3475	EGH	109	5	480088	5477700
3476	EGH	109	8	480253	5476570
3477	EGH	116	9	479065	5475920
3478	EGH	116	10	478854	5475540
3479	EGH	121	3	472518	5473960
3480	EGH	122	2	473001	5474620
3481	EGH	123	4	476612	5475890
3482	EGH	124	1	477083	5475840
3483	EGH	126	2	479252	5476990
3484	EGH	126	20	480286	5474470
3485	EGH	127	3	480590	5476060
3486	EGH	128	9	483337	5476800
3487	EGH	128	10	483903	5477070
3488	EGH	129	9	486121	5477420
3489	EGH	129	12	487002	5477820
3490	EGH	129	17	485634	5477310
3491	EGH	129	18	486355	5477770