

# NORTH PIKOUNDA REDD+ PROJECT MONITORING REPORT



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## List of Abbreviations & Acronyms

AAC	Annual Allowable Cut
AFOLU	Agriculture, Forestry and other Land Use
ALM	Agriculture Land Management
ALP	Annual Logging Plan
AGB	Above Ground Biomass
ARR	Afforestation Reforestation and Revegetation
ASL	Above Sea Level
BAU	Business as usual
BCEF	Biomass Conversion and Expansion Factor
BEF	Biomass Expansion Factor
BOD	Biological Oxygen Demand
CAT	<i>Convention d'Amenagement et de Transformation</i>
°c	Celcius degree
CC	Carbon Conservation Pte. Ltd.
CCB	Climate, Community and Biodiversity Standards
CDM	Clean Development Mechanism
CF	Carbon Fraction
CIB	<i>Congolaise Industrielle des Bois (also includes Olam International Limited, the sole owner of CIB)</i>
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CO <sub>2</sub>	Carbon dioxide
COMIFAC	Central African Forests Commission
CTI	<i>Convention de Transformation industrielle</i>
dbh	Diameter at Breast Height
DME	<i>Diametre Minimum d'aménagement</i>
EIA	Environmental Impact Assessment
FAO	Food and Agriculture Organization of the United Nations
FIR	Forest Inventory Report
FLU	Forest Logging Unit
FMO	Forest Management Organization
FMU	Forest Management Unit
FPIC	Free, Prior and Informed Consent
FSC	Forest Stewardship Council
GHG	Greenhouse Gas
GIS	Geographic Information System
ha	Hectares

HCVF	High Conservation Value Forest
IFM	Improved Forest Management
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
LOA	Logged over area
ltHWP	Long Term Harvest Wood Products
LtPF	Logged to Protected Forest
m	Meters
m <sup>3</sup>	Cubic Meters
mm	Millimeters
MAI	Mean Annual Increment
MEFDD	<i>Ministère de l'Economie Forestière et du Développement Durable</i>
NGO	Non Governmental Organization
OLAM	Olam International Limited
PDD	Project Design Document
PD	Project Document
PRC	Peat Rewetting and Conservation
PSP	Permanent Sample Plot
QA/QC	Quality Assurance/Quality Control
REDD	Reducing Emissions from Deforestation and Degradation
REDD+	Reducing Emissions from Deforestation and Degradation Plus conservation, sustainable management of forests and enhancement of forest carbon stocks
RIL	Reduced Impact Logging
RoC	Republic of Congo
R-PP	(REDD+) Readiness Preparation Proposal
SOP	Standard Operating Procedure
SFM	Sustainable Forest Management
tCO <sub>2</sub> e	Tonnes of Carbon Dioxide Equivalent
UFA	<i>Unité Forestière d'Aménagement</i> – Forest Management Unit
UFE	<i>Unité Forestière d'Exploitation</i> – Forest Exploitation Unit
UFP	<i>Unité Forestière de Production</i> – Forest Production Unit
UNFCCC	United Nations Framework Convention for Climate Change
VCS	Verified Carbon Standard
VCS-PD	VCS Project Document
VCS-MR	VCS Monitoring Report
VCU	Verified Carbon Unit
WSG	Wood Specific Gravity

## 1 PROJECT DETAILS

### 1.1 Summary Description of Project

The North Pikounda REDD+ Project (the Project) is a reducing emission from deforestation and degradation plus conservation and sustainable forestry (REDD+) project designed to protect 92,530 hectares (ha) of unlogged native Congolese forest, legally designated as a selective logging concession. The area is comprised of 60% of dry land mixed forest and 40% of areas designated as wetlands. The anticipated selective logging would normally have been undertaken on the dry lands, consisting on an area of 55,950 ha. Those dry lands constitute the project crediting area.

The concession is owned by Congolaise Industrielle des Bois (CIB) which has been established as a timber operator in the North of Congo since 1968. The company currently has five active sawmills, dryers and moulding units in Pokola and Loundoungou and employs over 900 people permanently and more than 100 subcontractors. Four forest concessions are allocated to the CIB and all have been engaged in sustainable forest management for several years. CIB was the first timber company to submit a Forest Management Plan in Congo in 2005 and the first to become FSC certified in 2006. The North Pikounda Unité Forestière d'Exploitation or Forest Exploitation Unit (UFE) was allocated to CIB by Ministerial Decree in 2002 and is 92,530 ha (the Project Area).

The Project is located in the Northern Congo region of Sangha, of the Northern Congo forest sector. The UFE is part of Pikounda *Unité Forestière d'Aménagement* (UFA)– a Forest Management Unit (FMU), which is divided in two UFEs:

1. North Pikounda UFE, designated for timber extraction being allocated to CIB, and;
2. South Pikounda UFE, has been decreed to become "Tokou-Pikounda Protected Area."

The main activity of the North Pikounda REDD+ Project is the cancelation of the planned degradation and deforestation activities and the decision to instead protect the forest area, while maintaining and protecting the biodiversity of the area. This is particularly important as the Project Area has considerable biodiversity, including one of the largest known lowland gorilla populations in the Congo basin.

From the implementation of the Project, it is estimated that around 4,900,000 tonnes of GHG emissions will be avoided which would have been emitted into the atmosphere over a period of 30 years in the absence of the Project, not including the Project's Non-Permanence Risk Buffer amount, leakage, if any, which will be accounted for over the life of the project.

### 1.2 Sectoral Scope and Project Type

**Sectoral Scope 14:** Agriculture, Forest and other Land Use (AFOLU).

**Project Category:** Reduction Emission from Deforestation and Degradation (REDD).

**Type of Activity:** Improved Forest Management – Logged to Protected Forests (IFM-LtPF).

The project is following the steps of methodology VM0011, "Estimating Greenhouse Gas Emissions Reductions From Planned Degradation (Improved Forest Management)" developed by Carbon Planet to estimate the emissions that would have occurred if the legal harvesting of the North Pikounda UFE would have occurred.

The project is not a grouped project

## 1.3 Project Proponents

Entity	<b>Congolaise Industrielle des Bois, a wholly owned subsidiary of Olam International Limited</b>
Role	Concession Holder and Project Proponent
Responsible Party	Robert Hunink
Role in the Company	President Global Head Wood Products / CEO CIB
Role in this Project	Project Owner
Telephone Number	+ 41 61 205 3940
E-mail Address	robert.hunink@olamnet.com
Address	Aeschengraben 6, 4051 Basel, Switzerland

Table 1 - Project proponent

## 1.4 Other Entities Involved in the Project

Entity	<b>Olam International Limited</b>
Role	Project Proponent
Responsible Party	Lucas Vanderwalt
Role in the Company	Director of Sustainability
Role in this Project	Project Manager
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Table 2 - Other entity involved in the project: Olam

Entity	<b>Carbon Conservation Pte Ltd</b>
Role	Technical Lead in Project Development
Responsible Party	Ralph Strebel
Role in the Company	Vice President of REDD+ / Senior Counsel
Role in this Project	Lead Project Manager
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Table 3 - Other entity involved in the project: Carbon Conservation

### 1.5 Project Start Date

The Project start date is 01 January 2012, which is the date when harvesting of the North Pikounda Forest could have commenced based on the approval of the North Pikounda UFE Forest Management Plan from the Ministry Sustainable Development, of Forestry Economy & Environment (MEFDD) of the Republic of Congo (RoC).

### 1.6 Project Crediting Period

The project has a crediting period of 30 years. The start date of the beginning of the crediting period is first day of January 2012 and the end date of the crediting period is December 31, 2041.

The Project itself will be 30 years, as there will be thirty years of monitoring from the date of initiation of Project Activity, that is, monitoring will continue until 2041. Per the VCS guidelines, a mandatory baseline re-evaluation is to be executed at a minimum of every 10 years after project start. Therefore, there will be a planned mandatory baseline re-evaluation on or before December 2021 and on or before December 2031.

The verification events are planned to occur on an annual basis.

Table 4 - Project crediting period

2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041

Baseline Validation/Re-evaluation  
 Verification



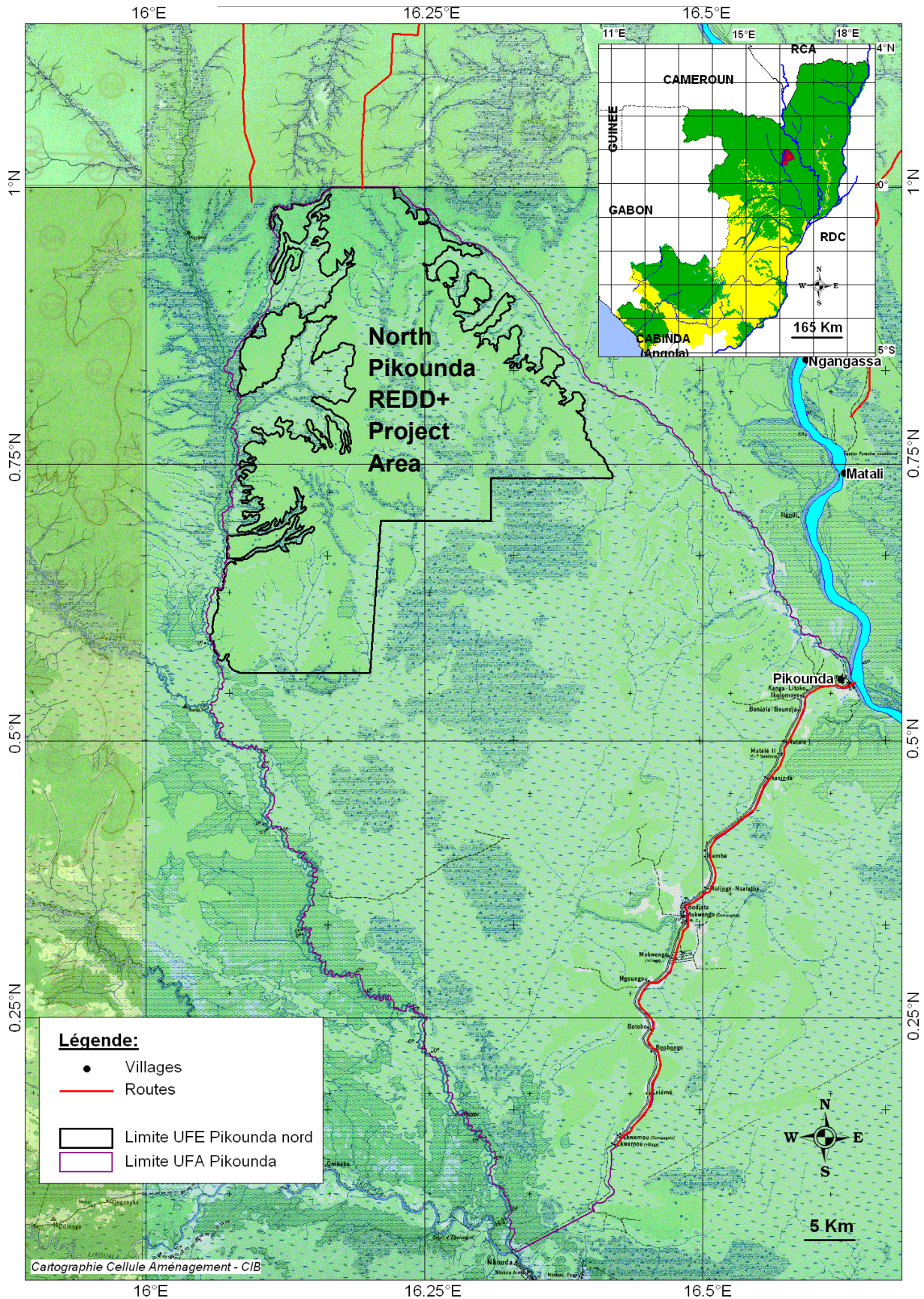
- On the West: from the 0°33'42" N parallel, the limit follows the flooded forests of the Kandeko river, then the Ebangapélé river up to the 1° N parallel;
- From North to North-Est and Est: the limit correspond to the 1°N parallel till the Ebangui river. There, it follows the Ebangui river flooded forests until the 16°25'07"E meridian;
- From South-East to West: the limit follows 0°44'13"N parallel between meridian 16°25'07"E and meridian 16°18'35"E. Then it follows the later meridian to the South until crossing the 0°41'56"N parallel, then this parallel straight to the West until it crosses the meridian 16°12'38"E. There, it follows a line oriented at 186° until the points of geographic coordinates 0°33'42"N – 16°12'03"E. From there, the limit follows the 0°33'42"N parallel until it crosses the Kandeko river.

According to the decree, the project area is 93,970 ha, but in fact the GIS corrected area (which is retained for this project) is 92,530 hectares. Figure 2 next page presents the localisation of the North Pikounda UFE and its boundaries.

**The project crediting area consists of all of the “dry land (*terra firma*) of the North Pikounda UFE.** The exact localisation of those dry lands is provided in Figure 2 below.

### 1.8 Title and Reference of Methodology

**Version 1.0 of VM0011 *Methodology for Improved Forest Management – Logged to Protected Forest: Calculating GHG Benefits from Preventing Planned Degradation*** by Carbon Planet Limited (referred to hereafter as VM0011).



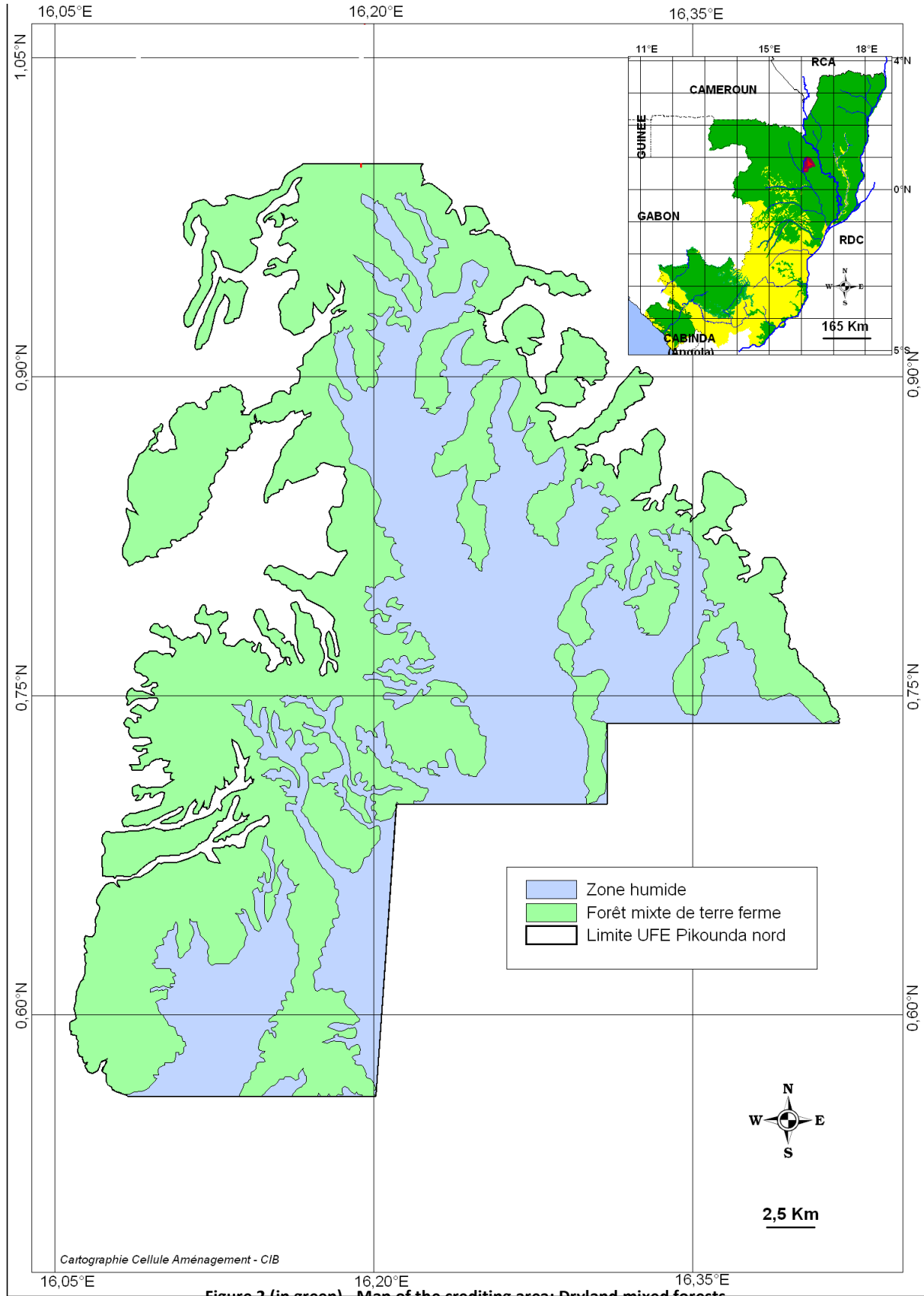


Figure 2 (in green) - Map of the crediting area: Dryland mixed forests

## 2 IMPLEMENTATION STATUS

### 2.1 Implementation Status of the Project Activity

#### 2.1.1 Implementation of project activities

The project activities are strictly following the implementation of the Monitoring Plan that has been described in the PDD and is provided in **Appendix 08**.

The table below describes precisely the implementation of each sub-activities of the Monitoring Plan during the Monitoring period considered in this document.

**Table 5 - Implementation status of project activities**

Activities and sub-activities	Description
<b>1. PSPs Monitoring</b>	
1.1 PSPs inventory	First mark-up and inventory of the 57 PSPs between 19/11/2012 and 23/12/2012
1.2 Data Capture	PSP inventory data have been captured onto the excel database at the end of the field work, in January 2013
1.3 Monitoring maps creation	Creation of the cartographic database. Edition of the 57 PSPs maps
1.4 AGB estimation	After controlling 40% of the PSPs, AGB has been estimated based on Excel model
1.5 Growth Foregone estimation	After controlling 40% of the PSPs, Growth Foregone has been estimated based on inventory data, Excel model and species-specific annual growth factors (see Methodology Deviation chap. 2.2)
1.6 Regrowth estimation	After controlling 40% of the PSPs, Regrowth has been estimated based on inventory data, Excel model and site-specific Regrowth model
<b>2. Remote Sensed Monitoring - Illegal/Natural Disturbances</b>	
2.1 Spot Images acquisition	License with Astrium signed in 07/01/2013  Images acquisition: <b>2010</b> N°40963491010290905551I (Spot 4, 29/10/2010) N°50963481001080910082J (Spot 5, 08/01/2010) <b>2011</b> N°50953471101170919212J (Spot 5, 17/01/2011) N°50953481101170919302J (Spot 5, 17/01/2011) N°50963481101280907522J (Spot 5, 28/01/2011) N°50963491103260911352J (Spot 5, 26/03/2011) N°50973491101020908112J (Spot 5, 02/01/2011) <b>2012</b>

	<p>N°40973481212070814081I (Spot 4, 07/12/2012)  N°50963481204240908402J (Spot 5, 24/04/2012)  N°50963491204240908492J (Spot 5, 24/04/2012)  <b>2013</b>  N°50953471301040856232J (Spot 5, 04/01/2013)  N°50953481301040856322J (Spot 5, 04/01/2013)</p>
2.2 Images Analyse	No degradation occurred in the Project Area at the time when the images were taken. No sign of illegal degradation around in the project area
2.3 General Monitoring	Road opening between Pikounda and Ekouamou village. Started in January 2012, end planned in August 2013
<b>3. Field Monitoring - Illegal Activities</b>	
3.1 Control SE access	SE access has been controlled in September 2012 and no signs of illegal activities have been seen (see map of control in <b>Appendix 01</b> ).
3.2 In-concession control	During PSP monitoring, CIB teams have controlled that no illegal activities have happened within the concession and the PSP areas.
3.3 Control North access	<p>North access as well as access to all Blocks have been controlled several times, when re-opening the access road, then each time teams have come to field for the pre-inventory (November 2012), the inventory (December 2012) and the inventory control (January-February 2013).</p> <p><b>No sign of illegal harvesting or of community encroachment where identified within the project area during those controls.</b></p>
3.4 Control Western access	Meeting with IFO responsible for Sustainable Management (Mr Couturier) in November confirmed that no access is possible through the Western boundary of the project area.
3.5 Community Consultation	Molenda Community has been consulted in October 2012. During this consultation, a movie explaining the consequences of global warming has been projected to the community, and a presentation on REDD+ in “easy French” has been given. The meeting has been closed by a consultation with community representative. A movie summarizing all the aspects of the consultation has been done.
<b>4. Natural Disturbances Emissions Monitoring</b>	
4.1 Estimate Area of Natural Disturbances and fraction of the growing stock naturally damaged	<b>N.C.</b> - No Natural Disturbances occurred during the monitoring period
4.2 Estimation of carbon stored by regrowth in Natural Disturbance Area	<b>N.C.</b> - No Natural Disturbances occurred during the monitoring period
4.3 Calculation of annual total carbon losses due to Natural Disturbances	<b>N.C.</b> - No Natural Disturbances occurred during the monitoring period
<b>5. Illegal Harvesting Emissions Monitoring</b>	
5.1 Estimate Area of Illegal	<b>N.C.</b> - No illegal Harvesting occurred during the monitoring period

Harvesting and Merchantable volumes illegally harvested	
5.2 Calculation of annual total carbon losses due to Illegal Harvesting	<b>N.C.</b> - No illegal Harvesting occurred during the monitoring period
<b>6. Leakage Monitoring</b>	
6.1 Collect leakage data	Data provided by MEFDD have been collected for 2002-2011 reference period and for 2012, the first year of monitoring
6.2 Calculate Activity Shifting Leakage	No Activity Shifting Leakage for the monitoring period. See Leakage report in <b>Appendix 02.a and 02.b.</b>
6.3 Calculate Market Leakage	No Market Leakage for the monitoring period. See Leakage report in <b>Appendix 02.a and 02.c.</b>
<b>7. Uncertainty Monitoring</b>	
7.1 Calculate uncertainty	Uncertainty has been calculated to be 4,84%. It is below the 10% threshold and therefore no uncertainty deduction will be done. See uncertainty calculation spreadsheet for both Baseline Activity Emissions and Baseline Degradation in <b>Appendix 07</b> respectively Tab 2.3 and Tab 3.2.
<b>8. Non-Permanence Risk Assessment</b>	
8.1 Non Permanence Risk Review and Analysis	Non-Permanence Risk assessment has been conducted and completed with an estimated 17% of originated credits to be set aside for the Non-Permanence pooled buffer account. See Non-Permanence Risk assessment report in <b>Appendix 03.a</b> and Non-Permanence Risk buffer calculation tool completed in <b>Appendix 03.b</b>
<b>9. Quality Assurance / Quality Control</b>	
9.1 PSPs inventory data control	100% of captured data has been controlled during Carbon Planet Senior Forest Engineer mission in January/February 2012. See Control Report in <b>Appendix 04.</b>
9.2 PSPs inventory field control	40 % of the PSPs inventoried in November/December have been controlled during Carbon Planet Senior Forest Engineer mission in January/February 2012. See Control Report in <b>Appendix 04.</b>
9.3 Team work quality	All teams have been rewarded a Quality premium following the requirements of the control procedure. See Control Report in <b>Appendix 04.</b>
9.4 Documentation management	All document have been stored in "Aménagement" office in Pokola Procedures have been modified following Inventory Control return of experience. See Control Report in <b>Appendix 04.</b>
<b>10. Training</b>	
10.1 New elements	All personnel involved in the inventory and inventory control have been trained following specification of Inventory and Control procedures prior to taking part to the field work.

10.2 Additional training	Following recommendations of the Control Report, all teams will be trained before the next monitoring inventory, especially concerning (i) the new botanical lexicon, (ii) strengthen measuring competences with a tape-meter, a relascope and a dendrometer and (iii) changes made to the different procedures.  See Control Report in <b>Appendix 04</b> .
<b>11. Documentation Management</b>	
11.1 PSPs field records	All document have been stored in “Aménagement” office in Pokola
11.2 PSPs control records	All document have been stored in “Aménagement” office in Pokola
11.3 Database	All document have been stored in “Aménagement” office in Pokola
11.4 Training records	All document have been stored in “Aménagement” office in Pokola
<b>12. VCU Calculation</b>	
12.1 Final VCU calculation	VCU vintage has been estimated based on results of parameters monitored and Excel model  Inventory data are processed into the excel spreadsheet and AGB carbon stock per hectare, Growth Foregone and regrowth Factor are calculated ( <b>Appendix 05</b> ). Ex-ante annual merchantable volumes and other timber volumes used under the baseline scenario are modelled in <b>Appendix 07, Tab 1</b> . Then, annual Baseline activities emissions are modelled (based on annual volumes harvested) in <b>Appendix 07, Tab 2.2</b> . Finally, annual Baseline GHG emission and removals are estimated in <b>Appendix 07, Tab 3.1</b> .

### 2.1.2 Monitoring results

No significant events have impacted the GHG emission reductions or removals and the monitoring plan. All activities described above have been implemented and the monitoring plan has been followed.

### 2.1.3 Leakage monitoring and management

Activity shifting leakage has been evaluated by monitoring production data throughout all CIB concessions and Market leakage has been assessed by monitoring production data for Sangha and Likouala department over the monitoring period. Data have been processed following Sharma and al (2012) methodology.

**No Activity Shifting and Market Leakages have been identified for the monitoring period.**

All information related to leakage is disclosed in **Appendixes 02.a, b and c**.

### 2.1.4 Non-permanence risks monitoring and management

Non-permanence risk buffer has been estimated by following the VCS AFOLU Non-Permanence Risk Tool (see report and calculation spreadsheet respectively in **Appendixes 03.a and 03.b**).

## 2.2 Project Description Deviations

The deviations, which does not impact the applicability of the methodology, its additionality or the appropriateness of the baseline scenario , are listed in the table below. All the deviations listed in this document are deviations from the VCS-PD.

In this table, equation references are from VM0011.

Methodology chapter	Deviation
<p>3.3.4</p> <p>Estimation of carbon in the Growth Foregone due to selective logging</p>	<p>For this first monitoring event, it has logically not been possible to estimate the Growth Foregone by calculating the growth of commercial trees monitored in the PSPs between two monitoring events.</p> <p>In order to have an accurate estimation for this factor, species-specific mean Annual Growth Rates have been applied to each commercial tree monitored.</p> <p>Those mean Annual Growth Rates have been selected from the three following sources:</p> <ul style="list-style-type: none"> <li>- PSPs set-up by Nature+ in CIB concessions between 2005 and 2009: those plots have been specifically design to monitor the growth rates of commercial species in CIB concessions. The results are available in the report “Croissance en diamètres des principaux essences commerciales sur les dispositifs de suivi de la CIB” (2011);</li> <li>- Forest Management Plan: growth rates approved by MDDFE;</li> <li>- Growth rates selected from CIRAD for most common species in Central Africa (Picard and Gourlet-Fleury, 2011).</li> </ul> <p><b>This deviation will only be used for the first monitoring event, as it will not longer be necessary when a second PSP inventory will be undertaken in 2013.</b></p> <p>As the PSPs monitoring was conducted at the end of the monitoring period, the mean Annual Growth Rates will be subtracted to the date measured and not added.</p>
<p>3.3.5</p> <p>Estimation of carbon in the Regrowth after selective logging</p>	<p>As for the estimation of the Growth Foregone, it has not been possible for the first monitoring event to estimate the Regrowth by calculating the growth of monitored trees between two monitoring events.</p> <p>In order to have an accurate estimation for this factor, species-specific mean Annual Growth Rates have been applied to each tree monitored.</p> <p>For commercial species, sources for growth rates are stated hereabove.</p> <p>For other species, growth rates have all been selected from CIRAD</p>

Methodology chapter	Deviation
	<p>growth rates for most common species in Central Africa (Picard and Gourlet-Fleury, 2011).</p> <p><b>This deviation will only be used for the first monitoring event, as it will not longer be necessary when a second PSP inventory will be undertaken in 2013.</b></p> <p>As the PSPs monitoring was conducted at the end of the monitoring period, the mean Annual Growth Rates will be subtracted to the date measured and not added.</p>

**2.3 Grouped Project**

Not Concerned

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Table 6 - Data and parameters available at validation

Data / Parameter	Unit	Description	Source	Value	Purpose / Justification	Uncertainty (CI95% or relative error)
<b>VM0011: General</b>						
$A_{\text{project},t=0}$	ha	Project Area	Management plan	55,950	-	-
$A_{\text{NHA\_annual},t}$	ha	1/5 <sup>th</sup> of the area of each UFP	Management plan	See VCS-MR <b>Appendix 07</b>	-	-
$CF_{\text{AGB}}$	tC.(t d.m.) <sup>-1</sup>	Carbon Fraction in the AGB	IPCC, AFOLU, Chap 4, Table 4.3	0.47	IPCC default values	-
$CF_{\text{wood}}$		Carbon Fraction in the Merchantable logs		0.49		
$D$	(t d.m.).m <sup>-3</sup>	Wood specific gravity	Zanne and al, 2009	See VCS-MR <b>Appendix 06</b>	Species-specific. If species not present in Zanne and al (2009), the value of 0,58 commonly accepted for timber in central Africa (Chave, Picard, ...) will be applied	-
$f(\text{DBH}_{n,l,s,j,t=0}, \text{H}_{n,l,s,j,t=0})$	dimensionless	Volume allometric equations for calculation of Merchantable volumes	Management plan	See <b>Appendix 06</b>	"Tarifs de cubage" commonly employed in the country	+/- 6% (on merchantable volumes calculated) for "objective" species and +/- 11% for "promotion" species
		Volume allometric equations for calculation of AGB	Chave and al, 2005 Feldspauch and al, 2012	See <b>Appendix 02.a</b> See annex of		+/- 8.3% (on mean carbon stock/ha)

Data / Parameter	Unit	Description	Source	Value	Purpose / Justification	Uncertainty (CI95% or relative error)		
				this document				
<b>DBH<sub>n,i,s,t=0</sub></b>	cm	Diameter at Breast Height (1,30 m)	PSPs inventory	See VCS-MR <b>Appendix 05</b>	Inventory procedure	-		
<b>V<sub>merch,t</sub></b>	m <sup>3</sup>	Merchantable volume harvested in year t	Management Plan  Total volumes given per UFP (5 years of harvesting)	See VCS-MR <b>Appendix 07, Tab 1</b>  See annex of this document	UFP	years	V <sub>merch</sub> (m <sup>3</sup> )	+/- 6,48%
					1	2012-2016	389,099	
					2	2017-2021	348,468	
					3	2022-2026	381,689	
					4	2027-2031	307,910	
<b>HI<sub>x</sub></b>	dimensionless	Harvesting Intensity ratio for species x: annual percentage of V <sub>merch</sub> estimated in the FMP that will be really harvested	CIB harvesting data (2006-2012), CIB FMPs	See annex of this document		-		
<b>C<sub>AGB</sub></b>	tC.ha <sup>-1</sup>	Carbon in the AGB of the growing stock	Monitoring inventory	149.05	See VCS-MR <b>Appendix 05</b>	+/- 8.3		
<b>VM0011: Net carbon from the Deadwood pool (3.3.1)</b>								
<b>k<sub>decay</sub></b>	yr <sup>-1</sup>		Chambers and al, 1999	0.186	Data for tropical evergreen forests with similar mean annual temperature (26,7°C) and superior mean WSG (0,69 g.cm <sup>-3</sup> )	Conservative value: mean decomposition rate is 1.9 yr <sup>-1</sup> , with a SE of 0.004 yr <sup>-1</sup>		
<b>f<sub>damages</sub></b>	tC.m <sup>-3</sup>	Factor combining Branch-Trim factor and Residual Stand Damage factor (see deviation description paragraph 2.6 of VCS-PD)	Brown and al, 2005	0.6989	Specific for CIB operations Total tC impact per m <sup>-3</sup> of merchantable volume extracted	+/- 0.0907		

Data / Parameter	Unit	Description	Source	Value	Purpose / Justification	Uncertainty (CI95% or relative error)
<b>VM0011: Net Carbon from the long term HWP pool (3.3.2)</b>						
$f_{\text{lumber\_recovery}}$	dimensionless	Proportion of merchantable log converted to LtHWP	CIB production data (2007-2012)	See VCS-MR <b>Appendix 07, Tab 1</b>	Specific for CIB operations Species specific	
$k_{\text{LtHWP\_ox}}$	yr <sup>-1</sup>	Rate of oxidation for LtHWP	VM001, Table B5 p.114; adapted from IPCC, 2006b, chap. 12, Table 12-2	0.023	-	+/- 50%
<b>VM001: Carbon in the Growth Foregone Due to Selective Logging (3.3.4) – See parameters monitored</b>						
<b>VM0011: Carbon in the Regrowth after Selective Logging (3.3.5) – See parameters monitored</b>						
<b>VM0011: Emissions due to Harvesting and On-site Preparation (3.4.1 &amp; 3.4.2)</b>						
$FC_{\text{harvest+onsiteprep}}$	L.m <sup>-3</sup>	Fuel consumptions of equipment used for harvesting and trimming per m <sup>3</sup> of merchantable log produced	CIB production data 2012	0.0912	Based on production monthly reports	+/- 0,0091
$EF_{\text{fuel}}$	kgCO <sub>2</sub> -e.L <sup>-1</sup>	Fuel emission factor	DEFRA, 2012; Annex 1	2.7782	Value for 100% mineral petrol	-
<b>VM0011: Emissions due to Log Hauling (3.4.3)</b>						
$FC_{\text{hauling}}$	L.m <sup>-3</sup>	Fuel consumptions of equipment used for hauling per m <sup>3</sup> of merchantable log produced	CIB production data 2012	4.7767	Based on production monthly reports	+/- 0.4841
$EF_{\text{fuel}}$	kgCO <sub>2</sub> -e.L <sup>-1</sup>	Fuel emission factor	DEFRA, 2012; Annex 1	3.6028	Value for Gas Oil	-
<b>VM0011: Emissions due to Log Transport (3.4.4)</b>						
$Cap_{\text{truck}}$	m <sup>3</sup>	Truck load capacity	CIB production data 2011	56.32	Based on transport monthly reports	-
$KM_{\text{transport,t}}$	km	Annual log transport distance from collection depot to processing plant	See Distance map in <b>Appendix 07.a</b>	See <b>Appendix 07.b</b> See Annex of	1/5 <sup>th</sup> of the average distance for each UFP. Estimated based on road network proposed in Management Plan	-

Data / Parameter	Unit	Description	Source	Value	Purpose / Justification	Uncertainty (CI95% or relative error)
				this document		
<b>FC<sub>transport</sub></b>	L.km <sup>-1</sup>	Truck fuel consumption	CIB production data 2011	0.6014	Based on transport monthly reports	+/- 0,014
<b>EF<sub>fuel</sub></b>	kgCO <sub>2</sub> -e.L <sup>-1</sup>	Fuel emission factor	DEFRA, 2012; Annex 1	3.6028	Value for Gas Oil	-
<b>VM0011: Emissions due to Timber Processing (3.4.5) – Only used while co-generation is not in place</b>						
<b>FC<sub>processing</sub></b>	L.m <sup>-3</sup>	Generators fuel consumption per m3 of timber entering the sawmill	CIB production data 2012	14.7	-	+/- 1.345
<b>EF<sub>fuel</sub></b>	kgCO <sub>2</sub> -e.L <sup>-1</sup>	Fuel emission factor	DEFRA, 2012; Annex 1	3.6028	Value for Gas Oil	-
<b>V<sub>sawn_timmer,t</sub></b>	m <sup>3</sup>	Volume of merchantable logs reserved for the sawmill in year t	Management plan, calculation based on <b>V<sub>merch,t</sub></b>	See VCS-MR <b>Appendix 07, Tab 1</b>	-	-
<b>f<sub>export/sawn</sub></b>	dimensionless	Ratio of total merchantable volume reserved for the sawmill	CIB production data 2007-2012	See VCS-MR <b>Appendix 07, Tab 1</b>	Species specific.	-
<b>VM0011: Emissions due to Log Distribution (3.4.6)</b>						
<b>V<sub>merch,vehicle,destination,t</sub></b>	m <sup>3</sup>	Volume of merchantable logs/sawn timber transported to destination d, by vehicle v, in year t	Management plan, CIB production data 2007-2012	See VCS-MR <b>Appendix 07, Tab 1</b>	Depends on destination	-
<b>Cap<sub>vehicle</sub></b>	m <sup>3</sup>	Truck load capacity	CIB production data 2011 Legal threshold for Cameroon	48.2 49.4	Based on transport monthly reports Based and Cameroon legislation	-

Data / Parameter	Unit	Description	Source	Value	Purpose / Justification			Uncertainty (CI95% or relative error)	
					Destination	Distance (km)			
<b>KM</b> <sub>distrib,destination,t</sub>	km	Distance between Pokola and export point	GIS software	See VCS-MR <b>Appendix 07, Tab 2.1</b>  See Annex of this document	<b>Destination</b>	Distance (km)		-	
					<b>PKL-BZV</b>	880	Road		
					<b>PKL-BZV</b>	850	River		
					<b>BZV-PTN</b>	510	Rail		
					<b>PKL-DOU</b>	1350	Road		
					<b>PKL-BELABO</b>	750	Road		
					<b>BELABO-DOU</b>	650	Rail		
<b>FC</b> <sub>truck</sub>	L.km <sup>-1</sup>	Truck fuel consumption	CIB production data 2011	0.6014	Based on transport monthly reports			+/- 0.014	
<b>EF</b> <sub>fuel</sub>	kgCO <sub>2</sub> -e.L <sup>-1</sup>	Fuel emission factor	DEFRA, 2012; Annex 1	3.6028	Value for Gas Oil			-	
<b>EF</b> <sub>rail</sub>	Kg CO <sub>2</sub> -e/t/km	Rail freight emission factor	DEFRA, 2012, Annex 7	0.03634	Value for Rail Freight			-	
<b>VM0011: Emissions due to Leakage (Chapter 5)</b>									
<b>V</b> <sub>historical_harvest,l,t=0</sub>	m <sup>3</sup>	Annual volume of harvest for land <i>l</i> , (where <i>l</i> = 1,2,3,...L), that is owned and/or operated by the Project Proponent over the historical reference period <i>K</i>	CIB production data	See <b>Appendixes 03.a and 03.b</b>	Annual volumes have been calculated for each years between 2002 and 2011 (Historical reference period), for the concessions of Pokola, Kabo, Toukoulaka and Loundoungou			-	
<b>V</b> <sub>c,M</sub>	m <sup>3</sup>	Annual volume of timber production in each concession, <i>c</i> , with the same forest types or tree species composition in the country in each year, <i>m</i> , of the historical reference period ( <i>M</i> ).	MEFDD compilation of production data	See <b>Appendixes 03.a and 03.c</b>	Annual volumes have been calculated for each years between 2002 and 2011 (Historical reference period), for the concessions of the department of Sangha (namely SOCALIB, SIFCO, SEFYD, IFO) and Likouala (namely BPL, Cristal, ITBL, Likouala			-	

Data / Parameter	Unit	Description	Source	Value	Purpose / Justification	Uncertainty (CI95% or relative error)
					Timber, Mokabi SA, Thanry Congo, Bois Khassa, Pietistes)	

### 3.2 Data and Parameters Monitored

Table 7 - Data and Parameters monitored

Data / Parameter	Unit	Description	Source	Value	Monitoring equipment	QA / QC	Uncertainty (CI95% or relative error),
<b>VM0011: General</b>							
<b>DBH<sub>n,i,s,t</sub></b>	cm	Diameter at Breast Height (1,30 m)	PSPs inventory	see VCS-MR	Tape-meter, relascope (see inventory procedure)	Control procedure	see VCS-MR
<b>VM0011: Net carbon from the Deadwood pool (3.3.1): see parameters available at validation</b>							
<b>VM0011: Net Carbon from the long term HWP pool (3.3.2): see parameters available at validation</b>							
<b>VM001: Carbon in the Growth Foregone Due to Selective Logging (3.3.4)</b>							
<b>B<sub>AGBmerch,t</sub></b>	(t.d.m).ha <sup>-1</sup>	Average aboveground biomass of the merchantable trees in the project area in year t	PSPs inventory	See VCS-MR	Tape-meter, relascope (see inventory procedure)	Control procedure	See VCS-MR
<b>C<sub>growth_foregone,t</sub></b>	tC.ha <sup>-1</sup> .yr <sup>-1</sup>	Annual carbon lost due to the growth foregone in the above ground biomass in the project area in year t	PSPs inventory	see VCS-MR	Tape-meter, relascope (see inventory procedure)	Control procedure	see VCS-MR
<b>VM0011: Carbon in the Regrowth after Selective Logging (3.3.5)</b>							
<b>B<sub>AGB_regrowth,t</sub></b>	(t.d.m).ha <sup>-1</sup>	Average aboveground biomass of trees in the regrowth estimated from the growth of trees in the regeneration sub-plot of the PSPs	PSPs inventory	See VCS-MR	Tape-meter, relascope (see inventory procedure)	Control procedure	See VCS-MR

Data / Parameter	Unit	Description	Source	Value	Monitoring equipment	QA / QC	Uncertainty (CI95% or relative error),
$G_{\text{regrowth},t}$	$(t.d.m).ha^{-1}$	Average regrowth per hectare per year of the AGB after logging in year t	PSPs inventory	See VCS-MR	Tape-meter, relascope (see inventory procedure)	Control procedure	See VCS-MR
$C_{\text{regrowth},t}$	$tC.ha^{-1}.yr^{-1}$	Average regrowth of the AGB in gaps after selective logging	PSPs inventory	see VCS-MR	Tape-meter, relascope (see inventory procedure)	Control procedure	see VCS-MR
<b>VM0011: Emissions due to Harvesting and On-site Preparation (3.4.1 &amp; 3.4.2): see parameters available at validation</b>							
<b>VM0011: Emissions due to Log Transport (3.4.4): see parameters available at validation</b>							
<b>VM0011: Emissions due to Timber Processing (3.4.5): see parameters available at validation</b>							
<b>VM0011: Emissions due to Log Distribution (3.4.6): see parameters available at validation</b>							
<b>3.2.1.1.1.1.1.1.1 VM0011: Emissions due to Natural Disturbances (4.4)</b>							
$A_{nd,j,t}$	ha	Annual area of natural disturbance "nd" in stratum j in year t	Annual Monitoring	see VCS-MR	Satellite images analyse, Tape-meter	Monitoring plan	see VCS-MR
$f_{natdisturb,j,t}$	dimensionless	Fraction of the growing stock naturally damaged in year t, in stratum j	Annual Monitoring	see VCS-MR	Satellite images analyse, Tape-meter	Monitoring plan	see VCS-MR
$DBH_{tree\_nd,i,snd,j,t}$	cm	Diameter at breast height for individual tree n, of species i, in sample plot in the naturally disturbed area snd, of stratum j in year t	Annual Monitoring	see VCS-MR	Tape-meter	Monitoring plan	see VCS-MR
<b>VM0011: Emissions due to Illegal Harvesting (4.5)</b>							
$A_{illegal\_harvest,t}$	ha	Annual area of illegal harvest in stratum j in year t	Annual Monitoring	see VCS-MR	Satellite images analyse, Tape-meter	Monitoring plan	see VCS-MR
$V_{illegal\_harvest,t}$	tC	Annual volume of wood sold as determined from field survey in year t	Annual Monitoring	see VCS-MR	Satellite images analyse, Tape-meter	Monitoring plan	see VCS-MR
<b>VM0011: Emissions due to Leakage (Chapter 5)</b>							
$V_{actualharvest,l,t}$	$m^3.yr^{-1}$	Annual actual volume of harvest for land l, operated by the project proponent in year t	Annual Monitoring	see VCS-MR	Sharma and al, 2012	-	see VCS-MR
$V_{marketleakage, M}$	$m^3.yr^{-1}$	Average annual volume of timber production after the	Annual Monitoring	see VCS-MR	Sharma and al, 2012	-	see VCS-MR

Data / Parameter	Unit	Description	Source	Value	Monitoring equipment	QA / QC	Uncertainty (CI95% or relative error),
		implementation of an IFM-LtPF project from the same forest types or tree species composition and in the same climatic region within the host country, for the monitoring period, <i>M</i>					

### 3.3 Description of the Monitoring Plan

The North Pikounda REDD+ Project is required to undertake periodic monitoring of the project and leakage area.

The North Pikounda REDD+ Project Monitoring System uses a dynamic system that seeks to identify, assess and create a mitigation plan for potential risks that might arise in relation to the Project. In order to ensure a process for monitoring Project progress and documenting lessons learned or corrections that may be needed, and incorporating them into project decision-making in future monitoring periods, the Project adopts the system that is already in place and implemented for CIB. The company being FSC certified, it has a set of procedures and systems in place (verified annually during the FSC verification audits) that regulate the documents management, the procedures verification and validation, etc, and for which CIB staff is used to work with. The QA/QC system already in place will serve as a “backbone” for the Project QA/QC system, for example to handle complaints or non-conformities, etc.

The Monitoring Plan described in detail in **Appendix 08**, is based on 12 main activities that are briefly described below. This appendix “Monitoring Plan for the North Pikounda REDD+ project” can be considered as the procedure that will be implemented in order to collect all the necessary information for the Verification audits.

#### 1. PSPs inventory

The PSPs network will be monitored before each verification event. Tree parameters and dynamic will be measured, analyzed and compiled in order to estimate the Carbon stock variations (AGB), the growth foregone and the regrowth factors.

#### 2. Remote Sensed Monitoring - Illegal/Natural Disturbances

Spot 5 images will be acquired annually through the partnership between CIB and *Portail de l’Observation Spatiale des Forêts du Congo* and Astrium. Those images will be analyzed to determine any evidences of illegal activities or natural disturbances.

#### 3. Field Monitoring - Illegal Activities

Illegal logging is not a viable threat in the early stage of the Project, as there are no communities within the Project Area and any nearby communities are at least 20km away. However, much can change in a developing country in 30 years such as RoC, including increased population pressures.

Annual field control will be organized with CIB teams, during PSPs inventory or if needed after satellite images analyze. Community consultation will also allow monitoring any kind of illegal activities in the area. CIB-Olam’s significant community experience from its FSC certification activities will be leveraged in this area to ensure a robust monitoring.

#### 4. Natural Disturbances Emissions Monitoring

If natural disturbances are identified, the associated emissions will be monitored following VM0011 and Monitoring Plan.

#### 5. Illegal Harvesting Emissions Monitoring

If illegal harvesting activities are identified, the associated emissions will be monitored following VM0011 and Monitoring Plan.

#### 6. Leakage Monitoring

Appropriate production data from the Leakage Area will be collected, analyzed and compiled upon each verification event to estimate activity shifting and market leakage.

#### 7. Uncertainty Monitoring

Uncertainty linked to the parameters monitored will be automatically calculated using excel models.

**8. Non-Permanence Risk Assessment**

The non-permanence risk tool will be reviewed upon each verification event and actualized if necessary, in view of the any relevant data collected.

**9. Quality Assurance / Quality Control**

The Project implement a rigorous quality assurance and quality control (QA/QC) system to ensure the long-term accuracy of the data that is collected, to ensure a robust data storage system and to create a systematic data management structure. This QA/QC systems is entirely integrated in the already existing QA/QC system that has been implemented for FSC certification. This system is reviewed annually during FSC Verification audits, that is a guarantee of the quality and dynamic nature of the QA/QC System.

**10. Training**

All new personal participating in PSPs inventory/control are trained following PSPs Inventory/Control/Monitoring Procedures specifications and standard CIB practices, as much as is reasonably possible.

**11. Documentation Management**

All documents are properly controlled managed and stored in a manor that complies with standard CIB practices, or as much as is reasonably possible.

**12. VCU Calculation**

For each verification event, VCU vintage is estimated and updated based on the parameters monitoring results.

See full Monitoring Plan in **Appendix 08**.

**4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS**

**4.1 Baseline Emissions**

Please refer to **Appendix 10** for detailed calculation of Baseline Degradation emissions and to **Appendix 09** for detailed calculation of Baseline Activities emissions.

**Table 8 – 2012 Baseline emissions**

Emissions leaving the DW pool	Emissions leaving lthWHP pool	Carbon in the growth foregone	Carbon due to regrowth	Emissions due to degradation	Emissions due to degradation	Emissions due to harvesting and processing operations	Emissions due to Baseline Activity
CDW_deca	ClthWHP_oxidati	Cgrowth_foreg	Cregrowth	C'Degradatio	C'Degradatio	C'Emissions	C'Baseline
tC	tC	tC	tC	tC	tCO2e	tCO2e	tCO2e
6,296	10,061	1,065	100	17,322	63,515	6,032	<b>69,547</b>

#### 4.2 Project Emissions

Not Accounted. Considered as insignificant (see PDD).

#### 4.3 Leakage

Leakage emissions are equal to zero for the monitoring period:  $C'_{leakage}$  is equal to zero.

See **Appendixes 02.a, 02.b and 02.c.**

#### 4.4 Uncertainty Deduction

Annual relative uncertainty has been calculated and is equal to 6% ( $U_{IFM-LiPF}$ ). This is under the 10% threshold as set forth in the methodology and therefore no uncertainty deduction will be considered.

Please refer to **Appendixes 07 Tabs 2.3 and 3.2** for detailed calculation.

#### 4.5 Non-Permanence Risk Withholding percentage

The Non-Permanence Risk buffer withholding percentage is 21% ( $NP_{buffer}$ ).

Please refer to **Appendixes 03.a and b** for detailed calculation.

#### 4.6 Summary of GHG Emission Reductions and Removals

**Table 9 - Summary of GHG emissions reductions and removals for 2012**

$C'_{Degradation}$ tCO2e	$C'_{Baseline}$ tCO2e	$C'_{IFM-LiPF}$ tCO2e	$CC_{IFM-LiPF}$ tCO2e	$CC_{NP-Buffer}$ tCO2e	<b>VCU</b> tCO2e
63,515	69,547	69,547	69,547	13,338	<b>56,209</b>

The above parameters are calculated with the following equations from VM0011:

$$\text{Equation 1-1: } C'_{IFM-LiPF} = C'_{baseline} - C'_{leakage}$$

$$\text{Equation 1-2: } CC_{NPbuffer} = NP_{buffer} * C'_{degradation}$$

$$\text{Equation 6-11: } CC_{IFM-LiPF} = \frac{100 - (U_{IFM-LiPF} - 10)}{100} * C'_{IFM-LiPF}$$

Equation 1-3:  $VCU = CC_{IFM-LiPF} - CC_{NPbuffer}$

## 5 ADDITIONAL INFORMATION

No additional information.