REPORT SUMMARY

CDM/JI FEASIBILITY STUDIES 2003

A/R AND BIOMASS ENERGY PROJECTS IN INDONESIA

March 2004

Sumitomo Forestry Co., Ltd.

Sumitomo Forestry Co., Ltd reported two projects for biomass energy and three projects for afforestation and/or reforestation activities. Details are available in our experimental PDD in English on the web. site of Global Environment Centre Foundation.

Part 1 Biomass Energy Projects

1 RPI CDM Biomass Project in Central Java

The RPI project is carried out by PT Rimba Partikel Indonesia (PT RPI). PT.RPI manufactures particle board, a type of wooden board used for furniture and housing. PT.RPI is located in the Central Java province in the Republic of Indonesia. Production has been around 100,000 – 120,000 metric ton a year. The company uses wood wastes for their raw materials, which are collected from industries, local community and their own forest plantation activity.

The RPI project is composed of components as follows;

A) "Substitution of the fossil fuel by installation of biomass fuel facilities into manufacturing process"

- Biomass fuel chip dryer component
  The wood powder as biomass fuel will be used as substitute for diesel oil. A biomass fuel chip dryer will largely reduce the current use of diesel oil. This will result in a reduction of carbon dioxide emissions from combustion of diesel oil, because CO2 emitted from biomass is defined as carbon-neutral under IPCC guidelines. This component was installed in 2002 and has been working.
- Biomass fuel power plant component
  A biomass fuel power plant will be installed into a factory as substitute for a diesel oil power plant. This displacement will largely eliminate carbon dioxide emissions from the current practice of using the diesel oil power plant because of same reason as above.

B) "Supply of electricity to power grid by biomass fuel generation"

- Electricity supply component
  The sale of surplus electricity generated by the biomass fuel power plant will substitute for grid electricity and result in reduction of carbon dioxide emissions from combustion of fossil fuel for electric generation on the power grid, because CO2 emitted from biomass is defined as carbon-neutral under IPCC guidelines.

Project participants are PT Rimba Partikel Indonesia, Semarang, Central Java Province, the Republic of Indonesia and Sumitomo Forestry Co., Ltd. Tokyo, Japan.

Category(ies) of project activity: There are two categories as for the project activities;

- Energy industries (Renewable energy):Grid-connected electricity generation
- Manufacturing industries : substitution of the fossil fuel

The Baseline Methodology of the Project is;

Name	Compornent	Objectives and details	Baseline Scenario
Substitution of the fossil fuel by installation of biomass fuel facilities into manufacturing process	Biomass-typed wood chip drier component	The wood powder as biomass fuel will be used as substitute for diesel oil. A biomass-typed wood chip drier will largely reduce the current use of diesel oil. This will result in a reduction of carbon dioxide emissions from combustion of diesel oil. Therefore, the baseline of this component is decided to be the emission from the current use of the biomass fuel chip dryer.	Baseline scenario related to the biomass fuel facilities is that the existing diesel oil facilities will not be retooled and will be continued to be used in manufacturing process during a crediting period (2003-2012). Determine fossil fuel consumption as baseline by consideration of energy efficiency Calculate CO2 emission from diesel oil consumption
	Biomass fuel power plant component	A biomass fuel power plant will be installed into a factory as substitute for a diesel oil power plant. This displacement will largely eliminate carbon dioxide emissions from the current practice of using the diesel oil power plant. Therefore, the baseline of this component is decided to be the emissions from current use of the diesel oil power plant.	Same as above.
Supply of electricity to power grid by biomass fuel generation	Electricity supply component	The sale of surplus electricity generated by the biomass fuel power plant will substitute for grid electricity and result in reduction of carbon dioxide emissions from combustion of fossil fuel for electric generation on the power grid.	With regard to the baseline scenario, the biomass fuel power plant would not be installed and the existing diesel oil power plant will continue to be used for the generation of electricity in the factory.

Monitoring methodologies are;

Methodology	General description
methodology I	Monitoring methodology I aims to monitor the fact that proposed fossil fuel has been partially reduced or totally eliminated owing to two components in question. It requires to be monitored by direct measurement
methodology II	Monitoring methodology II intends to monitor the fact that power generation is totally replaced by biomass materials as well as its progress compared to its original designing. All the monitoring items are also available by direct measurement.

Emission reduction by the Project is estimated to be 212,528 CO2-ton as follows;

year		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total
Methodology I	Baseline	21,057	22,617	22,498	23,020	22,901	22,784	22,668	22,555	22,443	22,332	224,875
	Emission	15,373	16,451	16,623	2,569	2,595	2,595	2,595	2,595	2,595	2,595	66,584
	Reduction	5,684	6,166	5,875	20,451	20,306	20,189	20,073	19,960	19,848	19,737	158,291
Methodoolgy II	Baseline	0	0	0	7,626	7,733	7,626	7,733	7,733	7,839	7,945	54,237
	Emission	0	0	0	0	0	0	0	0	0	0	0
	Reduction	0	0	0	7,626	7,733	7,626	7,733	7,733	7,839	7,945	54,237
Total reduction		5,684	6,166	5,875	28,077	28,039	27,815	27,806	27,693	27,687	27,682	212,528

Environmental impacts and social impacts by the project are considered as follows;
Environmental impacts should be considered before the project commences. If there is significant and negative impacts, the project participants should implement environmental impact assessment based on the host country's regulation, which is called AMDAL in Indonesia and well established system under BAPEDAL facilitated under the Ministry of Environment. If the project is small and no negative impacts, the participants should voluntarily make a environmental management and monitoring plan before starting.

Cost effectiveness of the project is expected to be US$19,646,000/212,528 = US$92.4 /CO2-ton
From the above estimation, it is clear that there is no incentive to invest to the proposed project without CDM activity, because the long term cost of installation of the project is higher than that of the baseline scenario. In addition, the incentive to invest may lag because of a high risk of implementation of the project.

2. KTI Biomass Project in East Java

The project will reduce anthropogenic GHG emissions by displacing electricity generated by electric power plant with electricity generated by biomass energy. This project is carried out by PT Kutai Timber Indonesia (PT KTI) which products wood products such as plywood, timber and woodworks, in the East Java Province. For the purpose of substitution of electricity supplied from electrical grid through biomass energy utilization. For the purpose of substitution of grid-connected electricity, PT KTI facilitate their biomass generators with 10MW capacity.
The CDM project will create CER which is equivalent to the reduced grid-connected electricity as an energy substitution project. As for electricity power supply project, PT KTI will sell their surplus electricity to national power grid. The emission reductions are equivalent to the sold and substituted electricity which is calculated based on average grid emission will becomes CER as a CDM project.

There are two categories as for the project activities;
- Energy industries (Renewable energy): Grid-connected electricity generation
- Manufacturing industries : Substitution of grid electricity with biomass energy

This project consists of two components. The methodology described approach (a) is selected to determine the baseline of each component.

Baseline methodologies of the project are;

	Methodology I	Methodology II
Name	Substitution of grid-connected electricity by biomass fuel generator	Supply of electricity to power grid by biomass fuel generation
Approach	A biomass fuel power plant will be installed into a factory as substitution for a electricity used in the factory. The electricity is supplied via electrical grid. This displacement will largely eliminate carbon dioxide	The sale of excessive electricity generated by the biomass fuel power plant will substitute for grid electricity and result in reduction of carbon dioxide emissions from combustion of fossil fuel for electric generation on the power grid because

	emissions from the generation on national electrical grid. The generation on the national grid was mainly conducted by fossil fuel combustion in Indonesia.	CO2 emitted from biomass is defined as carbon-neutral under IPCC guidelines.
Scenario	Baseline scenario is that electricity supplied from power grid will continue to be used in the factory during a crediting period (2006-2015).	Baseline scenario is that electricity supplied from power grid will continue to be used in the factory during a crediting period (2006-2015).
Project period	10 years (2006-2015).	10 years (2006-2015).
Boundary	The project boundary of the project is all the factory site.	The project boundary of the project is all the factory site.
Additionality	(1)Technological barriers; Assessment of economically attractive courses of action (2)Barrier of common conscious (3)Technology is considered from assessment of common conscious and policies in the project area	(1)Technological barriers; Assessment of economically attractive courses of action (2)Barrier of common conscious (3)Technology is considered from assessment of common conscious and policies in the project area

Emission reduction by the project is;

Table E.5.1. Total emission reduction by the project Unit:(tonCO2)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Baseline	44,882	45,026	44,935	45,309	45,149	45,874	46,521	47,206	47,890	48,572	461,363
Emission	2,269	2,708	2,599	2,609	2,515	2,424	2,441	2,404	2,471	2,533	24,973
Reduction	42,613	42,318	42,335	42,699	42,634	43,450	44,080	44,802	45,419	46,039	436,390

Part 2 Afforestation and/or Reforestation Project

1. KTI A/R CDM Project in East Java

The project is developed by PT. Kutai Timber Indonesia (refereed as " PT KTI" hereinafter), who is plywood manufactures in Indonesia established in 1975 with the head office in Jakarta and factory in Probolinggo, East Java province. The company raises necessary substance to commence the project and will manage it together with stakeholders.

General description of the project is;

Items	Description
Title of the project activity	A/R CDM project in East Java Provice
Category	LULUCF
Type	A/R activities

<table>
<tr><td>Purpose of the project Activity</td><td>1) To increase carbon stock by planting trees in community land through falcata-based agroforestry system and in state land through industrial timber plantation.
2) To reduce pressure on natural forest to meet demand for future raw material of timber for plywood industry
3) To increase soil productivity and reduce soil degradation at steep slopes surrounding the project area.
4) To improve income of local communities</td></tr>
<tr><td>Site, areas and boundary</td><td>Project sites are scattered in the province and integrated as single project boundary
<table>
<tr><th>Site</th><th>Area</th><th>Method</th></tr>
<tr><td>Pasuruan</td><td>500ha</td><td>Agro-forestry</td></tr>
<tr><td>Krucil</td><td>500ha</td><td>Industrial plantation</td></tr>
<tr><td>Jember</td><td>1,000ha</td><td>Industrial plantation</td></tr>
<tr><td>Others＊</td><td>500ha</td><td>Agro-forestry in approx. 10 sites</td></tr>
<tr><td>Total</td><td>2,500ha</td><td></td></tr>
</table>
＊ Ngantang, UNIBRAW, UNESA, Probolinggo,Golf Singosar, Malang, etc.</td></tr>
<tr><td>Project period</td><td>20 years</td></tr>
<tr><td>Participants</td><td>Project developer: PT Kutai Timber Industry (PT. KTI)
Project Participants:
• At Krucil: The local entity, the ex-servicemen's foundation and Local Community (Farmer Groups)
• At Pasuruan: The religious group and Local community (Farmer Groups)
• At Jember: PT Perkebunan Nusantara XII (PTPN)
Sumitomo Forestry Co., Ltd. Tokyo, Japan: CDM arrangement both in Japan and host country.</td></tr>
<tr><td>Tree species</td><td>Paraterianthes falcataria</td></tr>
</table>

Baseline methodology is;
The title of baseline methodology is tentatively refereed as "Methodology for A/R activity in Indonesia " refereed from Annex 3 of our document. This project proposed an approach for defining baseline using past trend data, therefore the approach (i) is appropriate.

Net anthoropogenic greenhouse removals by sink will amount to 223,682CO2-ton, averagely 11,184CO2-ton per year and 4.5CO2-ton per 1ha, year.

	Year										1-10
	2001	2002	2003	3004	2005	2006	2007	2008	2009	2010	
	1	2	3	4	5	6	7	8	9	10	Subtotal
Actual greenhouse gas removal by sink (CO2-ton)	360	8,538	29,897	48,812	71,711	40,195	2,587	5,118	2,672	2,613	212,502
Baseline net removals (CO2-ton) **0.4** ton/ha	204	315.2	120	360.8	0	132	158	162	151.2	152	1,755
Leakage (CO2-ton) **242** ton/year	242	242	242	242	242	242	242	242	242	242	2,420
Net anthropogenic greenhouse gas removals by sink	-127	7,939	29,494	48,168	71,428	39,780	2,146	4,673	2,238	2,178	207,917

											11-20	1-20
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
	11	12	13	14	15	16	17	18	19	20	Subtota	G.Total
Actual greenhouse gas removal by sink (CO2-ton)	1,977	1,953	2,101	2,393	1,025	2,829	1,395	2,318	1,428	2,099	19,518	231,608
Baseline net removals (CO2-ton) **0.4** ton/ha	136.8	124	132	140	143.2	132	132	136.8	134	124	1,335	3,090
Leakage (CO2-ton) **242** ton/year	242	242	242	242	242	242	242	242	242	242	2,420	4,840
Net anthropogenic greenhouse gas removals by sink	1,599	1,587	1,727	2,011	640	2,455	1,021	1,939	1,052	1,733	15,765	223,682

Estimation of the project and its feasibility are;

		year 1-20	year 1-10	year 11-20
Actual greenhouse gas removals by sink (CO2-ton)	overall	231,608	212,502	19,518
	yearly average	11,580	21,250	1,951
	average/ha,year	4.6	8.5	0.8
Baseline greenhouse gas net removals (CO2-ton)		3,090	1,755	1,335
Leakage (CO2-ton)		4,840	2,420	2,420
Net anthropogenic greenhouse removals by sink (CO2-ton)	overall	223,682	207,917	15,765
	yearly average	11,184	20,791	1,945
	average/ha,year	4.5	8.3	0.8
Cost effectiveness				
Case of CER=0				
capital		200	200	0
direct expenses	A/R activity	2,283	1,229	1,054
	felling and cutting (transport not included)	1,675	589	1,086
indirect expenses	depreciation, CDM expense	4,402	1,978	2,424
other expenses	interest	1,084	926	158
total expenses		9,644	4,922	4,722
per capita	US$/1CO2-ton	43.1	23.6	299.5
Case of CER=US$10				
capital		200	200	0
direct expenses	A/R activity	2,283	1,229	1,054
	felling and cutting (transport not included)	1,675	589	1,086
indirect expenses	depreciation, CDM expense	4,402	1,978	2,424
other expenses	interest	230	230	0
total expenses		8,590	4,026	4,564
per capita	US$/1CO2-ton	38.4	19.3	289.5

2. Other A/R Projects

We surveyed and estimated another two projects; one is in the Central Java Province and the other in the East Kalimantan Province. These information are also available on the Web. Site.

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