Sustainable Development Models Of Plantation Forest With Coal Mine In The Forest Production

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Abstract

The dissertation examined integrated exploration of natural forest and coal mines in the area of forests based on Extended Benefit-Cost Analysis. This particular research was conducted in a quantitative research with the design of exploratory and development. The exploration of plantation forest for the purpose of unrestricted coal mining activities in the Production Forest has an effect to the plantation forest and the disturbances to the ecosystems of production forest. It needs an appropriate cost for compensation to the employers of plantation forest, the Governance and the social development of the local communities due to the declining of the exploration areas and the optimal decision of forest plantation which are for the purpose of coal mining.

In order to manage the plantations and coal mines in synergic ways to support sustainable development and at the same time preventing losses among the managers of exploitation, it is necessary to define a model for the plants and forest management based on optimum area suitable for coal mining and establish a certain compensation rate to employers, government and society as a result of the exploitation of the forest areas for mining.

Keywords: *Forest Plantation, Coal Mines, Forest Production, Compensation, Optimal Area, Benefit and Cost Analysis.*

1. INTRODUCTION

Indonesia is a country rich in natural resources, which include renewable and non-renewable natural resources. Indonesia's forests as renewable natural resources contained biodiversity of flora and fauna. It also has many mineral resources, which include coals.

Miranti (2008) explained that the Indonesian had a high consumption on coal in the last ten years, i.e. from ± 13.2 million tons in 1997 to ± 45.3 million tonnes in 2007 (up 243%). Based on data collected until the end of 2011 by Karo-Karo Gurusingam from The Center for Coal and Mineral Resources, Geology Agency Ministry of Energy and Mineral Resources, it stated that Indonesia's coal resources has increased to 161 billion tons, which consists of up to 120 billion tons from Open Pit sources and 41 billion tons from Underground sources, with additional reserve of 28 billion tons (Isuenergi, 2012).

Minister of Forestry issued a Decree No. SK. 79/Kpts-II/2001 dated March 15, 2001 on the utilization of Forests and Waters in East Kalimantan Province. It has appointed 14.65 million hectares of forest area in East Kalimantan province to be utilized (in percentage, this area is 10.98% of Indonesia's forest area or 73.83% of East Kalimantan). From those appointed forest area of East Kalimantan, it resulted in Protected Forest area about 2.75 million hectares, Conservation Area about 2.17 million hectares, Production Area about 9.73 million hectares, and Aquatic Area about 0.50 million hectares.

Based on the digital calculation of coal mines distribution in East Kalimantan Province in 2007, there were a total of 467 coal mines over 2,706,196 hectares area (13.64% from total area in East Kalimantan province. Out of the total area, 1,488,203 hectares or 54.99% were in the forest area which scattered on Protected Forest areas (HL) about 107,084 hectares, forest Conservation (HK) 108,460 hectares, Production Forest (HP) 1,272,658 hectares, and Aquatic area 13,725 hectares (Ministry of Forestry, 2010).

Out of 1,488,203 hectares mining area located on the forest area, there was 77.62% or an area of 1,155,206 hectares that overlap with Forest Product Utilization License (IUPHHK) areas which consists of Business License Timber Utilization on Natural Forests (IUPHHKHA) covering 801,053 hectares and

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Exploitation Permit-Timber Forest Plantation (IUPHHK-HT) covering 354,153 hectares. However, the remaining mining area of 332,997 hectares did not overlap with IUPHHK-HA/HT area.

The increasing price of coal which leads to a high number of overlapping area between IUPHHK-HT, could be a predicting factor in the steep rise of coal production. In return, the rise of IUPHHK-HT area of utilization could increase of level of damage in IUPHHK-HT areas and its environment and threaten the livelihood of IUPHHK-HT. On the other hand, coal mining has a very strategic role and major contribution to the state economy.

In order for the management of plantations and coal mines to run in synergy with sustainable development, as well as to avoid loss of profit among the managing companies, it was necessary to set crop and forest management model based on an optimum forest area that is viable for coal mining and a fixed compensation for profit losses to the plantation companies, government, and surrounding residents due to mining activities.

To determine whether sustainable development can be implemented in managing forest plants and coal mines in synergy, this study's hypotheses are:

1. There is a need for extensive analysis on optimum utilization of forest area for coal mining to support the concept of sustainable development.
2. A need to analyze the value of compensation that coal mining production caused on the function and production of actively maintained forests.
3. To create a model of a sustainable development of forest plants and coal mines in the overlapping areas within actively maintained forests.

1.1. Research objective

Research questions that need to be analyzed are:

1. How much the optimal use of extensive plantation areas for coal mining?
2. How to count the value of compensation to be prepared by the management of the coal mine to the plantation managers, government and society?
3. How to build a model of forest management on plant and coal mine in an overlapping areas?

1.2. Study Area

The study was conducted at working area of Sumalindo Hutani PT Jaya Unit II (SHJ Pt. II) due to the Decree of the Minister of Forestry. SK. 675/Kpts-II/1997 dated October 10, 1997 consist of 70.300 hectares valid for 50 (fifty years (1997-2047) and in the area of Forest Area Usage Permit (IPPKH) situated in IUPHHK SHJ-HT PT II at 6,955.17 hectares.

The study was conducted in November 2011 to February 2012. Reasons for conducting the study in November is due to administration paperwork.

1.3. Population and Sampling

This study is using a secondary data, thus no need for the population and sample

1.4. Formulas and Analytical Methods

A *development* categorized as sustainable if it meets three dimensions, namely: (1) economically feasible, (2) socially appropriate, and (3) ecologically feasible. To ensure the sustainability of forest plants and coal mines, the Cost Benefit Analysis conducted on 3 aspects sustainable development, namely: an analysis of the financial, ecological and social, by using the formula:

The Net Present Value (NPV) analysis used to determine the equivalent value today of cash flow (cash flow) of revenues and expenditures in the future from an investment plan; criteria for acceptance of an investment plan with the current method is if the investment plans of the above have a value Positive current, NPV > 0.

$$NPV = \sum_{t=0}^{n} \frac{B_t - C_t}{(1+i)^t} \quad \text{.....(1)}$$

The Benefit Cost Ratio Analysis (BCR), was conducted by way of comparison between the value of benefits equivalent to the cost of an equivalent value; criteria for acceptable / success of an investment plan is that if the BCR has a value greater than one, whereas if the value of the BCR was less than one, then investment plan was rejected / failed.

$$BCR = P_{Benefits} / P_{Costs} \quad \text{.....(2)}$$

II. RESULTS AND DISCUSSION

2.1. Benefit and Cost Analysis at Plantation Forest

The data analysis used main plant area 54,131 hectares of plantations (before there was a coal mine) and an area of 44,289 hectares (after a coal mine area of 10%) and 53,639 hectares (after mining is completed as it will void left 10% of the coal mines). Discount factor used is in accordance with the prevailing bank interest rates today, i.e. 11%.

2.1.1. Financial Analysis

The analysis of financial benefit involved these components (a) forest value at recovery time and (b) timber value during company operating time, (c) timber value after mining company completed their

operation. Financial analysis will count (a) planning cost, (b) planting cost, (c) maintenance cost, (d) forest fire preventing cost, (e) tax, (f) social responsibility cost, (g) facility building cost, (h) general administration cost, and (i) timber harvesting cost.

2.1.2. Ecological Analysis

Ecological benefit analysis will involved these components: (a) controlling interference, (b) nutrient cycling regulating, (c) flood stopper (d) flood control, (e) storage of biological diversity, (f) the formation of soil layer, (g) erosion control, (h) air regulator , (i) water supply for domestic use, (j) rice water providers, (k) carbon sequestration, (l) value of the crops have not been harvested, (m) recreation, (n) the value of existence, and (n) the value of choice. Ecological cost component is the cost of plantation establishment. If the forest plantation were not built, then the ecological function within the forest plantation ecosystem will not be existing.

2.1.3. Social Analysis

At this part, the components to be analyzed are: (a) the income of people working as employees in the plantation, (b) the income of forest plant communities who depend on forests, and (c) the availability of facilities and infrastructure for the construction of forest plantation activities. Component that was analyzed as a social cost was a public health fund that was allocated for the community around the forest plantation.

2.1.4. Total Cost Benefit Analysis of Forest Plantation

Calculation results and partial cost benefit analysis ~~,~~ showed that the financial, ecological and social forest crops on existing mining operations over 10% area still gave a positive result, which means it was feasible for plantation activities to be carried out together with coal mining activities.

The third analysis of the benefits and costs of plantations showed the highest yield was from the analysis of the benefits and the ecological and social costs, while the financial cost benefit analysis contributed the lowest value compared to ecological and social analysis. It can be seen from the value of financial BCR is only 1.28 whereas the ecological and social value respectively 2.47 and 3.94. Calculation results can be seen in **Table 1**, and **Table 2**. And detail calculation can be seen in attachment 1 to 3.

Table 1. Total NPV forest plantation, before Coal Mining

(US$ x 1.000)

Item	Financial	Ecology	Social	Sum
Total Benefits PV	404,794.414	7,884,231.849	141,848.177	8,430,874.440
Total Costs PV	316,931.800	1,999,044.375	57,523.648	2,373,499.823
NPV	87,862.614	5,885,187.474	199,371.824	6,057,374.617
BC Rasio	1.28	3.94	2.47	3.55

Table 2. Total NPV forest plantation, after Coal Mining

(US$ x 1.000)

Item	Financial	Ecology	Social	Sum
Total Benefits PV	372,837.438	7,734,176.335	138.709,044	8,245,722.,817
Total Costs PV	342,544.910	1,999,044.375	57.523,648	2,399,112.934
NPV	30,292.528	5,735,131.959	81.185,396	5,846,609.883
BC Rasio	1.09	3.87	2.41	3.44

As stated, a comparison of total NPV plantations without coal mining activities with a total NPV of forest plant after coal mining activities in the plantation areas showed that there was the difference in total NPV of US. $ 210,764,734 (US. $ 6,057,374,617 - US. $ 5,846,609,883).

With positive NPV result, the forest plantation management with or without mining activity still provide a feasible business activity at the usage of 10% from total area of forest plantation. However, with the existence of mining activity there is potentilally loss revenue at US$ 210,764,734.

2.2. Benefit and Cost Analysis at Coal Mine.

2.2.1. Financial Analysis

The analysis of benefit component of coal mining was only the production of coal as a main commodity. Meanwhile, there were 19 cost components that were analyzed, namely: (1) cost of services Mining Areas Information Services, (2) Determination of cost of mining area coordinates, (3) costs Map Document Services Licensing Services, (4) the cost of mining area Compilation Services, (5) contribution Fixed general of Inquiry, Exploration, and Exploitation, (6) Royalty, (7) Technology Services, (8) general and administrative costs, (9) the cost of preparation of the EIA, (10) the cost of preparation of the Long Term, (11) the cost of preparation of the Annual Work Plan, (12) the cost of infrastructure development, (13) the costs associated with the forestry sector, (14) the cost of production, (15) the cost of CSR, (16) Reclamation costs, (17) cost revegetation, (18) the cost of maintenance year 1 to year 3, and (19) environmental cost.

Analysis of the benefits and costs of coal mines, carried out under the following conditions:

a. Management of coal mines for 17 years (2008-2025).
b. The area of coal mine according IPPKH is 6,955.17 hectares, but based on the work plan of the area of potential coal mine area of 4,219.40 hectares only, while the other area is not an area of 2,735.77 hectares and a potential mine infrastructure area.
c. Production activities carried out from 2008 to 2021, a total of 106,517,554 tons of coal.
d. Based on data from 6 coal mining company, the market price of U.S. $ 70/ton.

2.2.2. Ecological Analysis

There were no ecological benefit in coal mining because the mining exploitation did not provide ecological benefits for the surrounding environment, instead it typically leads to disaster and environmental damages.

The ecological cost component of coal mining is the opportunity cost derived from the financial benefits, ecological benefits and social benefits of forest plantation development. The reason that the components of the ecological costs of coal mining is the sum of the financial benefits, ecological benefits and social benefits of forest plantation development, because in constructing coal mining there was a missing opportunity cost to developing a forest plantation, which were then added into the ecology cost of the coal mining.

2.2.3. Social Analysis

Components of the social benefits of coal mining were the income of the coal mining workers and the infrastructure development which was built as a result of coal mining activities. The social cost component of coal mining was the public fund prepared by the community to maintain public health.

2.2.4. Total Cost Benefit Analysis of Coal Mine

The results of the partial cost benefit analysis, shows that financial analysis and social analysis on the management of the coal mine, still gives a positive result, meaning that coal mining is feasible together with plantation activities.

The results of the calculation of the ecological cost benefit analysis of coal mining showed that NPV negative ecological coal mine which means that the ecological management of the coal mine is not feasible, because it would result in environmental damage.

The three analysis of the benefits and costs of coal mining, the highest NPV is NPV of social, financial and ecological NPV while contributing less than the social NPV coal mines. It can be seen from the value of 1.02 only financial BCR, BCR zero ecological, social and BCR of 1.20.

Based on the analysis of benefits and costs of coal mines in total, the resulting NPV still has a positive value, ie US $ 165,297,881, which means that coal mining is still feasible, even though in terms of the ecology of coal mining activities is not feasible. Calculation results can be seen in **Table 3** and detail calculation can be seen in attachment 4 to 6.

Table 3. Total NPV Coal Mine

(US$ x 1.000)

Item	Financial	Ecology	Social	Sum
Total Benefits PV	4,503,784.813	-	406,659.775	4,910,444.588
Total Costs PV	4,401,598.238	5,091.159	338,457.310	4,745,146.707
NPV	102,186.575	(5,091.159)	68,202.465	165,297.881
BC Rasio	1.02	-	1.20	1.03

2.1. Analysis of Optimal Use of Forest Area For Coal Mine

Outcomes and cost benefit analysis of forest plant emphasized that the use of forest land for coal mines up to 30% still generate a positive total NPV. It means that with the use of forest areas up to 30% is still in the business of providing feasibility plantations. More can be seen in Table 4.

Table 4. Results of Total NPV analysis Forest Plantation at Different Levels of Use of Forest Land For Coal Mines

NPV Value	The Use of Forest Land for Coal Mines (US$ x 1.000)			
	10%	20%	30%	40%
Financial	30,292.528	18,194.143	6,095.758	(6,002.627)
Ecology	5,735,131.959	5,585,076.445	5,435,020.930	5,284,965.415
Social	81,185.396	78,046.263	74,907.130	71,767.997
Sum	5,846,609.983	5,681,317.050	5,516,024.117	5,350,731.184

Noted the NPV of each analysis as it is known that the financial NPV with the use of forest area of more than 30% will give a negative NPV, while the ecological and social value of NPV is still positive. So it was determined that for the use of forest land for mining coal plant is at a maximum of 30% of the staple crop plantations.

Components of benefits and costs that affect the feasibility of plantations are:

(a) Use of forest area to 30%.
(b) decrease the potential price of wood or wood up to 22%,
(c) increase in the value of DF to 15.18%,

(d) increase in forest plantation development costs up to 32%,

Increase or decrease the financial component of plantations, as mentioned above, will generate NPV<0 and the value of BCR<1, so that a plantation activities not worth continuing. While the ecological and social components, does not affect the viability of plantations, due to the increase or decrease in the value of the ecological and social components of forest plants, will still produce NPV> 0 and BCR> 1.

2.2. Indemnity Value Analysis Forest Area to Use Coal Mine

Due to coal mining area of 10% (ten percent) of the total principal crop plantations, forestry crops suffer financial loss. By comparing the total NPV of forest plants with coal mining activities with a total NPV of forest plants that no coal mining activities, the value of the loss can be determined.

Difference in total NPV of forest plants are the basis of the value of the compensation paid by the coal mining company. From the analysis of the total NPV of forest plants, obtained compensation values are presented in Table 5.

Table 5. Total difference forest plantation

(US$ x 1.000)

NPV Value	NPV Value (US$)	NPV Value / hectare (US$)	Percentase (%)
Financial	57,570.086	11,699	27.31
Ecology	150,055.515	30,493	71.20
Social	3,139.133	0,638	1.49
Sum	210,764.734	42,830	100.00

From Table 5. note that the difference in NPV of financial plantations U.S.$ 57,570,086, while the difference ecology NPV of U.S. $ 150,055,515, and the difference in social NPV of U.S. $ 3,139,133. NPV of the three mentioned above, the highest difference is in the ecological value of NPV is equal to 71.20%, and 27.31% for the financial NPV and the last is the social NPV of 1.49%.

So the value of compensation as a result of coal mining activities in the area of plantation labor is U.S. $ 11,699/ hectare (NPV financially) to entrepreneurs plantations, U.S. $ 30,493/ hectare (NPV ecology) to the government and amounted to U.S. $ 638/ hectare (NPV social) to the community.

Coal mining activities, by including the value of the compensation in the financial analysis of the coal mine, will produce a positive NPV. What this means is that by entering the burden of compensation to the plantation company for U.S. $ 11,699/ hectare and to the government amounted to U.S. $ 30,493/ hectare well as to the public of U.S. $ 638/ hectare, will result in a positive NPV of U.S.$ 8,858,639,612 with BCR for 1.03%, which means that coal mining is still feasible. Coal mine NPV results can be seen in Table 6.

Table 6. Total NPV Value Coal Mine, after entering the burden of compensation

(US$ x 1.000)

Item	Finansial
Total benefits PV	4,503,784.813
Total costs PV	4,354,854.799
NPV	8,858,639.612
BC Rasio	1.03

III. CONCLUSIONS

Cost Benefit Analysis is based on financial feasibility, ecological and social aspects of natural forest management and Coal Mining can be summarized as follows are: Optimal use of extensive forest areas for coal mining is covering 30% of the staple crop plantations, with patchy distribution pattern in each block of natural forest. The Value of compensation in coal mining concession in the plantation areas is U.S. $ 11,699/hectare (financial NPV) to entrepreneurs plantations, amounting to U.S. $ 30,493/ hectare (NPV ecology) to the government and amounted to U.S. $ 638/hectare (social NPV) to the community. Sustainable Development Model on natural forests and coal mining is feasible to be created in synergy with 30% of forest utilization for coal mining and pay compensation to the value of plantation employers, governments and society.

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Attachment 1

Financial Analysis of Forest Plantation

period				-12	-11	-10	-9	-8	34	35	36	37	38
year				1997	1998	1999	2000	2001	2043	2044	2045	2046	2047
	unit	price	Vol						Blok VI	Blok I	Blok II	Blok III	Blok IV
		(Rp)											
MANFAAT													
1 Land clearing recovery time	(Rp./m3)	100.000	15	-	-	-	-	-	-	-	-	-	-
2 timber production													
a. without IPPKH	(Rp./m3)	500.000	150	-	-	-	-	-	615.125.000	615.125.000	615.125.000	615.125.000	615.125.000
b. Post IPPKH	(Rp./m3)	500.000	135	-	-	-	-	-	-	-	-	-	-
Total Benefit				-	-	-	-	-	615.125.000	615.125.000	615.125.000	615.125.000	615.125.000
DISCOUNT RATE (1/((1+i)^t)))	11%			3,50	3,15	2,84	2,56	2,30	0,029	0,026	0,023	0,021	0,019
PV Benefits				-	-	-	-	-	17.700.360	15.946.270	14.366.009	12.942.351	11.659.775
BIAYA (x Rp. 1.000)													
1 Planning													
a. without IPPKH	(Rp./Ha)	517.228	-	-	-	-	-	-	-	-	-	-	-
a. post IPPKH	(Rp./Ha)	517.228	-	-	-	-	-	-	4.242.129	4.242.129	4.242.129	4.242.129	4.242.129
2 Planting													
a. Tanaman Pokok													
- during IPPKH	(Rp./Ha)	8.934.635	-	-	-	-	-	-	-	-	-	-	-
- post IPPKH	(Rp./Ha)	8.934.635	-	-	-	-	-	-	73.278.901	73.278.901	73.278.901	73.278.901	73.278.901
b. Tanaman Unggulan dan Kehidupan	(Rp./Ha)	8.934.635	10.545	-	-	-	-	-	-	-	-	-	-
3 Cultivation													
a. without IPPKH	(Rp./Ha)	3.397.859	-	-	-	-	-	-	-	-	-	-	-
b. Post IPPKH	(Rp./Ha)	3.397.859	-	-	-	-	-	-	27.868.107	27.868.107	27.868.107	27.868.107	27.868.107
4 Fire controlling													
a. without IPPKH	(Rp./Ha)	917.063	-	-	-	-	-	-	-	-	-	-	-
b. Post IPPKH	(Rp./Ha)	917.063	-	-		-	-	-	7.521.445	7.521.445	7.521.445	7.521.445	7.521.445
5 Government Tax													
a. without IPPKH	(Rp./Ha)	151.463	-	-	-	-	-	-	-	-	-	-	-
b. Post IPPKH	(Rp./Ha)	151.463	-	-		-	-	-	1.242.249	1.242.249	1.242.249	1.242.249	1.242.249
6 obligations to the social environment													
a. without IPPKH	(Rp./Ha)	232.139	-	-	-	-	-	-	-	-	-	-	-
b. Post IPPKH	(Rp./Ha)	232.139	-	-	-	-	-	-	1.903.924	1.903.924	1.903.924	1.903.924	1.903.924
7 infrastructure													
a. without IPPKH	(Rp./Ha)	2.007.087	-	-	-	-	-	-	-	-	-	-	-
b. Post IPPKH	(Rp./Ha)	2.007.087	-	-	-	-	-	-	16.461.456	16.461.456	16.461.456	16.461.456	16.461.456
8 General Administration													
a. without IPPKH	(Rp./Ha)	9.733.512	-	-	-	-	-	-	-	-	-	-	-
b. Post IPPKH	(Rp./Ha)	9.733.512	-	-	-	-	-	-	79.831.024	79.831.024	79.831.024	79.831.024	79.831.024
9 Harvesting costs													
a. without IPPKH	(Rp./Ha)	1.000.000	-	-	-	-	-	-	-	-	-	-	-
b. Post IPPKH	(Rp./Ha)	1.000.000	-	-	-	-	-	-	8.201.667	8.201.667	8.201.667	8.201.667	8.201.667
Total Costs		26.322.173		-	-	-	-	-	220.550.901	220.550.901	220.550.901	220.550.901	220.550.901
DISCOUNT RATE (1/((1+i)^t)))	11%			3,50	3,15	2,84	2,56	2,30	0,029	0,026	0,023	0,021	0,019
PV Cost				-	-	-	-	-	6.346.402	5.717.479	5.150.882	4.640.434	4.180.571
TOTAL	PER HEKTAR	TOTAL											
- PV Benefit	51.823	3.643.149.729		-	-	-	-	-	17.700.360	15.946.270	14.366.009	12.942.351	11.659.775
- PV Cost	40.574	2.852.386.201		-	-	-	-	-	6.346.402	5.717.479	5.150.882	4.640.434	4.180.571
- NPV	11.248	790.763.528		-	-	-	-	-	11.353.958	10.228.791	9.215.127	8.301.916	7.479.204
- BCR	1,28	1,28		-	-	-	-	-	2,79	2,79	2,79	2,79	2,79

Attachment 2

Ecology Analisys of forest plantation

period				-12	-11	-10	-9	-8	34	35	36	37	38
year				1997	1998	1999	2000	2001	2043	2044	2045	2046	2047
	unit	price (Rp)	Volume (ha)						Blok VI	Blok I	Blok II	Blok III	Blok IV
Benefits													
1 disturbance control	(Rp ha tahun)	18.000	66.785	1.202.130	1.202.130	1.202.130	1.202.130	1.202.130	-	-	-	-	-
- During PPKH	(Rp ha tahun)	18.000	66.785	-	-	-	-	-	-	-	-	-	-
- Post PPKH	(Rp ha tahun)	18.000	70.300	-	-	-	-	-	1.265.400	1.265.400	1.265.400	1.265.400	1.265.400
2 nutrient cycling controlling	(Rp ha tahun)	7.500.000	66.785	500.887.500	500.887.500	500.887.500	500.887.500	500.887.500	-	-	-	-	-
- During PPKH	(Rp ha tahun)	7.500.000	66.785	-	-	-	-	-	-	-	-	-	-
- Post PPKH	(Rp ha tahun)	7.500.000	70.300	-	-	-	-	-	527.250.000	527.250.000	527.250.000	527.250.000	527.250.000
3 Flood prevention	(Rp ha tahun)	2.654.043	66.785	177.250.262	177.250.262	177.250.262	177.250.262	177.250.262	-	-	-	-	-
- During PPKH	(Rp ha tahun)	2.654.043	66.785	-	-	-	-	-	-	-	-	-	-
- Post PPKH	(Rp ha tahun)	2.654.043	70.300	-	-	-	-	-	186.579.223	186.579.223	186.579.223	186.579.223	186.579.223
4 Flood controlling	(Rp ha tahun)	351.268	66.785	23.459.433	23.459.433	23.459.433	23.459.433	23.459.433	-	-	-	-	-
- During PPKH	(Rp ha tahun)	351.268	66.785	-	-	-	-	-	-	-	-	-	-
- Post PPKH	(Rp ha tahun)	351.268	70.300	-	-	-	-	-	24.694.140	24.694.140	24.694.140	24.694.140	24.694.140
5 *Biodiversity*	(Rp ha tahun)	52.380	66.785	3.498.198	3.498.198	3.498.198	3.498.198	3.498.198	-	-	-	-	-
- During PPKH	(Rp ha tahun)	52.380	66.785	-	-	-	-	-	-	-	-	-	-
- Post PPKH	(Rp ha tahun)	52.380	70.300	-	-	-	-	-	3.682.314	3.682.314	3.682.314	3.682.314	3.682.314
6 forming a layer of soil	(Rp ha tahun)	72.000	66.785	4.808.520	4.808.520	4.808.520	4.808.520	4.808.520	-	-	-	-	-
- During PPKH	(Rp ha tahun)	72.000	66.785	-	-	-	-	-	-	-	-	-	-
- Post PPKH	(Rp ha tahun)	72.000	70.300	-	-	-	-	-	5.061.600	5.061.600	5.061.600	5.061.600	5.061.600
7 Erotion control	(Rp ha tahun)	477.000	66.785	31.856.445	31.856.445	31.856.445	31.856.445	31.856.445	-	-	-	-	-
- During PPKH	(Rp ha tahun)	477.000	66.785	-	-	-	-	-	-	-	-	-	-
- Post PPKH	(Rp ha tahun)	477.000	70.300	-	-	-	-	-	33.533.100	33.533.100	33.533.100	33.533.100	33.533.100
8 water regulator	(Rp ha tahun)	27.000	66.785	1.803.195	1.803.195	1.803.195	1.803.195	1.803.195	-	-	-	-	-
- During PPKH	(Rp ha tahun)	27.000	66.785	-	-	-	-	-	-	-	-	-	-
- Post PPKH	(Rp ha tahun)	27.000	70.300	-	-	-	-	-	1.898.100	1.898.100	1.898.100	1.898.100	1.898.100
9 water for household use	(Rp ha tahun)	3.579.753	66.785	239.073.804	239.073.804	239.073.804	239.073.804	239.073.804	-	-	-	-	-
- During PPKH	(Rp ha tahun)	3.579.753	66.785	-	-	-	-	-	-	-	-	-	-
- Post PPKH	(Rp ha tahun)	3.579.753	70.300	-	-	-	-	-	251.656.636	251.656.636	251.656.636	251.656.636	251.656.636
10 water for farm	(Rp ha tahun)	273.485	66.785	18.264.696	18.264.696	18.264.696	18.264.696	18.264.696	-	-	-	-	-
- During PPKH	(Rp ha tahun)	273.485	66.785	-	-	-	-	-	-	-	-	-	-
- Post PPKH	(Rp ha tahun)	273.485	70.300	-	-	-	-	-	19.225.996	19.225.996	19.225.996	19.225.996	19.225.996
11 carbon sequestration	(Rp ha tahun)	893.640	66.785	59.681.747	59.681.747	59.681.747	59.681.747	59.681.747	-	-	-	-	-
- During PPKH	(Rp ha tahun)	893.640	66.785	-	-	-	-	-	-	-	-	-	-
- Post PPKH	(Rp ha tahun)	893.640	70.300	-	-	-	-	-	62.822.892	62.822.892	62.822.892	62.822.892	62.822.892
12 Unharvest plantation	(Rp ha tahun)	2.505.963	66.785	167.360.769	167.360.769	167.360.769	167.360.769	167.360.769	-	-	-	-	-
- During PPKH	(Rp ha tahun)	2.505.963	66.785	-	-	-	-	-	-	-	-	-	-
- Post PPKH	(Rp ha tahun)	2.505.963	70.300	-	-	-	-	-	-	-	-	-	-
13 Recreation	(Rp ha tahun)	12.219.632	66.785	816.088.123	816.088.123	816.088.123	816.088.123	816.088.123	-	-	-	-	-
- During PPKH	(Rp ha tahun)	12.219.632	66.785	-	-	-	-	-	-	-	-	-	-
- Post PPKH	(Rp ha tahun)	12.219.632	70.300	-	-	-	-	-	859.040.130	859.040.130	859.040.130	859.040.130	859.040.130
14 Existence Value	(Rp ha tahun)	174.600	66.785	11.660.661	11.660.661	11.660.661	11.660.661	11.660.661	-	-	-	-	-
- During PPKH	(Rp ha tahun)	174.600	66.785	-	-	-	-	-	-	-	-	-	-
- Post PPKH	(Rp ha tahun)	174.600	70.300	-	-	-	-	-	12.274.380	12.274.380	12.274.380	12.274.380	12.274.380
15 Optional Value	(Rp ha tahun)	166.500	66.785	11.119.703	11.119.703	11.119.703	11.119.703	11.119.703	-	-	-	-	-
- During PPKH	(Rp ha tahun)	166.500	66.785	-	-	-	-	-	-	-	-	-	-
- Post PPKH	(Rp ha tahun)	166.500	70.300	-	-	-	-	-	11.704.950	11.704.950	11.704.950	11.704.950	11.704.950
Total Benefits				2.068.015.187	2.068.015.187	2.068.015.187	2.068.015.187	2.068.015.187	2.000.688.860	2.000.688.860	2.000.688.860	2.000.688.860	2.000.688.860
DISCOUNT RATE (1/((1+i)^t)))	11%			3,50	3,15	2,84	2,56	2,30	0,029	0,026	0,023	0,021	0,019
PV Benefit				7.234.848.964	6.517.881.949	5.871.965.720	5.290.059.207	4.765.819.106	57.570.271	51.865.109	46.725.324	42.094.886	37.923.321
COST (x Rp. 1.000)													
1. Forest establishment cost	(Rp. / Ha)	23.887.413	66.785	11.119.703	11.119.703	11.119.703	11.119.703	11.119.703	-	-	-	-	-
- During PPKH	(Rp. / Ha)	23.887.413	66.785	-	-	-	-	-	-	-	-	-	-
- Post PPKH	(Rp. / Ha)	23.887.413	70.300	-	-	-	-	-	1.679.285.134	1.679.285.134	1.679.285.134	1.679.285.134	1.679.285.134
Total cost				11.119.703	11.119.703	11.119.703	11.119.703	11.119.703	1.679.285.134	1.679.285.134	1.679.285.134	1.679.285.134	1.679.285.134
DISCOUNT RATE (1/((1+i)^t)))	11%			3,50	3,15	2,84	2,56	2,30	0,029	0,026	0,023	0,021	0,019
PV cost				38.901.730	35.046.603	31.573.517	28.444.610	25.625.774	48.321.807	43.533.159	39.219.062	35.332.489	31.831.071
TOTAL	**PER HEKTAR**	**TOTAL**											
- Benefits PV	1.009.361	70.958.086.645		7.234.848.964	6.517.881.949	5.871.965.720	5.290.059.207	4.765.819.106	57.570.271	51.865.109	46.725.324	42.094.886	37.923.321
- Costs PV	255.923	17.991.399.378		38.901.730	35.046.603	31.573.517	28.444.610	25.625.774	48.321.807	43.533.159	39.219.062	35.332.489	31.831.071
- NPV	753.438	52.966.687.267		7.195.947.234	6.482.835.346	5.840.392.203	5.261.614.598	4.740.193.331	9.248.464	8.331.950	7.506.261	6.762.397	6.092.250
- BCR	3,94	3,94		-	-	-	-	-	1,19	1,19	1,19	1,19	1,19

Attachment 3

Social Analisys of Forest Plantations

Period				-12	-11	-10	-9	-8	34	35	36	37	38
year				1997	1998	1999	2000	2001	2043	2044	2045	2046	2047
	Unit	Price	Vol						Blok VI	Blok I	Blok II	Blok III	Blok IV
		(Rp)											
BENEFIT													
1 Community income													
- Without coal mining	(Rp./org/bulan)	2.219.225	1.118	29.773.123	29.773.123	29.773.123	29.773.123	29.773.123	29.773.123	29.773.123	29.773.123	29.773.123	29.773.123
- with coal mining	(Rp./org/bulan)	2.219.225	1.118	-	-	-	-	-	-	-	-	-	-
2 Income communities who depend on forests													
- Without coal mining	(Rp./KK/bulan)	1.500.000	362	6.516.000	6.516.000	6.516.000	6.516.000	6.516.000	6.516.000	6.516.000	6.516.000	6.516.000	6.516.000
- with coal mining	(Rp./KK/bulan)	1.500.000	362	-	-	-	-	-	-	-	-	-	-
3 Infrastructure building													
- Without coal mining	(Rp/Tahun)	48.300	-	48.300	48.300	48.300	48.300	48.300	48.300	48.300	48.300	48.300	48.300
- with coal mining	(Rp/Tahun)	57.960	-	-	-	-	-	-	-	-	-	-	-
TOTAL BENEFITS				36.337.423	36.337.423	36.337.423	36.337.423	36.337.423	36.337.423	36.337.423	36.337.423	36.337.423	36.337.423
DISCOUNT RATE (1/((1+i)^t)))	11%			3,50	3,15	2,84	2,56	2,30	0,029	0,026	0,023	0,021	0,019
PV BENEFITS				127.124.678	114.526.737	103.177.240	92.952.469	83.740.963	1.045.617	941.998	848.647	764.547	688.781
BIAYA (x Rp. 1.000)													
1. Public health fund													
- Without coal mining	(Rp./KK/bulan)	115.000	7.230	9.977.400	9.977.400	9.977.400	9.977.400	9.977.400	9.977.400	9.977.400	9.977.400	9.977.400	9.977.400
- with coal mining	(Rp./KK/bulan)	345.000	7.230	-	-	-	-	-	-	-	-	-	-
TOTAL COST				9.977.400	9.977.400	9.977.400	9.977.400	9.977.400	9.977.400	9.977.400	9.977.400	9.977.400	9.977.400
DISCOUNT RATE (1/((1+i)^t)))	11%			3,50	3,15	2,84	2,56	2,30	0,029	0,026	0,023	0,021	0,019
PV Costs				34.905.441	31.446.343	28.330.039	25.522.558	22.993.295	287.102	258.650	233.018	209.926	189.123
TOTAL	PER HEKTAR	TOTAL											
- Benefit PV	18.160	1.276.633.590		127.124.678	114.526.737	103.177.240	92.952.469	83.740.963	1.045.617	941.998	848.647	764.547	688.781
- PV Costs	7.364	517.712.830		34.905.441	31.446.343	28.330.039	25.522.558	22.993.295	287.102	258.650	233.018	209.926	189.123
- NPV	10.795	758.920.760		92.219.237	83.080.394	74.847.201	67.429.911	60.747.668	758.516	683.347	615.628	554.620	499.658
- BCR	2,47	2,47		3,64	3,64	3,64	3,64	3,64	3,64	3,64	3,64	3,64	3,64

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Attachment 4

Analisis Finansial Tambang Batubara

years				-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0
years				1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
	time	Unit	price											
MANFAAT	(year)	(ton)	(Rp./ton)											
1. PT. Mahakam Sumber Jaya I Production	5	28.000.000	630.000	-	-	-	-	-	-	-	-	-	-	-
2. PT. Mahakam Sumber Jaya II Production	12	43.000.000	630.000	-	-	-	-	-	-	-	-	-	-	-
3. PT. Santan Batubara I Production	3	10.000.000	630.000	-	-	-	-	-	-	-	-	-	-	-
4. PT. Santan Batubara II Production	5	4.500.000	630.000	-	-	-	-	-	-	-	-	-	-	-
5. PT. Indominco Mandiri Production	4	4.000.000	630.000	-	-	-	-	-	-	-	-	-	-	-
6. PT. Kimco Armindo production	12	12.096.000	630.000	-	-	-	-	-	-	-	-	-	-	-
7. PT. Pancaran Surya Abadi production	5	1.242.054	630.000	-	-	-	-	-	-	-	-	-	-	-
8. PT. Karya Usaha Pertiwi production	6	3.679.500	630.000	-	-	-	-	-	-	-	-	-	-	-
TOTAL BENEFITS		106.517.554		-	-	-	-	-	-	-	-	-	-	-
DISCOUNT RATE (1/((1+i)^t))	11%			-	-	-	-	-	-	-	-	-	-	-
PV BENEFITS				-	-	-	-	-	-	-	-	-	-	-
COST (x Rp. 1.000)														
1. Service Information Service Area Mining	(Rp./jam)	2.600	100.000	260.000,00	-	-	-	-	-	-	-	-	-	-
2. Determination of coordinates Mining Areas	per publishing	6	10.000.000	60.000,00	-	-	-	-	-	-	-	-	-	-
3. Map document services	per publishing	6	2.000.000	12.000,00	-	-	-	-	-	-	-	-	-	-
4. Compilation services of Mining Areas	per application													
a. area < 2000 Ha		2	75.000.000	150.000,00	-	-	-	-	-	-	-	-	-	-
b. area 2000 - 10000 Ha		2	100.000.000	200.000,00	-	-	-	-	-	-	-	-	-	-
e. area > 100.000 Ha		2	250.000.000	500.000,00	-	-	-	-	-	-	-	-	-	-
5. Fix Fees														
a. General inquiry	(Rp./ha/th)													
- year I		6.955,17	500	676,40	2.574,40	226,79	-	-	-	-	-	-	-	-
- year II		6.955,17	1.000	-	1.352,80	5.148,80	453,57	-	-	-	-	-	-	-
b. Eksploration														
- year I		6.955,17	2.000	-	2.705,60	10.297,60	907,14	-	-	-	-	-	-	-
- year II		6.955,17	2.500	-	-	3.382,00	12.872,00	1.133,93	-	-	-	-	-	-
- year III		6.955,17	3.000	-	-	-	4.058,40	15.446,40	1.360,71	-	-	-	-	-
c. extension of Exploration														
- year I		6.955,17	5.000	-	-	-	-	-	6.764,00	25.744,00	2.267,85	-	-	-
- year II		6.955,17	7.000	-	-	-	-	-	-	9.469,60	36.041,60	3.174,99	-	-
d. Pembangunan Fasilitas Eksploitasi														
- year I		6.955,17	8.000	-	-	-	-	-	-	-	-	10.822,40	41.190,40	3.628,56
- year II		6.955,17	8.000	-	-	-	-	-	-	-	-	-	10.822,40	41.190,40
- year III		6.955,17	8.000	-	-	-	-	-	-	-	-	-	-	10.822,40
e. Eksploitasi														
- year I		6.955,17	15.000	-	-	-	-	-	-	-	-	-	-	20.292,00
- year II		6.955,17	25.000	-	-	-	-	-	-	-	-	-	-	-
6. Iuran Eksplorasi/Eksploitasi/Royalty	(Rp./ton)													
a. calor < 5.100		106.517.554	3%	-	-	-	-	-	-	-	-	-	-	-
7.Technology services														
a.general inquiry/exploration	(Rp./meter)	6.955,17	1.000.000	-	-	-	-	-	135.280.000,00	514.880.000,00	45.357.000,00	-	-	-
b. Coal drilling														
- Drilling distance 400 x 400 meter	Rp./drilling point	62.597	300.000							3.652.560,00	13.901.760,00	1.224.639,00		
- Drilling distance 200 x 200 meter	Rp./drilling point	173.879	300.000								10.146.000,00	38.616.000,00	3.401.775,00	
- Drilling distance 100 x 100 meter	Rp./drilling point	278.207	300.000									16.233.600,00	61.785.600,00	5.442.840,00
8. Administration and General Affairs (yr 2009)	(Rp./Ha)	6.955,17	1.031.250	-	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59
9. Environmental impact assessment	(Rp./Ha)		27.500	-	-	-	-	-	-	37.202,00	141.592,00	12.473,18	-	-
10. Long Term Work Plan	(Rp./Ha)		20.625	-	-	-	-	-	-	-	27.901,50	106.194,00	9.354,88	-
11. Annual Work Plan	(Rp./Ha)		10.000	-	-	-	-	-	-	-	-	13.528,00	51.488,00	4.535,70
12. Infrastructure Building (yr 2009)														
a. road	(Rp./Ha)	2.715,77	2.062.500	-	-	-	-	-	-	-	-	2.790.150,00	10.619.400,00	935.488,13
b. infrastructure maintenance	(Rp./Ha)	2.715,77	27.500	-	-	-	-	-	-	-			75.210,68	75.210,68
13. Costs Related to the Forestry Sector														
a. General inquiry License	per publishing	8	100.000.000									800.000,00		
b. Exploration license	per publishing	8	100.000.000										800.000,00	
c. Principal approval IPPKH	per publishing	8	100.000.000											800.000,00
c.1. Area boundary PPKH	(Rp./Ha)	6.955,17	34.375	-	-	-	-	-	-	-	-	-	46.502,50	176.990,00
c.2. forest inventory	(Rp./Ha)	6.955,17	34.375										46.502,50	176.990,00
c.3. structuring area IPPKH	(Rp./Ha)	6.955,17	165.000	-	-	-	-	-	-	-	-	-	223.212,00	849.552,00
c.4. Compensation to timber companies	(Rp./Ha)	6.955,17	23.887.413	-	-	-	-	-	-	-	-	-	-	32.314.892,31
d. Use of Forest Area Permit	per publishing	8	-											-
d.1. Government Fee	(Rp./Ha/yr)													
- L1 (Active mining area)	(Rp./Ha/yr)	351,62	2.400.000	-	-	-	-	-	-	-	-	-	6.493.440,00	24.714.240,00
- L2 (Unreclaimed mining area)	(Rp./Ha/yr)	281,29	2.400.000	-	-	-	-	-	-	-	-	-	-	12.986.880,00
- L3 (permanently damaged area - void tambang)	(Rp./Ha/yr)	421,94	2.400.000	-	-	-	-	-	-	-	-	-	-	-
d.2. Forest resource provision	(Rp./M3)	pm	1.250.000											
d.3. Rehabilitation Fund	(Rp./M3)	pm	150.000											
d.4. Rehabilitation on critical Watershed	(Rp./Ha)	6.955	5.320.400	-	-	-	-	-	-	-	-	-	-	-
14. Production cost	(Rp./ton)	106.517.554	653.020	-	-	-	-	-	-	-	-	-	-	-
15. CSR Cost	(Rp./ton)	6.955,17	10.000	-	-	-	-	-	-	-	-	-	-	-
16. Reclamation cost	(Rp./Ha)	4.219,41	100.000.000	-	-	-	-	-	-	-	-	-	-	-
17. Revegetations cost	(Rp./Ha)	6.955,17	10.072.260	-	-	-	-	-	-	-	-	-	-	-
18. Maintenace cost (yr 1 - 5)	(Rp./Ha)	6.955,17	2.796.300	-	-	-	-	-	-	-	-	-	-	-
19. Environmental cost	(Rp./Ha)	6.955,17	185.625	-	-	-	-	-	-	-	-	-	-	-
20. Cost of financial compensation, social ecology and forest			894.023.143											
JUMLAH BIAYA				1.182.676,40	332.656,39	345.078,78	344.314,70	342.603,92	135.614.148,30	518.930.999,19	69.938.586,54	60.136.605,16	83.930.544,95	78.879.598,76
DISCOUNT RATE (1/((1+i)^t))	11%			1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
PV BIAYA				1.182.676,40	332.656,39	345.078,78	344.314,70	342.603,92	135.614.148,30	518.930.999,19	69.938.586,54	60.136.605,16	83.930.544,95	78.879.598,76
TOTAL	PER HEKTAR		TOTAL											
- Manfaat PV	5.827.904,04		40.534.063.314,93	-	-	-	-	-	-	-	-	-	-	-
- Biaya PV	5.695.674,46		39.614.384.140,81	1.182.676,40	332.656,39	345.078,78	344.314,70	342.603,92	135.614.148,30	518.930.999,19	69.938.586,54	60.136.605,16	83.930.544,95	78.879.598,76
- NPV	132.229,58		919.679.174,12	(1.182.676,40)	(332.656,39)	(345.078,78)	(344.314,70)	(342.603,92)	(135.614.148,30)	(518.930.999,19)	(69.938.586,54)	(60.136.605,16)	(83.930.544,95)	(78.879.598,76)
- BCR	1,02		1,02	-	-	-	-	-	-	-	-	-	-	-

years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
years	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
MANFAAT																	
1. PT. Mahakam Sumber Jaya I Production	3.528.000.000,00	3.528.000.000,00	3.528.000.000,00	3.528.000.000,00	3.528.000.000,00	-	-	-	-	-	-	-	-	-	-	-	-
2. PT. Mahakam Sumber Jaya II Production	-	2.257.500.000,00	2.257.500.000,00	2.257.500.000,00	2.257.500.000,00	2.257.500.000,00	2.257.500.000,00	2.257.500.000,00	2.257.500.000,00	2.257.500.000,00	2.257.500.000,00	2.257.500.000,00	2.257.500.000,00	-	-	-	-
3. PT. Santan Batubara I Production	2.100.000.000,00	2.100.000.000,00	2.100.000.000,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4. PT. Santan Batubara II Production	-	567.000.000,00	567.000.000,00	567.000.000,00	567.000.000,00	567.000.000,00	-	-	-	-	-	-	-	-	-	-	-
5. PT. Indominco Mandiri Production	-	630.000.000,00	630.000.000,00	630.000.000,00	630.000.000,00	-	-	-	-	-	-	-	-	-	-	-	-
6. PT. Kimco Armindo production	-	635.040.000,00	635.040.000,00	635.040.000,00	635.040.000,00	635.040.000,00	635.040.000,00	635.040.000,00	635.040.000,00	635.040.000,00	635.040.000,00	635.040.000,00	635.040.000,00	-	-	-	-
7. PT. Pancaran Surya Abadi production	-	-	156.498.804,00	156.498.804,00	156.498.804,00	156.498.804,00	156.498.804,00	-	-	-	-	-	-	-	-	-	-
8. PT. Karya Usaha Pertiwi production	-	-	386.347.500,00	386.347.500,00	386.347.500,00	386.347.500,00	386.347.500,00	386.347.500,00	-	-	-	-	-	-	-	-	-
TOTAL BENEFITS	5.628.000.000,00	9.717.540.000,00	10.260.386.304,00	8.160.386.304,00	8.160.386.304,00	4.002.386.304,00	3.435.386.304,00	3.278.887.500,00	2.892.540.000,00	2.892.540.000,00	2.892.540.000,00	2.892.540.000,00	2.892.540.000,00	-	-	-	-
DISCOUNT RATE (1/((1+i)^t))	0,90	0,81	0,73	0,66	0,59	0,53	0,48	0,43	0,39	0,35	0,32	0,29	0,26	0,23	0,21	0,19	0,17
PV BENEFITS	5.070.270.270,27	7.886.973.459,95	7.502.306.034,30	5.375.499.219,43	4.842.792.089,58	2.139.839.159,92	1.654.682.707,98	1.422.796.164,63	1.130.765.538,38	1.018.707.692,23	917.754.677,69	826.806.015,94	744.870.284,63	-	-	-	-
COST (x Rp. 1.000)																	
1. Service Information Service Area Mining	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2. Determination of coordinates Mining Areas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3. Map document services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4. Compilation services of Mining Areas																	
a. area < 2000 Ha	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
b. area 2000 - 10000 Ha	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
e. area > 100.000 Ha	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5. Fix Fees																	
a. General inquiry																	
- year I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- year II	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
b. Eksploration																	
- year I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- year II	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- year III	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
c. extension of Exploration																	
- year I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- year II	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
d. Pembangunan Fasilitas Eksploitasi																	
- year I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- year II	3.628,56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- year III	41.190,40	3.628,56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
e. Eksploitasi																	
- year I	77.232,00	6.803,55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- year II	33.820,00	128.720,00	11.339,25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6. Iuran Eksplorasi/Eksploitasi/Royalty																	
a. calor < 5.100	168.840.000,00	291.526.200,00	307.811.589,12	244.811.589,12	244.811.589,12	120.071.589,12	103.061.589,12	98.366.625,00	86.776.200,00	86.776.200,00	86.776.200,00	86.776.200,00	86.776.200,00	-	-	-	-
7.Technology services																	
a.general inquiry/exploration	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
b. Coal drilling															-	-	-
- Drilling distance 400 x 400 meter																	
- Drilling distance 200 x 200 meter																	
- Drilling distance 100 x 100 meter																	
8. Administration and General Affairs (yr 2009)	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59
9. Environmental impact assessment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10. Long Term Work Plan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11. Annual Work Plan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12. Infrastructure Building (yr 2009)																	
a. road	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
b. infrastructure maintenance	75.210,68	75.210,68	75.210,68	75.210,68	75.210,68	75.210,68	75.210,68	75.210,68	75.210,68	75.210,68	75.210,68	75.210,68	75.210,68	75.210,68	-	-	-
13. Costs Related to the Forestry Sector																	
a. General inquiry License																	
b. Exploration license																	
c. Principal approval IPPKH																	
c.1. Area boundary PPKH	15.591,47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
c.2. forest inventory	15.591,47																
c.3. structuring area IPPKH	74.839,05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
c.4. Compensation to timber companies	122.991.512,05	10.834.613,91	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
d. Use of Forest Area Permit																	
d.1. Government Fee																	
- L1 (Active mining area)	2.177.136,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- L2 (Unreclaimed mining area)	49.428.480,00	4.354.272,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- L3 (permanently damaged area - void tambang)	487.008,00	1.853.568,00	163.285,20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
d.2. Forest resource provision																	
d.3. Rehabilitation Fund																	
d.4. Rehabilitation on critical Watershed	-	-	7.197.437,12	27.393.675,52	2.413.173,83	-	-	-	-	-	-	-	-	-	-	-	-
14. Production cost	5.833.645.333	10.072.615.827	10.635.297.562	845.856.423	8.458.564.229	4.148.632.229	3.560.914.229	3.398.697.008	2.998.232.493	2.998.232.493	2.998.232.493	2.998.232.493	2.998.232.493	-	-	-	-
15. CSR Cost	69.552	69.552	69.552	69.552	69.552	69.552	69.552	69.552	69.552	69.552	69.552	69.552	69.552	-	-	-	-
16. Reclamation cost	-	-	31.932.000	67.421.000	75.277.000	69.592.000	66.641.000	33.622.000	31.183.000	24.941.000	8.539.000	5.665.000	4.082.000	3.045.000	-	-	-
17. Revegetations cost	-	-	-	3.216.274	6.790.818	7.582.095	7.009.487	6.712.255	3.386.495	3.140.833	2.512.122	860.070	570.594	411.150	306.700	-	-
18. Maintenace cost (yr 1 - 5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.482.914	6.482.914	6.482.914
19. Environmental cost	-	-	-	59.274	125.150	139.733	129.180	123.702	62.411	57.883	46.297	15.851	10.516	7.577	5.652	-	-
20. Cost of financial compensation, social ecology and forest																	
JUMLAH BIAYA	6.178.302.171,30	10.381.794.441,66	10.982.884.021,94	1.189.229.044,34	8.788.452.769,51	4.346.488.455,13	3.738.226.294,37	3.537.992.399,44	3.120.111.408,40	3.113.619.218,58	3.096.576.921,40	3.092.020.423,10	3.090.142.611,49	3.864.984,13	7.121.290,15	6.808.937,55	6.808.937,55
DISCOUNT RATE (1/((1+i)^t))	0,90	0,81	0,73	0,66	0,59	0,53	0,48	0,43	0,39	0,35	0,32	0,29	0,26	0,23	0,21	0,19	0,17
PV BIAYA	5.566.037.992,17	8.426.097.266,18	8.030.590.138,67	783.382.006,86	5.215.518.967,65	2.323.810.221,70	1.800.548.136,50	1.535.228.645,82	1.219.728.839,19	1.096.568.361,60	982.492.188,33	883.825.664,37	795.755.774,01	896.656,32	1.488.380,59	1.282.069,86	1.155.017,89
TOTAL																	
- Manfaat PV	5.070.270.270,27	7.886.973.459,95	7.502.306.034,30	5.375.499.219,43	4.842.792.089,58	2.139.839.159,92	1.654.682.707,98	1.422.796.164,63	1.130.765.538,38	1.018.707.692,23	917.754.677,69	826.806.015,94	744.870.284,63	-	-	-	-
- Biaya PV	5.566.037.992,17	8.426.097.266,18	8.030.590.138,67	783.382.006,86	5.215.518.967,65	2.323.810.221,70	1.800.548.136,50	1.535.228.645,82	1.219.728.839,19	1.096.568.361,60	982.492.188,33	883.825.664,37	795.755.774,01	896.656,32	1.488.380,59	1.282.069,86	1.155.017,89
- NPV	(495.767.721,90)	(539.123.806,23)	(528.284.104,37)	4.592.117.212,57	(372.726.878,07)	(183.971.061,78)	(145.865.428,51)	(112.432.481,19)	(88.963.300,81)	(77.860.669,36)	(64.737.510,64)	(57.019.648,43)	(50.885.489,38)	(896.656,32)	(1.488.380,59)	(1.282.069,86)	(1.155.017,89)
- BCR	0,91	0,94	0,93	6,86	0,93	0,92	0,92	0,93	0,93	0,93	0,93	0,94	0,94	-	-	-	-

Attachment 5

Ecological Analysis of Coal Mine

Years				-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	13	14	15	16	17
year				1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2021	2022	2023	2024	2025
	item	unit	price																
Benefit																			
Forest plantation				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Recreational				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Existence Value				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Optional Value				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL BENEFIT				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DISCOUNT RATE (1/((1+i)^t)))	11%			-	-	-	-	-	-	-	-	-	-	1,00	0,26	0,23	0,21	0,19	0,17
PV BENEFIT				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COST (x Rp. 1.000)																			
1. Financial benefit on forest plantation		6955,17	1.628,80	-	-	-	-	-	-	-	-	-	-	11.328.571	6.693.831	6.693.831	6.693.831	6.693.831	6.693.831
2. Ecological benefit of Forest plantation		6955,17	20.592,54	-	-	-	-	-	-	-	-	-	-	143.224.646	118.340.669	118.340.669	118.340.669	118.340.669	118.340.669
3. Social benefit of forest plantation		6955,17	508,75	-	-	-	-	-	-	-	-	-	-	3.538.448	5.601.158	5.601.158	5.601.158	5.601.158	5.601.158
total cost				-	-	-	-	-	-	-	-	-	-	3.538.448,02	5.601.157,60	5.601.157,60	5.601.157,60	5.601.157,60	5.601.157,60
DISCOUNT RATE (1/((1+i)^t)))	11%			-	-	-	-	-	-	-	-	-	-	1,00	0,26	0,23	0,21	0,19	0,17
PV cost				-	-	-	-	-	-	-	-	-	-	3.538.448,02	1.442.377,93	1.299.439,58	1.170.666,28	1.054.654,31	950.139,02
TOTAL	PER HEKTAR	TOTAL																	
- PV Benefit	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- PV cost	6.587,97	45.820.435,13		-	-	-	-	-	-	-	-	-	-	3.538.448,02	1.442.377,93	1.299.439,58	1.170.666,28	1.054.654,31	950.139,02
- NPV	(6.587,97)	(45.820.435,13)		-	-	-	-	-	-	-	-	-	-	(3.538.448,02)	(1.442.377,93)	(1.299.439,58)	(1.170.666,28)	(1.054.654,31)	(950.139,02)
- BCR	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Attachment 6

Social Analysis of Coal Mine

Tahun ke	UNIT	PER UNIT	Harga	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	13	14	15	16	17
Tahun		VALUE		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2021	2022	2023	2024	2025
Benefit																			
1 Income of mining community	(Rp./IND/MONTH)	2.115	2.750.000	-	-	-	-	-	-	-	-	-	-	69.795.000,00	69.795.000,00	69.795.000,00	69.795.000,00	69.795.000,00	69.795.000,00
2 Income communities around the mine	(Rp./IND/MONTH)	7.230	4.000.000	-	-	-	-	-	-	-	-	-	-	347.040.000,00	347.040.000,00	347.040.000,00	347.040.000,00	347.040.000,00	347.040.000,00
3 Infrastructure building value	(Rp./IND/MONTH)	6.965	48.300.000	-	-	-	-	-	-	-	-	-	-	48.300,00	48.300,00	-	-	-	-
TOTAL BENEFIT				-	-	-	-	-	-	-	-	-	-	416.883.300,00	416.883.300,00	416.835.000,00	416.835.000,00	416.835.000,00	416.835.000,00
DISCOUNT RATE (1/((1+i)^t))	11%			-	-	-	-	-	-	-	-	-	-	1,00	0,27	0,25	0,22	0,20	0,18
PV BENEFIT				-	-	-	-	-	-	-	-	-	-	416.883.300,00	113.842.620,41	103.013.059,40	93.224.488,14	84.366.052,62	76.349.368,89
BIAYA (x Rp. 1.000)																			
1 Community health	(Rp./IND/MONTH)	7.230	345.000	-	-	-	-	-	-	-	-	-	-	29.932.200,00	29.932.200,00	29.932.200,00	29.932.200,00	29.932.200,00	29.932.200,00
2 Mine infrastructure building	(Rp./IND/MONTH)	6.965	96.622.404	-	-	-	-	-	-	-	-	-	-	672.975.046,67	-	-	-	-	-
TOTAL COST				-	-	-	-	-	-	-	-	-	-	702.907.246,67	29.932.200,00	29.932.200,00	29.932.200,00	29.932.200,00	29.932.200,00
DISCOUNT RATE (1/((1+i)^t))	11%			-	-	-	-	-	-	-	-	-	-	1,00	0,27	0,25	0,22	0,20	0,18
PV Cost				-	-	-	-	-	-	-	-	-	-	702.907.246,67	8.173.894,43	7.397.189,53	6.694.289,16	6.058.180,24	5.482.516,05
TOTAL	PER HEKTAR	TOTAL																	
- Benefit PV	526.218,34	3.659.937.979,39		-	-	-	-	-	-	-	-	-	-	416.883.300,00	113.842.620,41	103.013.059,40	93.224.488,14	84.366.052,62	76.349.368,89
- Cost PV	437.964,25	3.046.115.790,15		-	-	-	-	-	-	-	-	-	-	702.907.246,67	8.173.894,43	7.397.189,53	6.694.289,16	6.058.180,24	5.482.516,05
- NPV	88.254,09	613.822.189,24		-	-	-	-	-	-	-	-	-	-	(286.023.946,67)	105.668.725,99	95.615.869,87	86.530.198,98	78.307.872,38	70.866.852,83
- BCR	1,20	1,20		-	-	-	-	-	-	-	-	-	-	0,59	13,93	13,93	13,93	13,93	13,93

Attachment 7

Financial analisys of coal mining

years				-10	-9	-8	-7	13	14	15	16	17
years				1998	1999	2000	2001	2021	2022	2023	2024	2025
	time	Unit	price									
MANFAAT	(year)	(ton)	(Rp./ton)									
1. PT. Mahakam Sumber Jaya I Production	5	28.000.000	630.000	-	-	-	-	-	-	-	-	-
2. PT. Mahakam Sumber Jaya II Production	12	43.000.000	630.000	-	-	-	-	2.257.500.000,00	-	-	-	-
3. PT. Santan Batubara I Production	3	10.000.000	630.000	-	-	-	-	-	-	-	-	-
4. PT. Santan Batubara II Production	5	4.500.000	630.000	-	-	-	-	-	-	-	-	-
5. PT. Indominco Mandiri Production	4	4.000.000	630.000	-	-	-	-	-	-	-	-	-
6. PT. Kimco Armindo production	12	12.096.000	630.000	-	-	-	-	635.040.000,00	-	-	-	-
7. PT. Pancaran Surya Abadi production	5	1.242.054	630.000	-	-	-	-	-	-	-	-	-
8. PT. Karya Usaha Pertiwi production	6	3.679.500	630.000	-	-	-	-	-	-	-	-	-
TOTAL BENEFITS		106.517.554		-	-	-	-	2.892.540.000,00	-	-	-	-
DISCOUNT RATE (1/((1+i)^t)))	11%			2,84	2,56	2,30	2,08	0,26	0,23	0,21	0,19	0,17
PV BENEFITS				-	-	-	-	744.870.284,63	-	-	-	-
COST (x Rp. 1.000)												
1. Service Information Service Area Mining	(Rp./hour)	2.600	100.000	260.000,00	-	-	-	-	-	-	-	-
2. Determination of coordinates Mining Areas	per publishing	6	10.000.000	60.000,00	-	-	-	-	-	-	-	-
3. Map document services	per publishing	6	2.000.000	12.000,00	-	-	-	-	-	-	-	-
4. Compilation services of Mining Areas	per application											
a. area < 2000 Ha		2	75.000.000	150.000,00	-	-	-	-	-	-	-	-
b. area 2000 - 10000 Ha		2	100.000.000	200.000,00	-	-	-	-	-	-	-	-
e. area > 100.000 Ha		2	250.000.000	500.000,00	-	-	-	-	-	-	-	-
5. Fix Fees												
a. General inquiry	(Rp./ha/yr)											
- year I		6.955,17	500	676,40	2.574,40	226,79	-	-	-	-	-	-
- year II		6.955,17	1.000	-	1.352,80	5.148,80	453,57	-	-	-	-	-
b. Eksploration												
- year I		6.955,17	2.000	-	2.705,60	10.297,60	907,14	-	-	-	-	-
- year II		6.955,17	2.500	-	-	3.382,00	12.872,00	-	-	-	-	-
- year III		6.955,17	3.000	-	-	-	4.058,40	-	-	-	-	-
c. extension of Exploration												
- year I		6.955,17	5.000	-	-	-	-	-	-	-	-	-
- year II		6.955,17	7.000	-	-	-	-	-	-	-	-	-
d. Pembangunan Fasilitas Eksploitasi												
- year I		6.955,17	8.000	-	-	-	-	-	-	-	-	-
- year II		6.955,17	8.000	-	-	-	-	-	-	-	-	-
- year III		6.955,17	8.000	-	-	-	-	-	-	-	-	-
e. Eksploitasi												
- year I		6.955,17	15.000	-	-	-	-	-	-	-	-	-
- year II		6.955,17	25.000	-	-	-	-	-	-	-	-	-
6. Iuran Eksplorasi/Eksploitasi/Royalty	(Rp./ton)											
a. calor < 5.100		106.517.554	3%	-	-	-	-	86.776.200,00	-	-	-	-
7.Technology services												
a.general inquiry/exploration	(Rp./meter)	6.955,17	1.000.000	-	-	-	-	-	-	-	-	-
b. Coal drilling										-	-	-
- Drilling distance 400 x 400 meter	(Rp./drilling point)	62.597	300.000									
- Drilling distance 200 x 200 meter	(Rp./drilling point)	173.879	300.000									
- Drilling distance 100 x 100 meter	(Rp./drilling point)	278.207	300.000									
8. Administration and General Affairs (yr 2009)	(Rp./Ha)	6.955,17	1.031.250	-	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59	326.023,59
9. Environmental impact assessment	(Rp./Ha)		27.500	-	-	-	-	-	-	-	-	-
10. Long Term Work Plan	(Rp./Ha)		20.625	-	-	-	-	-	-	-	-	-
11. Annual Work Plan	(Rp./Ha)		10.000	-	-	-	-	-	-	-	-	-
12. Infrastructure Building (yr 2009)												
a. road	(Rp./Ha)	2.735,77	2.062.500	-	-	-	-	-	-	-	-	-
b. Infrastructure maintenance	(Rp./Ha)	2.735,77	27.500	-	-	-	-	75.233,68	75.233,68	-	-	-
13. Costs Related to the Forestry Sector												
a. General inquiry License	per publishing	8	100.000.000									
b. Exploration license	per publishing	8	100.000.000									
c. Principal approval IPPKH	per publishing	8	100.000.000									
c.1. Area boundary PPKH	(Rp./Ha)	6.955,17	34.375	-	-	-	-	-	-	-	-	-
c.2. forest inventory	(Rp./Ha)	6.955,17	34.375									
c.3. structuring area IPPKH	(Rp./Ha)	6.955,17	165.000	-	-	-	-	-	-	-	-	-
c.4. Compensation to timber companies	(Rp./Ha)	6.955,17	-	-	-	-	-	-	-	-	-	-
d. Use of Forest Area Permit	per publishing	8	-									
d.1. Government Fee	(Rp./Ha/yr)											
- L1 (Active mining area)	(Rp./Ha/yr)	351,62	2.400.000	-	-	-	-	-	-	-	-	-
- L2 (Unreclaimed mining area)	(Rp./Ha/yr)	281,29	2.400.000	-	-	-	-	-	-	-	-	-
- L3 (permanently damaged area - void tambar	(Rp./Ha/yr)	421,94	2.400.000	-	-	-	-	-	-	-	-	-
d.2. Forest resource provision	(Rp./M3)	pm	1.250.000									
d.3. Rehabilitation Fund	(Rp./M3)	pm	150.000									
d.4. Rehabilitation on critical Watershed	(Rp./Ha)	6.955	-	-	-	-	-	-	-	-	-	-
14. Production cost	(Rp./ton)	106.517.554	653.020	-	-	-	-	2.998.232.493	-	-	-	-
15. CSR Cost	(Rp./ton)	6.955,17	10.000	-	-	-	-	69.552	-	-	-	-
16. Reclamation cost	(Rp./Ha)	4.219,41	-	-	-	-	-	-	-	-	-	-
17. Revegetations cost	(Rp./Ha)	6.955,17	-	-	-	-	-	-	-	-	-	-
18. Maintenace cost (yr 1 - 5)	(Rp./Ha)	6.955,17	-	-	-	-	-	-	-	-	6.482.914	6.482.914
19. Environmental cost	(Rp./Ha)	6.955,17	-	-	-	-	-	-	-	-	-	-
20. Cost of financial compensation, social ecology and fore	(Rp./Ha)	6.955,17	385.466,898	-	-	-	-	157.705,17	157.705,17	157.705,17	157.705,17	157.705,17
			752.146.612									
TOTAL COST				1.182.676,40	332.656,39	345.078,78	344.314,70	3.085.637.207,47	558.962,43	483.728,76	6.966.642,72	6.966.642,72
DISCOUNT RATE (1/((1+i)^t)))	11%			1,00	1,00	1,00	1,00	0,26	0,23	0,21	0,19	0,17
PV COST				1.182.676,40	332.656,39	345.078,78	344.314,70	794.595.568,25	129.676,39	101.101,41	1.311.764,51	1.181.769,83
TOTAL	PER HEKTAR	TOTAL										
- PV BENEFIT	5.827.904,04	40.534.063.314,93		-	-	-	-	744.870.284,63	-	-	-	-
- PV COST	5.635.188,38	39.193.693.194,61		1.182.676,40	332.656,39	345.078,78	344.314,70	794.595.568,25	129.676,39	101.101,41	1.311.764,51	1.181.769,83
- NPV	192.715,65	1.340.370.120,32		(1.182.676,40)	(332.656,39)	(345.078,78)	(344.314,70)	(49.725.283,62)	(129.676,39)	(101.101,41)	(1.311.764,51)	(1.181.769,83)
- BCR	1,03	1,03		-	-	-	-	0,94	-	-	-	-