

## Lampiran 1: Perhitungan Penggunaan Bahan Bakar

PEMAKAIAN BAHAN BAKAR (Pembangkit PLN)						
Jenis Bahan Bakar	Satuan	2003	2004	2005	2006	2007
HSD/IDO	kilo liter	2.340.367,42	3.274.932,64	5.161.009,02	4.219.142,00	4.053.206,50
MFO	kilo liter	2.088.045,28	2.096.786,70	1.933.927,72	2.059.780,84	2.222.120,08
Batubara	ton	13.294.500,82	13.425.337,19	15.014.433,24	16.821.687,28	19.108.282,93
Gas Alam	MMSCF	154.901,94	138.693,30	113.404,07	126.366,74	134.276,98

ENERGI YANG DIHASILKAN (Pembangkit PLN)						
Jenis Bahan Bakar	Satuan	2003	2004	2005	2006	2007
HSD/IDO	GWh	8.483,90	14.641,99	18.879,50	16.574,51	19.501,78
MFO		7.713,88	8.294,79	7.132,75	7.716,82	3.659,87
Batubara		28.556,37	27.689,95	29.438,56	34.526,33	37.817,83
Gas Alam		18.387,87	14.120,51	12.901,79	13.433,81	15.589,20
		63.142,02	64.747,24	68.352,60	72.251,47	76.568,88

PEMAKAIAN BAHAN BAKAR SPESIFIK (Pembangkit PLN)							
Jenis Bahan Bakar	Satuan	2003	2004	2005	2006	2007	Rata-Rata
HSD/IDO	liter/kWh	0,2759	0,2237	0,2734	0,2546	0,2078	0,2471
MFO	liter/kWh	0,2707	0,2528	0,2711	0,2669	0,6072	0,2654
Batubara	kg/kWh	0,4656	0,4848	0,5100	0,4872	0,5053	0,4906
Gas Alam	MMSCF/kWh	0,00000842	0,00000982	0,00000879	0,00000941	0,00000861	0,00001

### PERHITUNGAN ASUMSI PEMAKAIAN BAHAN BAKAR PEMBANGKIT-PEMBANGKIT NON PLN

ENERGI (kWh) YANG DIHASILKAN (Pembangkit Non PLN)							
Pembangkit	Jenis Bahan Bakar	2003	2004	2005	2006	2007	Pemakaian Sendiri
PT Paiton EC	Batubara	7.947.855.896	9.682.794.563	9.753.166.125	9.496.113.188	10.054.861.500	5%
PT Jawa Power	Batubara	7.387.176.042	8.440.554.167	9.449.935.417	9.488.580.208	9.543.297.917	5%
PT Cikarang L	Gas Alam	544.633.673	622.951.064	555.804.344	410.860.450	476.510.714	2%
PT Krakatau DL	Gas Alam	18.794.272	12.847.459	2.929.641	2.367.335	1.806.902	6%
PT SS Primadaya	Batubara				2.038.727.642	3.134.154.352	5%
Total Batubara		15.335.031.938	18.123.348.729	19.203.101.542	21.023.421.038	22.732.313.768	
Total Gas Alam		563.427.946	635.798.523	558.733.985	413.227.785	478.317.616	
Total		15.898.459.883	18.759.147.252	19.761.835.527	21.436.648.823	23.210.631.385	

PEMAKAIAN BAHAN BAKAR (Pembangkit Non PLN)						
Jenis Bahan Bakar	Satuan	2003	2004	2005	2006	2007
Batubara	ton	7.523.088,17	8.890.985,75	9.420.692,88	10.313.708,56	11.152.060,30
Gas Alam	MMSCF	5.634,28	6.357,99	5.587,34	4.132,28	4.783,18

### Pemakaian bahan bakar total

Jenis Bahan Bakar	Satuan	2003	2004	2005	2006	2007
HSD/IDO	kilo liter	2.340.367,42	3.274.932,64	5.161.009,02	4.219.142,00	4.053.206,50
MFO	kilo liter	2.088.045,28	2.096.786,70	1.933.927,72	2.059.780,84	2.222.120,08
Batubara	ton	20.817.588,99	22.316.322,94	24.435.126,12	27.135.395,84	30.260.343,23
Gas Alam	MMSCF	160.536,22	145.051,29	118.991,41	130.499,02	139.060,16

Lampiran 2: Perhitungan Faktor Emisi *Baseline* Sebelum Penambahan PLTU Batubara

**Perhitungan Operating Margin (OM)**

**Penghitungan Emisi CO<sub>2</sub> Operating Margin Tahun 2005**

Jenis Bahan Bakar	A Jumlah Bahan Bakar (FC <sub>i,y</sub> )		B Net Calorific Value (NCV <sub>i,y</sub> )			C Kandungan Karbon	D Faktor Oksidasi Karbon	E Kandungan Karbon Per Satuan Jumlah Bahan Bakar	F Faktor Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar (EF <sub>CO<sub>2</sub>,i,y</sub> )	G Density	H Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar (cair)	I Emisi CO <sub>2</sub> Per Jenis Bahan Bakar (FC <sub>i,y</sub> *NCV <sub>i,y</sub> *EF <sub>CO<sub>2</sub>,i,y</sub> )
			TJ/kt			tC/TJ	IPCC	tC/kt	tCO <sub>2</sub> /kt	kt/kl	tCO <sub>2</sub> /kl	tCO <sub>2</sub>
			PERTAMINA	DJMBP	IPCC	IPCC						
HSD/IDO	5.161.009,02	kilo liter	43,244			20,2	1	873,529	3.202,939	0,000845	2,706	13.968.184,907
MFO	1.933.927,72	kilo liter	41,178			21,1	1	868,854	3.185,799	0,000990	3,154	6.099.493,021
Batubara	24.435.126,12	ton		24,969		26,2	1	654,175	2.398,641			58.611.096,841
Gas Alam	118.991,41	MMSCF			48	15,3	1	734,400	2.692,800			7.679.187,361
<b>Emisi CO<sub>2</sub> Total</b>											86.357.962,129	

**Penghitungan Emisi CO<sub>2</sub> Operating Margin Tahun 2006**

Jenis Bahan Bakar	A Jumlah Bahan Bakar (FC <sub>i,y</sub> )		B Net Calorific Value (NCV)			C Kandungan Karbon	D Faktor Oksidasi Karbon	E Kandungan Karbon Per Satuan Jumlah Bahan Bakar	F Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar	G Density	H Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar (cair)	I Emisi CO <sub>2</sub> Per Jenis Bahan Bakar (FC <sub>i,y</sub> *NCV <sub>i,y</sub> *EF <sub>CO<sub>2</sub>,i,y</sub> )
			TJ/kt			tC/TJ	IPCC	tC/kt	tCO <sub>2</sub> /kt	kt/kl	tCO <sub>2</sub> /kl	tCO <sub>2</sub>
			PERTAMINA	DJMBP	IPCC	IPCC						
HSD/IDO	4.219.142,00	kilo liter	43,244			20,2	1	873,529	3.202,939	0,000845	2,706	11.419.037,513
MFO	2.059.780,84	kilo liter	41,178			21,1	1	868,854	3.185,799	0,000990	3,154	6.496.426,277
Batubara	27.135.395,84	ton		24,969		26,2	1	654,175	2.398,641			65.088.074,684
Gas Alam	130.499,02	MMSCF			48,000	15,3	1	734,400	2.692,800			8.421.838,263
<b>Emisi CO<sub>2</sub> Total</b>											91.425.376,737	

**Penghitungan Emisi CO<sub>2</sub> Operating Margin Tahun 2007**

Jenis Bahan Bakar	A Jumlah Bahan Bakar (FC <sub>i,y</sub> )		B Net Calorific Value (NCV)			C Kandungan Karbon	D Faktor Oksidasi Karbon	E Kandungan Karbon Per Satuan Jumlah Bahan Bakar	F Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar	G Density	H Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar (cair)	I Emisi CO <sub>2</sub> Per Jenis Bahan Bakar (FC <sub>i,y</sub> *NCV <sub>i,y</sub> *EF <sub>CO<sub>2</sub>,i,y</sub> )
			TJ/kt			tC/TJ	IPCC	tC/kt	tCO <sub>2</sub> /kt	kt/kl	tCO <sub>2</sub> /kl	tCO <sub>2</sub>
			PERTAMINA	DJMBP	IPCC	IPCC						
HSD/IDO	4.053.206,50	kilo liter	43,244			20,2	1	873,529	3.202,939	0,000845	2,706	10.969.935,847
MFO	2.222.120,08	kilo liter	41,178			21,1	1	868,854	3.185,799	0,000990	3,154	7.008.434,586
Batubara	30.260.343,23	ton		24,969		26,2	1	654,175	2.398,641			72.583.701,806
Gas Alam	139.060,16	MMSCF			48	15,3	1	734,400	2.692,800			8.974.336,844
<b>Emisi CO<sub>2</sub> Total</b>											99.536.409,083	

**Energi Dari Setiap Jenis Bahan Bakar**

Jenis Bahan Bakar	Satuan	2005	2006	2007
Air/Hidro	GWh	6.952	5.267	5.874
Panas Bumi		6.320	6.334	6.673
Gas Alam		14.807	14.071	16.128
Minyak		22.978	23.543	21.981
Batubara		46.416	52.961	57.319
<b>Energi Netto Total (EG<sub>y</sub>)</b>			<b>97.473</b>	<b>102.176</b>

**Faktor Emisi OM**

Definisi	Satuan	2005	2006	2007
Emisi CO <sub>2</sub> Total	tCO <sub>2</sub>	86.357.962,129	91.425.376,737	99.536.409,083
Energi Netto Total (EG <sub>y</sub> )	MWh	98.038.451,329	101.611.200,752	107.974.850,120
EF <sub>grid,OM,y</sub>	tCO <sub>2</sub> /MWh	0,881	0,900	0,922

<b>Faktor Emisi Operatin Margin (OM) Grid JAMALI 2007</b>	<b>0,901</b>	<b>tCO<sub>2</sub>/MWh</b>
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**Perhitungan Build Margin (BM)****Daftar Pembangkit BM**

Pembangkit	Tahun Operasi	Energi (MWh)	Jenis Bahan Bakar	Jumlah Bahan Bakar	Satuan	Pemakaian Sendiri	Keterangan
Kamojang Unit V	2007	20.314,734	Panas Bumi			4%	Asumsi
Darajat Unit III	2007	453.907,708	Panas Bumi			4%	Data
PT Sakti Prima (Cilacap)	2006	3.134.154,352	Batubara	1.537.559,207	ton	5%	Data
Tanjung Jati B	2006	8.572.535,509	Batubara	4.205.530,238	ton	7,77%	Data
Cilegon	2006	1.383.975,683	Gas Alam	13.839,757	MSCF	3,32%	Data
Muara Tawar	2004	1.567.014,719	MFO	415.856,256	kl	1,35%	Data
PT KDL	2003	1.806,902	Gas Alam	18,069	MMSCF	6%	Data
PT Cikarang LP	2003	476.510,714	Gas Alam	4.765,107	MMSCF	2%	Data
PT Jawa Power	2000	9.643.753,684	Batubara	4.731.050,421	ton		Asumsi
<b>Total Energi</b>		<b>25.253.974,005</b>					

<b>Energi Total Tersalur ke Sistem Tahun 2007</b>	107.974.850,120	MWh
<b>Energi Yang Dihasilkan Pembangkit Build Margin</b>	25.253.974,005	MWh
<b>Kontribusi Pembangkit BM Terhadap Sistem</b>	23,39	%

**Penghitungan Emisi CO<sub>2</sub> Build Margin Tahun 2007**

Jenis Bahan Bakar	A Jumlah Bahan Bakar (FC <sub>i,y</sub> )		B Net Calorific Value (NCV)		C Kandungan Karbon	D Faktor Oksidasi Karbon	E Kandungan Karbon Per Satuan Jumlah Bahan Bakar	F Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar	G Density	H Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar (cair)	I Emisi CO <sub>2</sub> Per Jenis Bahan Bakar (FC <sub>i,y</sub> *NCV <sub>i,y</sub> *EF <sub>CO2i,y</sub> )
			TJ/kt		tC/TJ	IPCC	tC/kt	tCO <sub>2</sub> /kt	kt/kl	tCO <sub>2</sub> /kl	tCO <sub>2</sub>
	PERTAMINA	DJMBP	IPCC	IPCC	B*C'D	E*44/12	F/G				
MFO	415.856,26	kilo liter	41,178		21,1	1	868,854	3.185,799	0,000990	3,154	1.311.585,901
Batubara	10.474.157,93	ton		24,969	26,2	1	654,175	2.398,641			25.123.745,304
Gas Alam	18.622,93	MSCF		48,000	15,3	1	734,400	2.692,800			1.201.842,989
<b>Emisi CO<sub>2</sub> Total</b>											
<b>27.637.174,194</b>											

**Faktor Emisi BM Tahun 2007**

Definisi	Satuan	Jumlah
<b>Emisi CO<sub>2</sub> Total</b>	tCO <sub>2</sub>	27.637.174,194
<b>Energi Netto Total (EG<sub>y</sub>)</b>	MWh	25.253.974,005
<b>EF<sub>grid,BM,y</sub></b>	tCO <sub>2</sub> /MWh	1,094

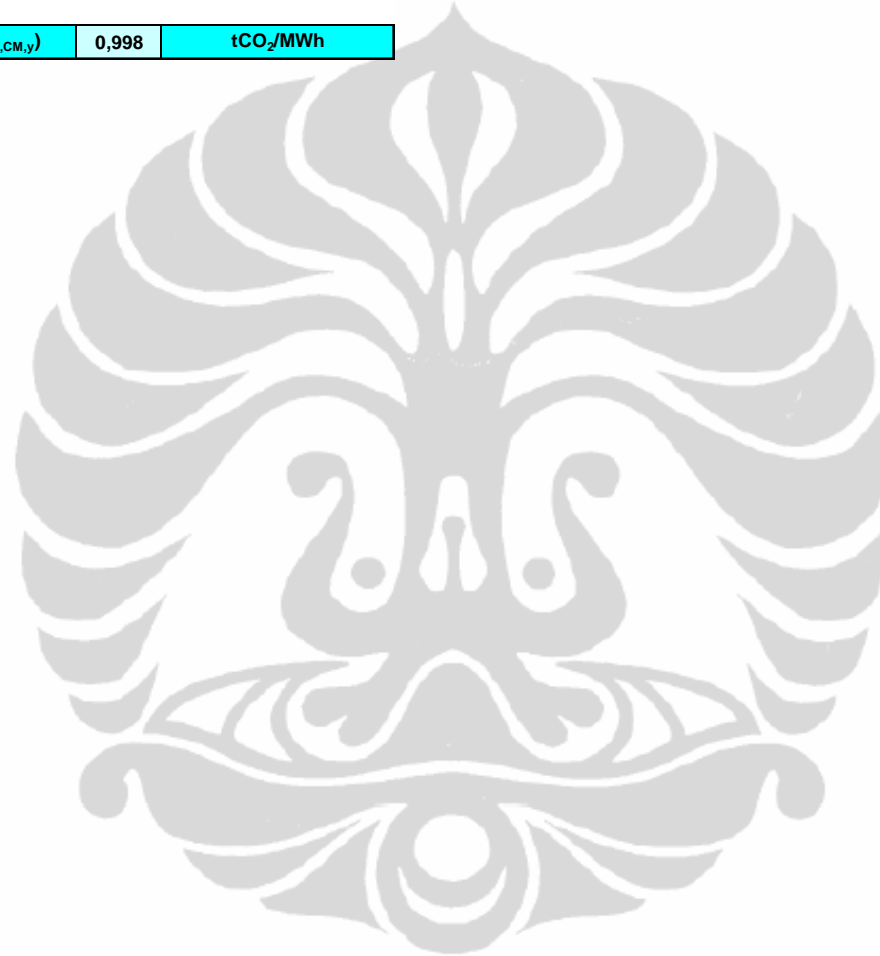
<b>Faktor Emisi Build Margin (BM) Grid JAMALI 2007</b>	<b>1,094</b>	<b>tCO<sub>2</sub>/MWh</b>
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**Perhitungan Combine Margin (CM)**

$$EF_{\text{grid,CM,y}} = EF_{\text{grid,OM,y}} \times W_{\text{OM}} + EF_{\text{grid,BM,y}} \times W_{\text{BM}}$$

$W_{\text{OM}}$	=	0,5
$W_{\text{BM}}$	=	0,5

<b>Faktor Emisi Combine Margin (CM) Grid JAMALI 2007 (<math>EF_{\text{grid,CM,y}}</math>)</b>	<b>0,998</b>	<b>tCO<sub>2</sub>/MWh</b>
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Lampiran 3: Perhitungan Faktor Emisi *Baseline* dengan Faktor Kapasitas  
 PLTU Batubara Tambahan 60%

PLTU 10.000 MW yang menjadi prioritas

PLTU 2 Banten (Labuan)	2 x 315 MW	630
PLTU 1 Jateng (Rembang)	2 x 315 MW	630
PLTU 1 Jabar (Indramayu)	3 x 350 MW	700

Asumsi Faktor Kapasitas Pembangkit Listrik =	60%
Asumsi Heat Rate 1 kWh =	2.400 kcal

**Energi dibangkitkan selama setahun (kWh)**

PLTU 2 Banten (Labuan)	3.311.280.000
PLTU 1 Jateng (Rembang)	3.311.280.000
PLTU 1 Jabar (Indramayu)	3.679.200.000
<b>Total</b>	<b>10.301.760.000</b>

**Kebutuhan bahan bakar per tahun**

NCV (kcal/kg)	4.327	4.370	4.414	4.458	4.503	4.548	4.593	4.639	4.686	4.732	4.780
<b>Pembangkit</b>	<b>Jumlah Bahan Bakar Per Tahun (ton)</b>										
PLTU 2 Banten (Labuan)	1.836.624	1.818.440	1.800.435	1.782.609	1.764.960	1.747.485	1.730.183	1.713.052	1.696.091	1.679.298	1.662.672
PLTU 1 Jateng (Rembang)	1.836.624	1.818.440	1.800.435	1.782.609	1.764.960	1.747.485	1.730.183	1.713.052	1.696.091	1.679.298	1.662.672
PLTU 1 Jabar (Indramayu)	2.040.693	2.020.488	2.000.484	1.980.677	1.961.066	1.941.650	1.922.425	1.903.392	1.884.546	1.865.887	1.847.413
<b>Total</b>	<b>5.713.941</b>	<b>5.657.368</b>	<b>5.601.354</b>	<b>5.545.895</b>	<b>5.490.985</b>	<b>5.436.619</b>	<b>5.382.791</b>	<b>5.329.496</b>	<b>5.276.729</b>	<b>5.224.484</b>	<b>5.172.757</b>

NCV (kcal/kg)	4.827	4.876	4.925	4.974	5.024	5.074	5.124	5.176	5.227	5.280	5.333
<b>Pembangkit</b>	<b>Jumlah Bahan Bakar Per Tahun (ton)</b>										
PLTU 2 Banten (Labuan)	1.646.210	1.629.911	1.613.773	1.597.795	1.581.975	1.566.312	1.550.804	1.535.449	1.520.247	1.505.195	1.490.292
PLTU 1 Jateng (Rembang)	1.646.210	1.629.911	1.613.773	1.597.795	1.581.975	1.566.312	1.550.804	1.535.449	1.520.247	1.505.195	1.490.292
PLTU 1 Jabar (Indramayu)	1.829.122	1.811.012	1.793.081	1.775.328	1.757.750	1.740.347	1.723.115	1.706.055	1.689.163	1.672.439	1.655.880
<b>Total</b>	<b>5.121.541</b>	<b>5.070.833</b>	<b>5.020.627</b>	<b>4.970.917</b>	<b>4.921.700</b>	<b>4.872.971</b>	<b>4.824.723</b>	<b>4.776.954</b>	<b>4.729.657</b>	<b>4.682.829</b>	<b>4.636.464</b>

NCV (kcal/kg)	5.386	5.440	5.494	5.549	5.605	5.661	5.717	5.774	5.832	5.890	5.949
<b>Pembangkit</b>	<b>Jumlah Bahan Bakar Per Tahun (ton)</b>										
PLTU 2 Banten (Labuan)	1.475.537	1.460.927	1.446.463	1.432.141	1.417.962	1.403.923	1.390.022	1.376.260	1.362.633	1.349.142	1.335.784
PLTU 1 Jateng (Rembang)	1.475.537	1.460.927	1.446.463	1.432.141	1.417.962	1.403.923	1.390.022	1.376.260	1.362.633	1.349.142	1.335.784
PLTU 1 Jabar (Indramayu)	1.639.485	1.623.253	1.607.181	1.591.268	1.575.513	1.559.914	1.544.469	1.529.178	1.514.037	1.499.047	1.484.205
<b>Total</b>	<b>4.590.559</b>	<b>4.545.108</b>	<b>4.500.107</b>	<b>4.455.551</b>	<b>4.411.437</b>	<b>4.367.759</b>	<b>4.324.514</b>	<b>4.281.697</b>	<b>4.239.304</b>	<b>4.197.331</b>	<b>4.155.773</b>

(Lanjutan)

NCV (kcal/kg)	6.009	6.069	6.130	6.191	6.253	6.315	6.379	6.442	6.507	6.572	6.638
<b>Pembangkit</b>	<b>Jumlah Bahan Bakar Per Tahun (ton)</b>										
PLTU 2 Banten (Labuan)	1.322.559	1.309.464	1.296.499	1.283.662	1.270.953	1.258.369	1.245.910	1.233.574	1.221.361	1.209.268	1.197.295
PLTU 1 Jateng (Rembang)	1.322.559	1.309.464	1.296.499	1.283.662	1.270.953	1.258.369	1.245.910	1.233.574	1.221.361	1.209.268	1.197.295
PLTU 1 Jabar (Indramayu)	1.469.510	1.454.960	1.440.554	1.426.291	1.412.170	1.398.188	1.384.344	1.370.638	1.357.067	1.343.631	1.330.328
Total	4.114.627	4.073.888	4.033.552	3.993.616	3.954.075	3.914.926	3.876.164	3.837.787	3.799.789	3.762.167	3.724.918

NCV (kcal/kg)	6.704	6.771	6.839	6.907	6.976	7.046	7.116	7.187	7.259	7.332	7.405
<b>Pembangkit</b>	<b>Jumlah Bahan Bakar Per Tahun (ton)</b>										
PLTU 2 Banten (Labuan)	1.185.441	1.173.704	1.162.083	1.150.577	1.139.185	1.127.906	1.116.739	1.105.682	1.094.735	1.083.896	1.073.164
PLTU 1 Jateng (Rembang)	1.185.441	1.173.704	1.162.083	1.150.577	1.139.185	1.127.906	1.116.739	1.105.682	1.094.735	1.083.896	1.073.164
PLTU 1 Jabar (Indramayu)	1.317.156	1.304.115	1.291.203	1.278.419	1.265.761	1.253.229	1.240.821	1.228.535	1.216.372	1.204.328	1.192.404
Total	3.688.037	3.651.522	3.615.369	3.579.573	3.544.132	3.509.041	3.474.298	3.439.899	3.405.841	3.372.120	3.338.732

NCV (kcal/kg)	7.479	7.554	7.630	7.706	7.783	7.861	7.939
<b>Pembangkit</b>	<b>Jumlah Bahan Bakar Per Tahun (ton)</b>						
PLTU 2 Banten (Labuan)	1.062.539	1.052.018	1.041.602	1.031.289	1.021.079	1.010.969	1.000.959
PLTU 1 Jateng (Rembang)	1.062.539	1.052.018	1.041.602	1.031.289	1.021.079	1.010.969	1.000.959
PLTU 1 Jabar (Indramayu)	1.180.598	1.168.909	1.157.336	1.145.877	1.134.532	1.123.299	1.112.177
Total	3.305.675	3.272.946	3.240.541	3.208.456	3.176.689	3.145.237	3.114.096

**Energi Dihasilkan BBM**

2007

HSD/IDO 19.501,78 GWh  
MFO 3.659,87 GWh

**Energi Dihasilkan BBM Setelah Digantikan Batubara**

2007

HSD/IDO 9.200,02 GWh  
MFO 3.659,87 GWh

**Pemakaian HSD/IDO Setelah Digantikan Batubara**

HSD/IDO 2.272.932 kl

(Lanjutan)

## Perhitungan Operating Margin (OM)

Penghitungan Emisi CO<sub>2</sub> Operating Margin Tahun 2005

Jenis Bahan Bakar	A Jumlah Bahan Bakar (FC <sub>i,y</sub> )		B Net Calorific Value (NCV <sub>i,y</sub> )			C Kandungan Karbon	D Faktor Oksidasi Karbon	E Kandungan Karbon Per Satuan Jumlah Bahan Bakar	F Faktor Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar (EFCO <sub>2,i,y</sub> )	G Density	H Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar (cair)	I Emisi CO <sub>2</sub> Per Jenis Bahan Bakar (FC <sub>i,y</sub> *NCV <sub>i,y</sub> *EFCO <sub>2,i,y</sub> )
								tC/kt	tCO <sub>2</sub> /kt		tCO <sub>2</sub> /kl	
			PERTAMINA	DJMBP	IPCC	IPCC	IPCC	B*C*D	E*44/12	kt/kl	F*G	tCO <sub>2</sub>
HSD/IDO	5.161.009,02	kilo liter	43,244			20,2	1	873,529	3.202,939	0,000845	2,706	13.968.184,907
MFO	1.933.927,72	kilo liter	41,178			21,1	1	868,854	3.185,799	0,000990	3,154	6.099.493,021
Batubara	24.435.126,12	ton		24,969		26,2	1	654,175	2.398,641			58.611.096,841
Gas Alam	118.991,41	MMSCF			48	15,3	1	734,400	2.692,800			7.679.187,361
<b>Emisi CO<sub>2</sub> Total</b>												86.357.962,129

Penghitungan Emisi CO<sub>2</sub> Operating Margin Tahun 2006

Jenis Bahan Bakar	A Jumlah Bahan Bakar (FC <sub>i,y</sub> )		B Net Calorific Value (NCV)			C Kandungan Karbon	D Faktor Oksidasi Karbon	E Kandungan Karbon Per Satuan Jumlah Bahan Bakar	F Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar	G Density	H Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar (cair)	I Emisi CO <sub>2</sub> Per Jenis Bahan Bakar (FC <sub>i,y</sub> *NCV <sub>i,y</sub> *EFCO <sub>2,i,y</sub> )
								tC/kt	tCO <sub>2</sub> /kt		tCO <sub>2</sub> /kl	
			PERTAMINA	DJMBP	IPCC	IPCC	IPCC	B*C*D	E*44/12	kt/kl	F*G	tCO <sub>2</sub>
HSD/IDO	4.219.142,00	kilo liter	43,244			20,2	1	873,529	3.202,939	0,000845	2,706	11.419.037,513
MFO	2.059.780,84	kilo liter	41,178			21,1	1	868,854	3.185,799	0,000990	3,154	6.496.426,277
Batubara	27.135.395,84	ton		24,969		26,2	1	654,175	2.398,641			65.088.074,684
Gas Alam	130.499,02	MMSCF			48,000	15,3	1	734,400	2.692,800			8.421.838,263
<b>Emisi CO<sub>2</sub> Total</b>												91.425.376,737



Penghitungan Emisi CO<sub>2</sub> Operating Margin Tahun 2007

Jenis Bahan Bakar	A						B			C	D	
	Jumlah Bahan Bakar (FC <sub>i,y</sub> )						Net Calorific Value (NCV)			Kandungan Karbon	Faktor Oksidasi Karbon	
							TJ/kt			tC/TJ	IPCC	
							PERTAMINA	DJMBP	IPCC	IPCC	IPCC	
HSD/IDO	2.272.932,36						kilo liter	43,244			20,2	1
MFO	2.222.120,08						kilo liter	41,178			21,1	1
Batubara	35.974.284,53	35.381.884,34	34.850.902,00	34.374.969,93	33.948.380,73	33.566.018,71	ton	24,969			26,2	1
	35.917.710,85	35.331.176,01	34.805.450,92	34.334.231,05	33.911.865,51	33.533.289,25						
	35.861.697,31	35.280.969,74	34.760.449,85	34.293.895,53	33.875.711,82	33.500.883,84						
	35.806.238,36	35.231.260,57	34.715.894,34	34.253.959,37	33.839.916,09	33.468.799,28						
	35.751.328,51	35.182.043,57	34.671.779,97	34.214.418,61	33.804.474,78	33.437.032,39						
	35.696.962,32	35.133.313,86	34.628.102,38	34.175.269,35	33.769.384,36	33.405.580,02						
	35.643.134,41	35.085.066,63	34.584.857,24	34.136.507,71	33.734.641,38	33.374.439,07						
	35.589.839,44	35.037.297,09	34.542.040,27	34.098.129,84	33.700.242,39							
	35.537.072,15	34.990.000,52	34.499.647,23	34.060.131,95	33.666.183,98							
	35.484.827,31	34.943.172,23	34.457.673,92	34.022.510,28	33.632.462,79							
35.433.099,75	34.896.807,58	34.416.116,19	33.985.261,10	33.599.075,47								
Gas Alam	139.060,16						MMSCF		48,000	15,3	1	
<b>Emisi CO<sub>2</sub> Total</b>												

(Lanjutan)





E	F	G	H	I					
Kandungan Karbon Per Satuan Jumlah Bahan Bakar	Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar	Density	Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar (cair)	Emisi CO <sub>2</sub> Per Jenis Bahan Bakar (FC <sub>i,y</sub> *NCV <sub>i,y</sub> *EFCO <sub>2i,y</sub> )					
tC/kt	tCO <sub>2</sub> /kt		tCO <sub>2</sub> /kl	tCO <sub>2</sub>					
B*C*D	E*44/12	kt/kl	F*G						
873,529	3.202,939	0,000845	2,706	6.151.653,544					
868,854	3.185,799	0,000990	3,154	7.008.434,586					
654,175	2.398,641			86.289.396,028	84.868.440,602	83.594.804,552	82.453.214,354	81.429.979,983	80.512.830,748
				86.153.696,085	84.746.809,525	83.485.783,733	82.355.496,408	81.342.393,070	80.434.324,520
				86.019.339,706	84.626.382,716	83.377.842,328	82.258.745,966	81.255.673,355	80.356.595,583
				85.886.313,588	84.507.148,251	83.270.969,650	82.162.953,450	81.169.812,250	80.279.636,238
				85.754.604,561	84.389.094,326	83.165.155,116	82.068.109,374	81.084.801,256	80.203.438,868
				85.624.199,583	84.272.209,252	83.060.388,252	81.974.204,349	81.000.631,954	80.127.995,927
				85.495.085,744	84.156.481,455	82.956.658,683	81.881.229,076	80.917.296,012	80.053.299,945
				85.367.250,259	84.041.899,478	82.853.956,140	81.789.174,350	80.834.785,178	
				85.240.680,472	83.928.451,977	82.752.270,453	81.698.031,058	80.753.091,284	
				85.115.363,852	83.816.127,718	82.651.591,556	81.607.790,174	80.672.206,239	
		84.991.287,990	83.704.915,580	82.551.909,479	81.518.442,765	80.592.122,037			
734,400	2.692,800			8.974.336,844					
<b>Emisi CO<sub>2</sub> Total</b>				108.423.821,002	107.002.865,576	105.729.229,527	104.587.639,328	103.564.404,957	102.647.255,722
				108.288.121,059	106.881.234,499	105.620.208,707	104.489.921,382	103.476.818,044	102.568.749,495
				108.153.764,680	106.760.807,690	105.512.267,302	104.393.170,940	103.390.098,329	102.491.020,557
				108.020.738,563	106.641.573,226	105.405.394,624	104.297.378,424	103.304.237,225	102.414.061,213
				107.889.029,535	106.523.519,300	105.299.580,091	104.202.534,348	103.219.226,230	102.337.863,842
				107.758.624,557	106.406.634,226	105.194.813,226	104.108.629,323	103.135.056,929	102.262.420,901
				107.629.510,718	106.290.906,430	105.091.083,657	104.015.654,050	103.051.720,987	102.187.724,920
				107.501.675,233	106.176.324,453	104.988.381,114	103.923.599,325	102.969.210,153	
				107.375.105,447	106.062.876,951	104.886.695,428	103.832.456,032	102.887.516,258	
				107.249.788,826	105.950.552,692	104.786.016,530	103.742.215,148	102.806.631,214	
107.125.712,964	105.839.340,554	104.686.334,453	103.652.867,739	102.726.547,011					

(Lanjutan)

## Energi Dari Setiap Jenis Bahan Bakar

Jenis Bahan Bakar	Satuan	2005	2006	2007
Air/Hidro	GWh	6.952	5.267	5.874
Panas Bumi		6.320	6.334	6.673
Gas Alam		14.807	14.071	16.128
Minyak		22.978	23.543	21.981
Batubara		46.416	52.961	57.319
<b>Energi Netto Total (EG<sub>y</sub>)</b>		<b>97.473</b>	<b>102.176</b>	<b>107.975</b>

## Faktor Emisi OM

Definisi	Satuan	2005	2006	2007					
Emisi CO <sub>2</sub> Total	tCO <sub>2</sub>	86.357.962,129	91.425.376,737						
Energi Netto Total (EG <sub>y</sub> )	MWh	98.038.451,329	101.611.200,752	107.975.000,000					
EF <sub>grid,OM,y</sub>	tCO <sub>2</sub> /MWh	0,881	0,900	1,004	0,991	0,979	0,969	0,959	0,951
				1,003	0,990	0,978	0,968	0,958	0,950
				1,002	0,989	0,977	0,967	0,958	0,949
				1,000	0,988	0,976	0,966	0,957	0,948
				0,999	0,987	0,975	0,965	0,956	0,948
				0,998	0,985	0,974	0,964	0,955	0,947
				0,997	0,984	0,973	0,963	0,954	0,946
				0,996	0,983	0,972	0,962	0,954	
				0,994	0,982	0,971	0,962	0,953	
				0,993	0,981	0,970	0,961	0,952	
				0,992	0,980	0,970	0,960	0,951	

(Lanjutan)

Faktor Emisi <i>Operatin Margin (OM) Grid</i> JAMALI 2007	0,928	0,924	0,920	0,916	0,913	0,910	tCO <sub>2</sub> /MWh
	0,928	0,923	0,920	0,916	0,913	0,910	
	0,927	0,923	0,919	0,916	0,913	0,910	
	0,927	0,923	0,919	0,916	0,912	0,910	
	0,927	0,922	0,919	0,915	0,912	0,909	
	0,926	0,922	0,918	0,915	0,912	0,909	
	0,926	0,922	0,918	0,915	0,912	0,909	
	0,925	0,921	0,918	0,914	0,911		
	0,925	0,921	0,917	0,914	0,911		
	0,925	0,921	0,917	0,914	0,911		
	0,924	0,920	0,917	0,914	0,911		



## Perhitungan Build Margin (BM)

## Daftar Pembangkit BM

Pembangkit	Tahun Operasi	Energi (MWh)	Jenis Bahan Bakar	Jumlah-Bahan-Bakar-1	Jumlah-Bahan-Bakar-2	Jumlah-Bahan-Bakar-3	Jumlah-Bahan-Bakar-4	Jumlah-Bahan-Bakar-5	Jumlah-Bahan-Bakar-6	Jumlah-Bahan-Bakar-7	Jumlah-Bahan-Bakar-8	Jumlah-Bahan-Bakar-9	Jumlah-Bahan-Bakar-10	Jumlah-Bahan-Bakar-11
Kamojang Unit V	2007	20.314,734	Panas Bumi											
Darajat Unit III	2007	453.907,708	Panas Bumi											
PT Sakti Prima (Cilacap)	2006	3.134.154,352	Batubara	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207
Tanjung Jati B	2006	8.572.535,509	Batubara	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238
Cilegon	2006	1.383.975,683	Gas Alam	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757
Muara Tawar	2004	1.567.014,719	MFO	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256
PLTU Labuan	2007	3.311.280,000	Batubara	1.836.623,989	1.818.439,593	1.800.435,241	1.782.609,149	1.764.959,554	1.747.484,706	1.730.182,878	1.713.052,354	1.696.091,440	1.679.298,455	1.662.671,738
PLTU Rembang	2007	3.311.280,000	Batubara	1.836.623,989	1.818.439,593	1.800.435,241	1.782.609,149	1.764.959,554	1.747.484,706	1.730.182,878	1.713.052,354	1.696.091,440	1.679.298,455	1.662.671,738
PLTU Indramayu	2007	3.679.200,000	Batubara	2.040.693,321	2.020.488,437	2.000.483,601	1.980.676,832	1.961.066,171	1.941.649,674	1.922.425,420	1.903.391,505	1.884.546,044	1.865.887,172	1.847.413,042
<b>Total Energi</b>		<b>25.433.662,705</b>												

Pembangkit	Tahun Operasi	Energi (MWh)	Jenis Bahan Bakar	Jumlah-Bahan-Bakar-12	Jumlah-Bahan-Bakar-13	Jumlah-Bahan-Bakar-14	Jumlah-Bahan-Bakar-15	Jumlah-Bahan-Bakar-16	Jumlah-Bahan-Bakar-17	Jumlah-Bahan-Bakar-18	Jumlah-Bahan-Bakar-19	Jumlah-Bahan-Bakar-20	Jumlah-Bahan-Bakar-21	Jumlah-Bahan-Bakar-22
Kamojang Unit V	2007	20.314,734	Panas Bumi											
Darajat Unit III	2007	453.907,708	Panas Bumi											
PT Sakti Prima (Cilacap)	2006	3.134.154,352	Batubara	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207
Tanjung Jati B	2006	8.572.535,509	Batubara	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238
Cilegon	2006	1.383.975,683	Gas Alam	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757
Muara Tawar	2004	1.567.014,719	MFO	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256
PLTU Labuan	2007	3.311.280,000	Batubara	1.646.209,641	1.629.910,536	1.613.772,808	1.597.794,859	1.581.975,108	1.566.311,988	1.550.803,949	1.535.449,454	1.520.246,985	1.505.195,034	1.490.292,113
PLTU Rembang	2007	3.311.280,000	Batubara	1.646.209,641	1.629.910,536	1.613.772,808	1.597.794,859	1.581.975,108	1.566.311,988	1.550.803,949	1.535.449,454	1.520.246,985	1.505.195,034	1.490.292,113
PLTU Indramayu	2007	3.679.200,000	Batubara	1.829.121,824	1.811.011,707	1.793.080,898	1.775.327,622	1.757.750,120	1.740.346,654	1.723.115,499	1.706.054,949	1.689.163,316	1.672.438,927	1.655.880,126
<b>Total Energi</b>		<b>25.433.662,705</b>												

Pembangkit	Tahun Operasi	Energi (MWh)	Jenis Bahan Bakar	Jumlah-Bahan-Bakar-23	Jumlah-Bahan-Bakar-24	Jumlah-Bahan-Bakar-25	Jumlah-Bahan-Bakar-26	Jumlah-Bahan-Bakar-27	Jumlah-Bahan-Bakar-28	Jumlah-Bahan-Bakar-29	Jumlah-Bahan-Bakar-30	Jumlah-Bahan-Bakar-31	Jumlah-Bahan-Bakar-32	Jumlah-Bahan-Bakar-33
Kamojang Unit V	2007	20.314,734	Panas Bumi											
Darajat Unit III	2007	453.907,708	Panas Bumi											
PT Sakti Prima (Cilacap)	2006	3.134.154,352	Batubara	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207
Tanjung Jati B	2006	8.572.535,509	Batubara	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238
Cilegon	2006	1.383.975,683	Gas Alam	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757
Muara Tawar	2004	1.567.014,719	MFO	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256
PLTU Labuan	2007	3.311.280,000	Batubara	1.475.536,746	1.460.927,471	1.446.462,842	1.432.141,428	1.417.961,810	1.403.922,584	1.390.022,361	1.376.259,763	1.362.633,429	1.349.142,009	1.335.784,167
PLTU Rembang	2007	3.311.280,000	Batubara	1.475.536,746	1.460.927,471	1.446.462,842	1.432.141,428	1.417.961,810	1.403.922,584	1.390.022,361	1.376.259,763	1.362.633,429	1.349.142,009	1.335.784,167
PLTU Indramayu	2007	3.679.200,000	Batubara	1.639.485,273	1.623.252,745	1.607.180,936	1.591.268,254	1.575.513,122	1.559.913,983	1.544.469,290	1.529.177,514	1.514.037,143	1.499.046,676	1.484.204,630
<b>Total Energi</b>		<b>25.433.662,705</b>												

Pembangkit	Tahun Operasi	Energi (MWh)	Jenis Bahan Bakar	Jumlah-Bahan-Bakar-34	Jumlah-Bahan-Bakar-35	Jumlah-Bahan-Bakar-36	Jumlah-Bahan-Bakar-37	Jumlah-Bahan-Bakar-38	Jumlah-Bahan-Bakar-39	Jumlah-Bahan-Bakar-40	Jumlah-Bahan-Bakar-41	Jumlah-Bahan-Bakar-42	Jumlah-Bahan-Bakar-43	Jumlah-Bahan-Bakar-44
Kamojang Unit V	2007	20.314,734	Panas Bumi											
Darajat Unit III	2007	453.907,708	Panas Bumi											
PT Sakti Prima (Cilacap)	2006	3.134.154,352	Batubara	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207
Tanjung Jati B	2006	8.572.535,509	Batubara	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238
Cilegon	2006	1.383.975,683	Gas Alam	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757
Muara Tawar	2004	1.567.014,719	MFO	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256
PLTU Labuan	2007	3.311.280,000	Batubara	1.322.558,581	1.309.463,942	1.296.498,952	1.283.662,329	1.270.952,801	1.258.369,110	1.245.910,010	1.233.574,267	1.221.360,660	1.209.267,981	1.197.295,030
PLTU Rembang	2007	3.311.280,000	Batubara	1.322.558,581	1.309.463,942	1.296.498,952	1.283.662,329	1.270.952,801	1.258.369,110	1.245.910,010	1.233.574,267	1.221.360,660	1.209.267,981	1.197.295,030
PLTU Indramayu	2007	3.679.200,000	Batubara	1.469.509,535	1.454.959,935	1.440.554,391	1.426.291,477	1.412.169,779	1.398.187,900	1.384.344,455	1.370.638,075	1.357.067,401	1.343.631,090	1.330.327,811
<b>Total Energi</b>		<b>25.433.662,705</b>												

(Lanjutan)

Pembangkit	Tahun Operasi	Energi (MWh)	Jenis Bahan Bakar	Jumlah-Bahan-Bakar-45	Jumlah-Bahan-Bakar-46	Jumlah-Bahan-Bakar-47	Jumlah-Bahan-Bakar-48	Jumlah-Bahan-Bakar-49	Jumlah-Bahan-Bakar-50	Jumlah-Bahan-Bakar-51	Jumlah-Bahan-Bakar-52	Jumlah-Bahan-Bakar-53	Jumlah-Bahan-Bakar-54	Jumlah-Bahan-Bakar-55
Kamojang Unit V	2007	20.314,734	Panas Bumi											
Darajat Unit III	2007	453.907,708	Panas Bumi											
PT Sakti Prima (Cilacap)	2006	3.134.154,352	Batubara	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1537559,207	1537559,207	1537559,207
Tanjung Jati B	2006	8.572.535,509	Batubara	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4205530,238	4205530,238	4205530,238
Cilegon	2006	1.383.975,683	Gas Alam	13.839,757	13.839,757	13.839,757	13839,75683	13.839,757	13.839,757	13.839,757	13.839,757	13839,75683	13839,75683	13839,75683
Muara Tawar	2004	1.567.014,719	MFO	415.856,256	415.856,256	415.856,256	415856,2561	415.856,256	415.856,256	415.856,256	415.856,256	415856,2561	415856,2561	415856,2561
PLTU Labuan	2007	3.311.280,000	Batubara	1.185.440,624	1.173.703,588	1.162.082,761	1.150.576,991	1.139.185,139	1.127.906,079	1.116.738,692	1.105.681,873	1.094.734,528	1.083.895,572	1.073.163,933
PLTU Rembang	2007	3.311.280,000	Batubara	1.185.440,624	1.173.703,588	1.162.082,761	1.150.576,991	1.139.185,139	1.127.906,079	1.116.738,692	1.105.681,873	1.094.734,528	1.083.895,572	1.073.163,933
PLTU Indramayu	2007	3.679.200,000	Batubara	1.317.156,249	1.304.115,098	1.291.203,067	1.278.418,879	1.265.761,266	1.253.228,976	1.240.820,768	1.228.535,414	1.216.371,697	1.204.328,413	1.192.404,370
<b>Total Energi</b>		<b>25.433.662,705</b>												

Pembangkit	Tahun Operasi	Energi (MWh)	Jenis Bahan Bakar	Jumlah-Bahan-Bakar-56	Jumlah-Bahan-Bakar-57	Jumlah-Bahan-Bakar-58	Jumlah-Bahan-Bakar-59	Jumlah-Bahan-Bakar-60	Jumlah-Bahan-Bakar-61	Jumlah-Bahan-Bakar-62
Kamojang Unit V	2007	20.314,734	Panas Bumi							
Darajat Unit III	2007	453.907,708	Panas Bumi							
PT Sakti Prima (Cilacap)	2006	3.134.154,352	Batubara	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207
Tanjung Jati B	2006	8.572.535,509	Batubara	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238
Cilegon	2006	1.383.975,683	Gas Alam	13.839,757	13.839,757	13.839,757	13839,75683	13.839,757	13.839,757	13.839,757
Muara Tawar	2004	1.567.014,719	MFO	415.856,256	415.856,256	415.856,256	415856,2561	415.856,256	415.856,256	415.856,256
PLTU Labuan	2007	3.311.280,000	Batubara	1.062.538,547	1.052.018,363	1.041.602,340	1.031.289,446	1.021.078,659	1.010.968,969	1.000.959,376
PLTU Rembang	2007	3.311.280,000	Batubara	1.062.538,547	1.052.018,363	1.041.602,340	1.031.289,446	1.021.078,659	1.010.968,969	1.000.959,376
PLTU Indramayu	2007	3.679.200,000	Batubara	1.180.598,386	1.168.909,293	1.157.335,933	1.145.877,162	1.134.531,843	1.123.298,855	1.112.177,084
<b>Total Energi</b>		<b>25.433.662,705</b>								

<b>Energi Total Tersalur ke Sistem Tahun 2007</b>	107.974.850,120	MWh
<b>Energi Yang Dihasilkan Pembangkit <i>Build Margin</i></b>	25.433.662,705	MWh
<b>Kontribusi Pembangkit BM Terhadap Sistem</b>	23,56	%

(Lanjutan)

Penghitungan Emisi CO<sub>2</sub> Build Margin Tahun 2007

Jenis Bahan Bakar	A							Jumlah Bahan Bakar (FC <sub>iy</sub> )	B			C		D	E		F	G	H				
	Jumlah Bahan Bakar (FC <sub>iy</sub> )								Net Calorific Value (NCV)	Kandungan Karbon	Faktor Oksidasi Karbon	Kandungan Karbon Per Satuan Jumlah Bahan Bakar	Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar		Density	Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar (cair)							
																				TJ/kt	tC/TJ	tC/kt	tCO <sub>2</sub> /kt
																				PERTAMINA	DJMBP	IPCC	IPCC
MFO	415,856,26							kilo liter	41,178			21,1	1	868,854	3.185,799	0,000990	3,154						
Batubara	11.457.030,74	10.864.630,55	10.333.648,21	9.857.716,14	9.431.126,94	9.048.764,92		ton	24,969	26,2	1	654,175	2.398,641										
	11.400.457,07	10.813.922,22	10.288.197,13	9.816.977,26	9.394.611,72	9.016.035,46																	
	11.344.443,53	10.763.715,96	10.243.196,07	9.776.641,74	9.358.458,03	8.983.630,06																	
	11.288.984,57	10.714.006,78	10.198.640,55	9.736.705,58	9.322.662,30	8.951.545,50																	
	11.234.074,72	10.664.789,78	10.154.526,19	9.697.164,83	9.287.220,99	8.919.778,61																	
	11.179.708,53	10.616.060,08	10.110.848,60	9.658.015,56	9.252.130,58	8.888.326,24																	
	11.125.880,62	10.567.812,84	10.067.603,46	9.619.253,92	9.217.387,60	8.857.185,28																	
	11.072.585,66	10.520.043,30	10.024.786,48	9.580.876,05	9.182.988,60																		
	11.019.818,37	10.472.746,73	9.982.393,44	9.542.878,17	9.148.930,20																		
	10.967.573,53	10.425.918,44	9.940.420,14	9.505.256,50	9.115.209,00																		
10.915.845,96	10.379.553,80	9.898.862,41	9.468.007,32	9.081.821,68																			
Gas Alam	13.839,76						MSCF			48,000	15,3	1	734,400	2.692,800									
<b>Emisi CO<sub>2</sub> Total</b>																							

Jenis Bahan Bakar	I						
	Emisi CO <sub>2</sub> Per Jenis Bahan Bakar (FC <sub>iy</sub> *NCV <sub>iy</sub> *EFCO <sub>2iy</sub> )						
	tCO <sub>2</sub>						
MFO	1.311.585,901						
Batubara	27.481.304,383	26.060.348,957	24.786.712,907	23.645.122,708	22.621.888,338	21.704.739,102	
	27.345.604,440	25.938.717,880	24.677.692,088	23.547.404,762	22.534.301,425	21.626.232,875	
	27.211.248,061	25.818.291,071	24.569.750,683	23.450.654,321	22.447.581,709	21.548.503,937	
	27.078.221,943	25.699.056,606	24.462.878,004	23.354.861,804	22.361.720,605	21.471.544,593	
	26.946.512,915	25.581.002,681	24.357.063,471	23.260.017,729	22.276.709,610	21.395.347,223	
	26.816.107,938	25.464.117,606	24.252.296,607	23.166.112,703	22.192.540,309	21.319.904,281	
	26.686.994,098	25.348.389,810	24.148.567,038	23.073.137,431	22.109.204,367	21.245.208,300	
	26.559.158,614	25.233.807,833	24.045.864,495	22.981.082,705	22.026.693,533		
	26.432.588,827	25.120.360,332	23.944.178,808	22.889.939,413	21.944.999,638		
	26.307.272,207	25.008.036,072	23.843.499,911	22.799.698,529	21.864.114,594		
	26.183.196,345	24.896.823,935	23.743.817,834	22.710.351,119	21.784.030,392		
	Gas Alam	893.157,631					
	<b>Emisi CO<sub>2</sub> Total</b>						
		29.686.047,915	28.265.092,489	26.991.456,439	25.849.866,241	24.826.631,870	23.909.482,635
	29.550.347,972	28.143.461,412	26.882.435,620	25.752.148,295	24.739.044,957	23.830.976,407	
	29.415.991,593	28.023.034,603	26.774.494,215	25.655.397,853	24.652.325,242	23.753.247,470	
	29.282.965,475	27.903.800,138	26.667.621,536	25.559.605,337	24.566.464,137	23.676.288,125	
	29.151.256,448	27.785.746,213	26.561.807,003	25.464.761,261	24.481.453,143	23.600.090,755	
	29.020.851,470	27.668.861,139	26.457.040,139	25.370.856,235	24.397.283,841	23.524.647,813	
	28.891.737,630	27.553.133,342	26.353.310,570	25.277.880,963	24.313.947,899	23.449.951,832	
	28.763.902,146	27.438.551,365	26.250.608,027	25.185.826,237	24.231.437,065		
	28.637.332,359	27.325.103,864	26.148.922,340	25.094.682,945	24.149.743,171		
	28.512.015,739	27.212.779,605	26.048.243,443	25.004.442,061	24.068.858,126		
	28.387.939,877	27.101.567,467	25.948.561,366	24.915.094,651	23.988.773,924		

(Lanjutan)

## Faktor Emisi BM Tahun 2007

Faktor Emisi <i>Build Margin</i> (BM) Grid JAMALI 2007	1,167	1,111	1,061	1,016	0,976	0,940	tCO <sub>2</sub> /MWh
	1,162	1,107	1,057	1,013	0,973	0,937	
	1,157	1,102	1,053	1,009	0,969	0,934	
	1,151	1,097	1,049	1,005	0,966	0,931	
	1,146	1,092	1,044	1,001	0,963	0,928	
	1,141	1,088	1,040	0,998	0,959	0,925	
	1,136	1,083	1,036	0,994	0,956	0,922	
	1,131	1,079	1,032	0,990	0,953		
	1,126	1,074	1,028	0,987	0,950		
	1,121	1,070	1,024	0,983	0,946		
	1,116	1,066	1,020	0,980	0,943		

Perhitungan *Combine Margin* (CM)

$$EF_{\text{grid,CM,y}} = EF_{\text{grid,OM,y}} \times W_{\text{OM}} + EF_{\text{grid,BM,y}} \times W_{\text{BM}}$$

$W_{\text{OM}}$	=	0,5
$W_{\text{BM}}$	=	0,5

Faktor Emisi <i>Combine Margin</i> (CM) Grid JAMALI 2007 ( $EF_{\text{grid,CM,y}}$ )	1,048	1,018	0,991	0,966	0,945	0,925	tCO <sub>2</sub> /MWh
	1,045	1,015	0,988	0,964	0,943	0,924	
	1,042	1,012	0,986	0,962	0,941	0,922	
	1,039	1,010	0,984	0,960	0,939	0,920	
	1,036	1,007	0,981	0,958	0,937	0,919	
	1,034	1,005	0,979	0,956	0,936	0,917	
	1,031	1,003	0,977	0,954	0,934	0,916	
	1,028	1,000	0,975	0,952	0,932		
	1,025	0,998	0,973	0,950	0,930		
	1,023	0,995	0,971	0,948	0,929		
	1,020	0,993	0,968	0,947	0,927		



Lampiran 4: Perhitungan Faktor Emisi *Baseline* dengan Faktor Kapasitas  
 PLTU Batubara Tambahan 70%

PLTU 10.000 MW yang menjadi prioritas

PLTU 2 Banten (Labuan)	2 x 315 MW	630
PLTU 1 Jateng (Rembang)	2 x 315 MW	630
PLTU 1 Jabar (Indramayu)	3 x 350 MW	700

Asumsi Faktor Kapasitas Pembangkit Listrik =	70%
Asumsi Heat Rate =	2.400 kcal

**Energi dibangkitkan selama setahun (kWh)**

PLTU 2 Banten (Labuan)	3.863.160.000
PLTU 1 Jateng (Rembang)	3.863.160.000
PLTU 1 Jabar (Indramayu)	4.292.400.000
<b>Total</b>	<b>12.018.720.000</b>

**Kebutuhan bahan bakar per tahun**

NCV (kcal/kg)	4.327	4.370	4.414	4.458	4.503	4.548	4.593	4.639	4.686	4.732	4.780
<b>Pembangkit</b>	<b>Jumlah Bahan Bakar Per Tahun (ton)</b>										
PLTU 2 Banten (Labuan)	2.142.728	2.121.513	2.100.508	2.079.711	2.059.119	2.038.732	2.018.547	1.998.561	1.978.773	1.959.182	1.939.784
PLTU 1 Jateng (Rembang)	2.142.728	2.121.513	2.100.508	2.079.711	2.059.119	2.038.732	2.018.547	1.998.561	1.978.773	1.959.182	1.939.784
PLTU 1 Jabar (Indramayu)	2.380.809	2.357.237	2.333.898	2.310.790	2.287.911	2.265.258	2.242.830	2.220.623	2.198.637	2.176.868	2.155.315
<b>Total</b>	<b>6.666.265</b>	<b>6.600.262</b>	<b>6.534.913</b>	<b>6.470.211</b>	<b>6.406.149</b>	<b>6.342.722</b>	<b>6.279.923</b>	<b>6.217.746</b>	<b>6.156.184</b>	<b>6.095.231</b>	<b>6.034.883</b>

NCV (kcal/kg)	4.827	4.876	4.925	4.974	5.024	5.074	5.124	5.176	5.227	5.280	5.333
<b>Pembangkit</b>	<b>Jumlah Bahan Bakar Per Tahun (ton)</b>										
PLTU 2 Banten (Labuan)	1.920.578	1.901.562	1.882.735	1.864.094	1.845.638	1.827.364	1.809.271	1.791.358	1.773.621	1.756.061	1.738.674
PLTU 1 Jateng (Rembang)	1.920.578	1.901.562	1.882.735	1.864.094	1.845.638	1.827.364	1.809.271	1.791.358	1.773.621	1.756.061	1.738.674
PLTU 1 Jabar (Indramayu)	2.133.975	2.112.847	2.091.928	2.071.216	2.050.708	2.030.404	2.010.301	1.990.397	1.970.691	1.951.179	1.931.860
<b>Total</b>	<b>5.975.131</b>	<b>5.915.972</b>	<b>5.857.398</b>	<b>5.799.404</b>	<b>5.741.984</b>	<b>5.685.132</b>	<b>5.628.844</b>	<b>5.573.113</b>	<b>5.517.933</b>	<b>5.463.300</b>	<b>5.409.208</b>

NCV (kcal/kg)	5.386	5.440	5.494	5.549	5.605	5.661	5.717	5.774	5.832	5.890	5.949
<b>Pembangkit</b>	<b>Jumlah Bahan Bakar Per Tahun (ton)</b>										
PLTU 2 Banten (Labuan)	1.721.460	1.704.415	1.687.540	1.670.832	1.654.289	1.637.910	1.621.693	1.605.636	1.589.739	1.573.999	1.558.415
PLTU 1 Jateng (Rembang)	1.721.460	1.704.415	1.687.540	1.670.832	1.654.289	1.637.910	1.621.693	1.605.636	1.589.739	1.573.999	1.558.415
PLTU 1 Jabar (Indramayu)	1.912.733	1.893.795	1.875.044	1.856.480	1.838.099	1.819.900	1.801.881	1.784.040	1.766.377	1.748.888	1.731.572
<b>Total</b>	<b>5.355.652</b>	<b>5.302.626</b>	<b>5.250.124</b>	<b>5.198.143</b>	<b>5.146.676</b>	<b>5.095.719</b>	<b>5.045.266</b>	<b>4.995.313</b>	<b>4.945.855</b>	<b>4.896.886</b>	<b>4.848.402</b>

(Lanjutan)

NCV (kcal/kg)	5.386	5.440	5.494	5.549	5.605	5.661	5.717	5.774	5.832	5.890	5.949
<b>Pembangkit</b>	<b>Jumlah Bahan Bakar Per Tahun (ton)</b>										
PLTU 2 Banten (Labuan)	1.721.460	1.704.415	1.687.540	1.670.832	1.654.289	1.637.910	1.621.693	1.605.636	1.589.739	1.573.999	1.558.415
PLTU 1 Jateng (Rembang)	1.721.460	1.704.415	1.687.540	1.670.832	1.654.289	1.637.910	1.621.693	1.605.636	1.589.739	1.573.999	1.558.415
PLTU 1 Jabar (Indramayu)	1.912.733	1.893.795	1.875.044	1.856.480	1.838.099	1.819.900	1.801.881	1.784.040	1.766.377	1.748.888	1.731.572
Total	5.355.652	5.302.626	5.250.124	5.198.143	5.146.676	5.095.719	5.045.266	4.995.313	4.945.855	4.896.886	4.848.402

NCV (kcal/kg)	6.009	6.069	6.130	6.191	6.253	6.315	6.379	6.442	6.507	6.572	6.638
<b>Pembangkit</b>	<b>Jumlah Bahan Bakar Per Tahun (ton)</b>										
PLTU 2 Banten (Labuan)	1.542.985	1.527.708	1.512.582	1.497.606	1.482.778	1.468.097	1.453.562	1.439.170	1.424.921	1.410.813	1.396.844
PLTU 1 Jateng (Rembang)	1.542.985	1.527.708	1.512.582	1.497.606	1.482.778	1.468.097	1.453.562	1.439.170	1.424.921	1.410.813	1.396.844
PLTU 1 Jabar (Indramayu)	1.714.428	1.697.453	1.680.647	1.664.007	1.647.531	1.631.219	1.615.069	1.599.078	1.583.245	1.567.570	1.552.049
Total	4.800.398	4.752.869	4.705.811	4.659.219	4.613.088	4.567.414	4.522.192	4.477.418	4.433.087	4.389.195	4.345.738

NCV (kcal/kg)	6.704	6.771	6.839	6.907	6.976	7.046	7.116	7.187	7.259	7.332	7.405
<b>Pembangkit</b>	<b>Jumlah Bahan Bakar Per Tahun (ton)</b>										
PLTU 2 Banten (Labuan)	1.383.014	1.369.321	1.355.763	1.342.340	1.329.049	1.315.890	1.302.862	1.289.962	1.277.190	1.264.545	1.252.025
PLTU 1 Jateng (Rembang)	1.383.014	1.369.321	1.355.763	1.342.340	1.329.049	1.315.890	1.302.862	1.289.962	1.277.190	1.264.545	1.252.025
PLTU 1 Jabar (Indramayu)	1.536.682	1.521.468	1.506.404	1.491.489	1.476.721	1.462.100	1.447.624	1.433.291	1.419.100	1.405.050	1.391.138
Total	4.302.710	4.260.109	4.217.930	4.176.168	4.134.820	4.093.881	4.053.348	4.013.216	3.973.481	3.934.139	3.895.188

NCV (kcal/kg)	7.479	7.554	7.630	7.706	7.783	7.861	7.939
<b>Pembangkit</b>	<b>Jumlah Bahan Bakar Per Tahun (ton)</b>						
PLTU 2 Banten (Labuan)	1.239.628	1.227.355	1.215.203	1.203.171	1.191.258	1.179.464	1.167.786
PLTU 1 Jateng (Rembang)	1.239.628	1.227.355	1.215.203	1.203.171	1.191.258	1.179.464	1.167.786
PLTU 1 Jabar (Indramayu)	1.377.365	1.363.728	1.350.225	1.336.857	1.323.620	1.310.515	1.297.540
Total	3.856.621	3.818.437	3.780.631	3.743.199	3.706.137	3.669.443	3.633.112



## Energi Dihasilkan BBM

	2007
HSD/IDO	19.501,78 GWh
MFO	3.659,87 GWh

## Energi Dihasilkan BBM Setelah Digantikan Batubara

	2007
HSD/IDO	7.483,06 GWh
MFO	3.659,87 GWh

## Pemakaian HSD/IDO Setelah Digantikan Batubara

HSD/IDO	1.848.745 kl
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(Lanjutan)

## Perhitungan Operating Margin (OM)

Penghitungan Emisi CO<sub>2</sub> Operating Margin Tahun 2005

Jenis Bahan Bakar	A		B			C	D	E	F	G	H	I
	Jumlah Bahan Bakar (FC <sub>i,y</sub> )		Net Calorific Value (NCV <sub>i,y</sub> )			Kandungan Karbon	Faktor Oksidasi Karbon	Kandungan Karbon Per Satuan Jumlah Bahan Bakar	Faktor Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar (EFCO <sub>2,i,y</sub> )	Density	Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar (cair)	Emisi CO <sub>2</sub> Per Jenis Bahan Bakar (FC <sub>i,y</sub> *NCV <sub>i,y</sub> *EFCO <sub>2,i,y</sub> )
			TJ/kt			tC/TJ		tC/kt	tCO <sub>2</sub> /kt		tCO <sub>2</sub> /kl	tCO <sub>2</sub>
			PERTAMINA	DJMBP	IPCC	IPCC	IPCC	B*C*D	E*44/12	kt/kl	F*G	
HSD/IDO	5.161.009,02	kilo liter	43,244			20,2	1	873,529	3.202,939	0,000845	2,706	13.968.184,907
MFO	1.933.927,72	kilo liter	41,178			21,1	1	868,854	3.185,799	0,000990	3,154	6.099.493,021
Batubara	24.435.126,12	ton		24,969		26,2	1	654,175	2.398,641			58.611.096,841
Gas Alam	118.991,41	MMSCF			48	15,3	1	734,400	2.692,800			7.679.187,361
<b>Emisi CO<sub>2</sub> Total</b>												<b>86.357.962,129</b>

Penghitungan Emisi CO<sub>2</sub> Operating Margin Tahun 2006

Jenis Bahan Bakar	A		B			C	D	E	F	G	H	I
	Jumlah Bahan Bakar (FC <sub>i,y</sub> )		Net Calorific Value (NCV)			Kandungan Karbon	Faktor Oksidasi Karbon	Kandungan Karbon Per Satuan Jumlah Bahan Bakar	Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar	Density	Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar (cair)	Emisi CO <sub>2</sub> Per Jenis Bahan Bakar (FC <sub>i,y</sub> *NCV <sub>i,y</sub> *EFCO <sub>2,i,y</sub> )
			TJ/kt			tC/TJ		tC/kt	tCO <sub>2</sub> /kt		tCO <sub>2</sub> /kl	tCO <sub>2</sub>
			PERTAMINA	DJMBP	IPCC	IPCC	IPCC	B*C*D	E*44/12	kt/kl	F*G	
HSD/IDO	4.219.142,00	kilo liter	43,244			20,2	1	873,529	3.202,939	0,000845	2,706	11.419.037,513
MFO	2.059.780,84	kilo liter	41,178			21,1	1	868,854	3.185,799	0,000990	3,154	6.496.426,277
Batubara	27.135.395,84	ton		24,969		26,2	1	654,175	2.398,641			65.088.074,684
Gas Alam	130.499,02	MMSCF			48,000	15,3	1	734,400	2.692,800			8.421.838,263
<b>Emisi CO<sub>2</sub> Total</b>												<b>91.425.376,737</b>

Penghitungan Emisi CO<sub>2</sub> Operating Margin Tahun 2007

Jenis Bahan Bakar	A						B			C	D	
	Jumlah Bahan Bakar (FC <sub>iy</sub> )						Net Calorific Value (NCV)			Kandungan Karbon	Faktor Oksidasi Karbon	
							TJ/kt			tC/TJ		
							PERTAMINA	DJMBP	IPCC	IPCC	IPCC	
HSD/IDO	1.848.744,81						kilo liter	43,244			20,2	1
MFO	2.222.120,08						kilo liter	41,178			21,1	1
Batubara	36.926.608,08	36.235.474,52	35.615.995,12	35.060.741,04	34.563.053,64	34.116.964,62	ton	24,969			26,2	1
	36.860.605,46	36.176.314,81	35.562.968,87	35.013.212,35	34.520.452,55	34.078.780,25						
	36.795.256,33	36.117.740,83	35.510.467,62	34.966.154,24	34.478.273,25	34.040.973,95						
	36.730.554,22	36.059.746,79	35.458.486,19	34.919.562,05	34.436.511,57	34.003.541,96						
	36.666.492,72	36.002.326,96	35.407.019,43	34.873.431,17	34.395.163,37	33.966.480,59						
	36.603.065,50	35.945.475,63	35.356.062,24	34.827.757,04	34.354.224,55	33.929.786,16						
	36.540.266,27	35.889.187,19	35.305.609,58	34.782.535,12	34.313.691,07	33.893.455,04						
	36.478.088,81	35.833.456,07	35.255.656,44	34.737.760,94	34.273.558,92							
	36.416.526,98	35.778.276,73	35.206.197,90	34.693.430,07	34.233.824,11							
	36.355.574,66	35.723.643,73	35.157.229,04	34.649.538,12	34.194.482,71							
36.295.225,83	35.669.551,64	35.108.745,02	34.606.080,75	34.155.530,84								
Gas Alam	139.060,16						MMSCF		48,000	15,3	1	
<b>Emisi CO<sub>2</sub> Total</b>												

(Lanjutan)



E	F	G	H	I					
Kandungan Karbon Per Satuan Jumlah Bahan Bakar	Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar	Density	Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar (cair)	Emisi CO <sub>2</sub> Per Jenis Bahan Bakar (FC <sub>i,y</sub> *NCV <sub>i,y</sub> *EFCO <sub>2i,y</sub> )					
tC/kt	tCO <sub>2</sub> /kt		tCO <sub>2</sub> /kl	tCO <sub>2</sub>					
B*C*D	E*44/12	kt/kl	F*G						
873,529	3.202,939	0,000845	2,706	5.003.597,011					
868,854	3.185,799	0,000990	3,154	7.008.434,586					
654,175	2.398,641			88.573.678,398	86.915.897,068	85.429.988,344	84.098.133,112	82.904.359,679	81.834.352,238
				88.415.361,798	86.773.994,145	85.302.797,388	83.984.128,841	82.802.174,948	81.742.761,640
				88.258.612,689	86.633.496,201	85.176.865,748	83.871.253,326	82.701.001,946	81.652.077,879
				88.103.415,552	86.494.389,326	85.052.180,957	83.759.495,390	82.600.830,658	81.562.291,977
				87.949.755,020	86.356.659,746	84.928.730,668	83.648.843,969	82.501.651,164	81.473.395,045
				87.797.615,879	86.220.293,826	84.806.502,660	83.539.288,106	82.403.453,646	81.385.378,280
				87.646.983,066	86.085.278,063	84.685.484,829	83.430.816,954	82.306.228,380	81.298.232,968
				87.497.841,668	85.951.599,091	84.565.665,195	83.323.419,774	82.209.965,741	
				87.350.176,917	85.819.243,672	84.447.031,895	83.217.085,933	82.114.656,197	
				87.203.974,193	85.688.198,703	84.329.573,181	83.111.804,902	82.020.290,312	
		87.059.219,021	85.558.451,209	84.213.277,425	83.007.566,258	81.926.858,742			
734,400	2.692,800			8.974.336,844					
				109.560.046,839	107.902.265,509	106.416.356,784	105.084.501,552	103.890.728,120	102.820.720,679
				109.401.730,239	107.760.362,585	106.289.165,828	104.970.497,282	103.788.543,388	102.729.130,080
				109.244.981,130	107.619.864,642	106.163.234,189	104.857.621,767	103.687.370,387	102.638.446,320
				109.089.783,993	107.480.757,766	106.038.549,398	104.745.863,831	103.587.199,098	102.548.660,418
				108.936.123,461	107.343.028,187	105.915.099,109	104.635.212,409	103.488.019,605	102.459.763,486
				108.783.984,320	107.206.662,267	105.792.871,100	104.525.656,546	103.389.822,086	102.371.746,721
				108.633.351,507	107.071.646,504	105.671.853,270	104.417.185,395	103.292.596,821	102.284.601,409
				108.484.210,109	106.937.967,531	105.552.033,636	104.309.788,215	103.196.334,181	
				108.336.545,358	106.805.612,113	105.433.400,335	104.203.454,374	103.101.024,637	
				108.190.342,634	106.674.567,144	105.315.941,622	104.098.173,343	103.006.658,752	

(Lanjutan)

## Energi Dari Setiap Jenis Bahan Bakar

Jenis Bahan Bakar	Satuan	2005	2006	2007
Air/Hidro	GWh	6.952	5.267	5.874
Panas Bumi		6.320	6.334	6.673
Gas Alam		14.807	14.071	16.128
Minyak		22.978	23.543	21.981
Batubara		46.416	52.961	57.319
<b>Energi Netto Total (EG<sub>y</sub>)</b>		<b>97.473</b>	<b>102.176</b>	<b>107.975</b>

Tabel 4.5.

## Faktor Emisi OM

Definisi	Satuan	2005	2006	2007					
Emisi CO <sub>2</sub> Total	tCO <sub>2</sub>	86.357.962,129	91.425.376,737						
Energi Netto Total (EG <sub>y</sub> )	MWh	98.038.451,329	101.611.200,752	107.975.000,000					
EF <sub>grid,OM,y</sub>	tCO <sub>2</sub> /MWh	0,881	0,900	1,015	0,999	0,986	0,973	0,962	0,952
				1,013	0,998	0,984	0,972	0,961	0,951
				1,012	0,997	0,983	0,971	0,960	0,951
				1,010	0,995	0,982	0,970	0,959	0,950
				1,009	0,994	0,981	0,969	0,958	0,949
				1,007	0,993	0,980	0,968	0,958	0,948
				1,006	0,992	0,979	0,967	0,957	0,947
				1,005	0,990	0,978	0,966	0,956	
				1,003	0,989	0,976	0,965	0,955	
				1,002	0,988	0,975	0,964	0,954	
				1,001	0,987	0,974	0,963	0,953	

(Lanjutan)

Faktor Emisi <i>Operatin Margin (OM) Grid JAMALI 2007</i>	0,932	0,927	0,922	0,918	0,914	0,911	tCO <sub>2</sub> /MWh
	0,931	0,926	0,922	0,918	0,914	0,911	
	0,931	0,926	0,921	0,917	0,914	0,910	
	0,930	0,925	0,921	0,917	0,913	0,910	
	0,930	0,925	0,921	0,917	0,913	0,910	
	0,929	0,924	0,920	0,916	0,913	0,910	
	0,929	0,924	0,920	0,916	0,912	0,909	
	0,928	0,924	0,919	0,916	0,912		
	0,928	0,923	0,919	0,915	0,912		
	0,928	0,923	0,919	0,915	0,912		
	0,927	0,922	0,918	0,915	0,911		



(Lanjutan)





## Perhitungan Build Margin (BM)

## Daftar Pembangkit BM

Pembangkit	Tahun Operasi	Energi (MWh)	Jenis Bahan Bakar	Jumlah-Bahan-Bakar-1	Jumlah-Bahan-Bakar-2	Jumlah-Bahan-Bakar-3	Jumlah-Bahan-Bakar-4	Jumlah-Bahan-Bakar-5	Jumlah-Bahan-Bakar-6	Jumlah-Bahan-Bakar-7	Jumlah-Bahan-Bakar-8	Jumlah-Bahan-Bakar-9	Jumlah-Bahan-Bakar-10	Jumlah-Bahan-Bakar-11
Kamojang Unit V	2007	20.314,734	Panas Bumi											
Darajat Unit III	2007	453.907,708	Panas Bumi											
PT Sakti Prima (Cilacap)	2006	3.134.154,352	Batubara	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207
Tanjung Jati B	2006	8.572.535,509	Batubara	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238
Cilegon	2006	1.383.975,683	Gas Alam	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757
Muara Tawar	2004	1.567.014,719	MFO	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256
PLTU Labuan	2007	3.863.160,000	Batubara	2.142.727,987	2.121.512,858	2.100.507,781	2.079.710,674	2.059.119,479	2.038.732,158	2.018.546,691	1.998.561,080	1.978.773,346	1.959.181,531	1.939.783,694
PLTU Rembang	2007	3.863.160,000	Batubara	2.142.727,987	2.121.512,858	2.100.507,781	2.079.710,674	2.059.119,479	2.038.732,158	2.018.546,691	1.998.561,080	1.978.773,346	1.959.181,531	1.939.783,694
PLTU Indramayu	2007	4.292.400,000	Batubara	2.380.808,875	2.357.236,509	2.333.897,534	2.310.789,638	2.287.910,532	2.265.257,953	2.242.829,656	2.220.623,422	2.198.637,052	2.176.868,368	2.155.315,216
<b>Total Energi</b>		<b>27.150.622,705</b>												

Pembangkit	Tahun Operasi	Energi (MWh)	Jenis Bahan Bakar	Jumlah-Bahan-Bakar-12	Jumlah-Bahan-Bakar-13	Jumlah-Bahan-Bakar-14	Jumlah-Bahan-Bakar-15	Jumlah-Bahan-Bakar-16	Jumlah-Bahan-Bakar-17	Jumlah-Bahan-Bakar-18	Jumlah-Bahan-Bakar-19	Jumlah-Bahan-Bakar-20	Jumlah-Bahan-Bakar-21	Jumlah-Bahan-Bakar-22
Kamojang Unit V	2007	20.314,734	Panas Bumi											
Darajat Unit III	2007	453.907,708	Panas Bumi											
PT Sakti Prima (Cilacap)	2006	3.134.154,352	Batubara	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207
Tanjung Jati B	2006	8.572.535,509	Batubara	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238
Cilegon	2006	1.383.975,683	Gas Alam	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757
Muara Tawar	2004	1.567.014,719	MFO	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256
PLTU Labuan	2007	3.863.160,000	Batubara	1.920.577,915	1.901.562,292	1.882.734,943	1.864.094,003	1.845.637,626	1.827.363,986	1.809.271,274	1.791.357,697	1.773.621,482	1.756.060,873	1.738.674,132
PLTU Rembang	2007	3.863.160,000	Batubara	1.920.577,915	1.901.562,292	1.882.734,943	1.864.094,003	1.845.637,626	1.827.363,986	1.809.271,274	1.791.357,697	1.773.621,482	1.756.060,873	1.738.674,132
PLTU Indramayu	2007	4.292.400,000	Batubara	2.133.975,461	2.112.846,991	2.091.927,714	2.071.215,558	2.050.708,474	2.030.404,429	2.010.301,415	1.990.397,441	1.970.690,536	1.951.178,748	1.931.860,147
<b>Total Energi</b>		<b>27.150.622,705</b>												

Pembangkit	Tahun Operasi	Energi (MWh)	Jenis Bahan Bakar	Jumlah-Bahan-Bakar-23	Jumlah-Bahan-Bakar-24	Jumlah-Bahan-Bakar-25	Jumlah-Bahan-Bakar-26	Jumlah-Bahan-Bakar-27	Jumlah-Bahan-Bakar-28	Jumlah-Bahan-Bakar-29	Jumlah-Bahan-Bakar-30	Jumlah-Bahan-Bakar-31	Jumlah-Bahan-Bakar-32	Jumlah-Bahan-Bakar-33
Kamojang Unit V	2007	20.314,734	Panas Bumi											
Darajat Unit III	2007	453.907,708	Panas Bumi											
PT Sakti Prima (Cilacap)	2006	3.134.154,352	Batubara	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207
Tanjung Jati B	2006	8.572.535,509	Batubara	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238
Cilegon	2006	1.383.975,683	Gas Alam	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757
Muara Tawar	2004	1.567.014,719	MFO	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256
PLTU Labuan	2007	3.863.160,000	Batubara	1.721.459,537	1.704.415,383	1.687.539,983	1.670.831,666	1.654.288,778	1.637.909,682	1.621.692,754	1.605.636,390	1.589.739,000	1.573.999,010	1.558.414,861
PLTU Rembang	2007	3.863.160,000	Batubara	1.721.459,537	1.704.415,383	1.687.539,983	1.670.831,666	1.654.288,778	1.637.909,682	1.621.692,754	1.605.636,390	1.589.739,000	1.573.999,010	1.558.414,861
PLTU Indramayu	2007	4.292.400,000	Batubara	1.912.732,818	1.893.794,870	1.875.044,425	1.856.479,629	1.838.098,643	1.819.899,646	1.801.880,838	1.784.040,434	1.766.376,667	1.748.887,789	1.731.572,068
<b>Total Energi</b>		<b>27.150.622,705</b>												

Pembangkit	Tahun Operasi	Energi (MWh)	Jenis Bahan Bakar	Jumlah-Bahan-Bakar-34	Jumlah-Bahan-Bakar-35	Jumlah-Bahan-Bakar-36	Jumlah-Bahan-Bakar-37	Jumlah-Bahan-Bakar-38	Jumlah-Bahan-Bakar-39	Jumlah-Bahan-Bakar-40	Jumlah-Bahan-Bakar-41	Jumlah-Bahan-Bakar-42	Jumlah-Bahan-Bakar-43	Jumlah-Bahan-Bakar-44
Kamojang Unit V	2007	20.314,734	Panas Bumi											
Darajat Unit III	2007	453.907,708	Panas Bumi											
PT Sakti Prima (Cilacap)	2006	3.134.154,352	Batubara	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207
Tanjung Jati B	2006	8.572.535,509	Batubara	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238
Cilegon	2006	1.383.975,683	Gas Alam	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757
Muara Tawar	2004	1.567.014,719	MFO	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256
PLTU Labuan	2007	3.863.160,000	Batubara	1.542.985,011	1.527.707,932	1.512.582,111	1.497.606,050	1.482.778,268	1.468.097,295	1.453.561,678	1.439.169,978	1.424.920,771	1.410.812,644	1.396.844,202
PLTU Rembang	2007	3.863.160,000	Batubara	1.542.985,011	1.527.707,932	1.512.582,111	1.497.606,050	1.482.778,268	1.468.097,295	1.453.561,678	1.439.169,978	1.424.920,771	1.410.812,644	1.396.844,202
PLTU Indramayu	2007	4.292.400,000	Batubara	1.714.427,790	1.697.453,258	1.680.646,790	1.664.006,723	1.647.531,409	1.631.219,216	1.615.068,531	1.599.077,754	1.583.245,301	1.567.569,605	1.552.049,113
<b>Total Energi</b>		<b>27.150.622,705</b>												

(Lanjutan)

Pembangkit	Tahun Operasi	Energi (MWh)	Jenis Bahan Bakar	Jumlah-Bahan-Bakar-45	Jumlah-Bahan-Bakar-46	Jumlah-Bahan-Bakar-47	Jumlah-Bahan-Bakar-48	Jumlah-Bahan-Bakar-49	Jumlah-Bahan-Bakar-50	Jumlah-Bahan-Bakar-51	Jumlah-Bahan-Bakar-52	Jumlah-Bahan-Bakar-53	Jumlah-Bahan-Bakar-54	Jumlah-Bahan-Bakar-55
Kamojang Unit V	2007	20.314,734	Panas Bumi											
Darajat Unit III	2007	453.907,708	Panas Bumi											
PT Sakti Prima (Cilacap)	2006	3.134.154,352	Batubara	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207
Tanjung Jati B	2006	8.572.535,509	Batubara	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238
Cilegon	2006	1.383.975,683	Gas Alam	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757
Muara Tawar	2004	1.567.014,719	MFO	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256
PLTU Labuan	2007	3.863.160,000	Batubara	1.383.014,061	1.369.320,853	1.355.763,221	1.342.339,822	1.329.049,329	1.315.890,425	1.302.861,807	1.289.962,185	1.277.190,282	1.264.544,834	1.252.024,588
PLTU Rembang	2007	3.863.160,000	Batubara	1.383.014,061	1.369.320,853	1.355.763,221	1.342.339,822	1.329.049,329	1.315.890,425	1.302.861,807	1.289.962,185	1.277.190,282	1.264.544,834	1.252.024,588
PLTU Indramayu	2007	4.292.400,000	Batubara	1.536.682,291	1.521.467,614	1.506.403,579	1.491.488,692	1.476.721,477	1.462.100,472	1.447.624,230	1.433.291,317	1.419.100,314	1.405.049,815	1.391.138,431
<b>Total Energi</b>		<b>27.150.622,705</b>												

Pembangkit	Tahun Operasi	Energi (MWh)	Jenis Bahan Bakar	Jumlah-Bahan-Bakar-56	Jumlah-Bahan-Bakar-57	Jumlah-Bahan-Bakar-58	Jumlah-Bahan-Bakar-59	Jumlah-Bahan-Bakar-60	Jumlah-Bahan-Bakar-61	Jumlah-Bahan-Bakar-62
Kamojang Unit V	2007	20.314,734	Panas Bumi							
Darajat Unit III	2007	453.907,708	Panas Bumi							
PT Sakti Prima (Cilacap)	2006	3.134.154,352	Batubara	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207
Tanjung Jati B	2006	8.572.535,509	Batubara	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238
Cilegon	2006	1.383.975,683	Gas Alam	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757	13.839,757
Muara Tawar	2004	1.567.014,719	MFO	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256	415.856,256
PLTU Labuan	2007	3.863.160,000	Batubara	1.239.628,305	1.227.354,757	1.215.202,730	1.203.171,020	1.191.258,436	1.179.463,798	1.167.785,938
PLTU Rembang	2007	3.863.160,000	Batubara	1.239.628,305	1.227.354,757	1.215.202,730	1.203.171,020	1.191.258,436	1.179.463,798	1.167.785,938
PLTU Indramayu	2007	4.292.400,000	Batubara	1.377.364,783	1.363.727,508	1.350.225,256	1.336.856,689	1.323.620,484	1.310.515,331	1.297.539,931
<b>Total Energi</b>		<b>27.150.622,705</b>								

<b>Energi Total Tersalur ke Sistem Tahun 2007</b>	107.975.000,000	MWh
<b>Energi Yang Dihasilkan Pembangkit Build Margin</b>	27.150.622,705	MWh
<b>Kontribusi Pembangkit BM Terhadap Sistem</b>	25,15	%

(Lanjutan)

Penghitungan Emisi CO<sub>2</sub> Build Margin Tahun 2007

Jenis Bahan Bakar	A							B	C	D	E	F	G	H							
	Jumlah Bahan Bakar (FC <sub>1y</sub> )														Net Calorific Value (NCV)	Kandungan Karbon	Faktor Oksidasi Karbon	Kandungan Karbon Per Satuan Jumlah Bahan Bakar	Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar	Density	Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar (cair)
							PERTAMINA	DJMBP	IPCC	IPCC	IPCC	B*C*D	E*44/12	kt/kl	F*G						
MFO	415.856,26							kilo liter	41,178				21,1	1	868,854	3.185,799	0,000990	3,154			
Batubara	12.409.354,29	11.718.220,74	11.098.741,34	10.543.487,26	10.045.799,86	9.599.710,84		ton	24,969	26,2	1	654,175	2.398,641								
	12.343.351,67	11.659.061,02	11.045.715,08	10.495.958,57	10.003.198,76	9.561.526,47															
	12.278.002,54	11.600.487,04	10.993.213,84	10.448.900,46	9.961.019,46	9.523.720,16															
	12.213.300,43	11.542.493,01	10.941.232,41	10.402.308,27	9.919.257,78	9.486.288,17															
	12.149.238,94	11.485.073,17	10.889.765,64	10.356.177,39	9.877.909,58	9.449.226,80															
	12.085.811,71	11.428.221,85	10.838.808,45	10.310.503,25	9.836.970,77	9.412.532,37															
	12.023.012,48	11.371.933,41	10.788.355,79	10.265.281,33	9.796.437,29	9.376.201,25															
	11.960.835,03	11.316.202,28	10.738.402,66	10.220.507,15	9.756.305,13																
	11.899.273,19	11.261.022,94	10.688.944,11	10.176.176,29	9.716.570,32																
	11.838.320,87	11.206.389,94	10.639.975,25	10.132.284,34	9.677.228,93																
Gas Alam	13.839,76						MSCF		48,000	15,3	1	734,400	2.692,800								
<b>Emisi CO<sub>2</sub> Total</b>																					

Jenis Bahan Bakar	I						
	Emisi CO <sub>2</sub> Per Jenis Bahan Bakar (FC <sub>1y</sub> *NCV <sub>1y</sub> *EFCO <sub>2ly</sub> )						
	tCO <sub>2</sub>						
MFO	1.311.585,901						
Batubara	29.765.586,753	28.107.805,423	26.621.896,698	25.290.041,466	24.096.268,034	23.026.260,593	
	29.607.270,153	27.965.902,499	26.494.705,742	25.176.037,196	23.994.083,302	22.934.669,994	
	29.450.521,044	27.825.404,556	26.368.774,103	25.063.161,681	23.892.910,301	22.843.986,234	
	29.295.323,907	27.686.297,680	26.244.089,312	24.951.403,745	23.792.739,012	22.754.200,332	
	29.141.663,375	27.548.568,101	26.120.639,023	24.840.752,323	23.693.559,519	22.665.303,399	
	28.989.524,234	27.412.202,181	25.998.411,014	24.731.196,460	23.595.362,000	22.577.286,635	
	28.838.891,421	27.277.186,418	25.877.393,184	24.622.725,309	23.498.136,735	22.490.141,323	
	28.689.750,023	27.143.507,445	25.757.573,550	24.515.328,129	23.401.874,095		
	28.542.085,271	27.011.152,027	25.638.940,249	24.408.994,288	23.306.564,551		
	28.395.882,548	26.880.107,058	25.521.481,536	24.303.713,257	23.212.198,666		
	Gas Alam	28.251.127,375	26.750.359,564	25.405.185,779	24.199.474,612	23.118.767,097	
	<b>Emisi CO<sub>2</sub> Total</b>	893.157,631					
		31.970.330,285	30.312.548,955	28.826.640,230	27.494.784,999	26.301.011,566	25.231.004,125
	31.812.013,685	30.170.646,032	28.699.449,275	27.380.780,728	26.198.826,834	25.139.413,526	
	31.655.264,576	30.030.148,088	28.573.517,635	27.267.905,213	26.097.653,833	25.048.729,766	
	31.500.067,439	29.891.041,212	28.448.832,844	27.156.147,277	25.997.482,545	24.958.943,864	
	31.346.406,907	29.753.311,633	28.325.382,555	27.045.495,855	25.898.303,051	24.870.046,932	
	31.194.267,766	29.616.945,713	28.203.154,547	26.935.939,992	25.800.105,533	24.782.030,167	
	31.043.634,953	29.481.929,950	28.082.136,716	26.827.468,841	25.702.880,267	24.694.884,855	
	30.894.493,555	29.348.250,977	27.962.317,082	26.720.071,661	25.606.617,627		
	30.746.828,804	29.215.895,559	27.843.683,781	26.613.737,820	25.511.308,084		
	30.600.626,080	29.084.850,590	27.726.225,068	26.508.456,789	25.416.942,198		
	30.455.870,908	28.955.103,096	27.609.929,312	26.404.218,145	25.323.510,629		

(Lanjutan)

<b>Faktor Emisi <i>Build Margin</i> (BM) Grid JAMALI 2007</b>	1,178	1,116	1,062	1,013	0,969	0,929	<b>tCO<sub>2</sub>/MWh</b>
	1,172	1,111	1,057	1,008	0,965	0,926	
	1,166	1,106	1,052	1,004	0,961	0,923	
	1,160	1,101	1,048	1,000	0,958	0,919	
	1,155	1,096	1,043	0,996	0,954	0,916	
	1,149	1,091	1,039	0,992	0,950	0,913	
	1,143	1,086	1,034	0,988	0,947	0,910	
	1,138	1,081	1,030	0,984	0,943		
	1,132	1,076	1,026	0,980	0,940		
	1,127	1,071	1,021	0,976	0,936		
	1,122	1,066	1,017	0,973	0,933		



Perhitungan *Combine Margin* (CM)

$$EF_{\text{grid,CM,y}} = EF_{\text{grid,OM,y}} \times W_{\text{OM}} + EF_{\text{grid,BM,y}} \times W_{\text{BM}}$$

$W_{\text{OM}}$	=	0,5
$W_{\text{BM}}$	=	0,5

Faktor Emisi <i>Combine Margin</i> (CM) Grid JAMALI 2007 ( $EF_{\text{grid,CM,y}}$ )	1,055	1,022	0,992	0,965	0,941	0,920	tCO <sub>2</sub> /MWh
	1,051	1,019	0,989	0,963	0,939	0,918	
	1,048	1,016	0,987	0,961	0,937	0,916	
	1,045	1,013	0,984	0,959	0,935	0,915	
	1,042	1,010	0,982	0,956	0,933	0,913	
	1,039	1,008	0,979	0,954	0,931	0,911	
	1,036	1,005	0,977	0,952	0,930	0,909	
	1,033	1,002	0,975	0,950	0,928	0,000	
	1,030	1,000	0,972	0,948	0,926	0,000	
	1,027	0,997	0,970	0,946	0,924	0,000	
	1,024	0,994	0,968	0,944	0,922	0,000	

Lampiran 5: Perhitungan Faktor Emisi *Baseline* dengan Faktor Kapasitas  
PLTU Batubara Tambahan 80%

PLTU 10.000 MW yang menjadi prioritas

PLTU 2 Banten (Labuan)	2 x 315 MW	630
PLTU 1 Jateng (Rembang)	2 x 315 MW	630
PLTU 1 Jabar (Indramayu)	3 x 350 MW	700

Asumsi Faktor Kapasitas Pembangkit Listrik = 80%  
Asumsi Heat Rate = 2.400 kcal

**Energi dibangkitkan selama setahun (kWh)**

PLTU 2 Banten (Labuan)	4.415.040.000
PLTU 1 Jateng (Rembang)	4.415.040.000
PLTU 1 Jabar (Indramayu)	4.905.600.000
<b>Total</b>	<b>13.735.680.000</b>

**Kebutuhan bahan bakar per tahun**

NCV (kcal/kg)	4.327	4.370	4.414	4.458	4.503	4.548	4.593	4.639	4.686	4.732	4.780
<b>Pembangkit</b>	<b>Jumlah Bahan Bakar Per Tahun (ton)</b>										
PLTU 2 Banten (Labuan)	2.448.832	2.424.586	2.400.580	2.376.812	2.353.279	2.329.980	2.306.911	2.284.070	2.261.455	2.239.065	2.216.896
PLTU 1 Jateng (Rembang)	2.448.832	2.424.586	2.400.580	2.376.812	2.353.279	2.329.980	2.306.911	2.284.070	2.261.455	2.239.065	2.216.896
PLTU 1 Jabar (Indramayu)	2.720.924	2.693.985	2.667.311	2.640.902	2.614.755	2.588.866	2.563.234	2.537.855	2.512.728	2.487.850	2.463.217
<b>Total</b>	<b>7.618.588</b>	<b>7.543.157</b>	<b>7.468.472</b>	<b>7.394.527</b>	<b>7.321.314</b>	<b>7.248.825</b>	<b>7.177.055</b>	<b>7.105.995</b>	<b>7.035.639</b>	<b>6.965.979</b>	<b>6.897.009</b>

NCV (kcal/kg)	4.827	4.876	4.925	4.974	5.024	5.074	5.124	5.176	5.227	5.280	5.333
<b>Pembangkit</b>	<b>Jumlah Bahan Bakar Per Tahun (ton)</b>										
PLTU 2 Banten (Labuan)	2.194.946	2.173.214	2.151.697	2.130.393	2.109.300	2.088.416	2.067.739	2.047.266	2.026.996	2.006.927	1.987.056
PLTU 1 Jateng (Rembang)	2.194.946	2.173.214	2.151.697	2.130.393	2.109.300	2.088.416	2.067.739	2.047.266	2.026.996	2.006.927	1.987.056
PLTU 1 Jabar (Indramayu)	2.438.829	2.414.682	2.390.775	2.367.103	2.343.667	2.320.462	2.297.487	2.274.740	2.252.218	2.229.919	2.207.840
<b>Total</b>	<b>6.828.721</b>	<b>6.761.110</b>	<b>6.694.169</b>	<b>6.627.890</b>	<b>6.562.267</b>	<b>6.497.294</b>	<b>6.432.965</b>	<b>6.369.272</b>	<b>6.306.210</b>	<b>6.243.772</b>	<b>6.181.952</b>

NCV (kcal/kg)	5.386	5.440	5.494	5.549	5.605	5.661	5.717	5.774	5.832	5.890	5.949
<b>Pembangkit</b>	<b>Jumlah Bahan Bakar Per Tahun (ton)</b>										
PLTU 2 Banten (Labuan)	1.967.382	1.947.903	1.928.617	1.909.522	1.890.616	1.871.897	1.853.363	1.835.013	1.816.845	1.798.856	1.781.046
PLTU 1 Jateng (Rembang)	1.967.382	1.947.903	1.928.617	1.909.522	1.890.616	1.871.897	1.853.363	1.835.013	1.816.845	1.798.856	1.781.046
PLTU 1 Jabar (Indramayu)	2.185.980	2.164.337	2.142.908	2.121.691	2.100.684	2.079.885	2.059.292	2.038.903	2.018.716	1.998.729	1.978.940
<b>Total</b>	<b>6.120.745</b>	<b>6.060.144</b>	<b>6.000.142</b>	<b>5.940.735</b>	<b>5.881.916</b>	<b>5.823.679</b>	<b>5.766.019</b>	<b>5.708.929</b>	<b>5.652.405</b>	<b>5.596.441</b>	<b>5.541.031</b>

(Lanjutan)

NCV (kcal/kg)	5.386	5.440	5.494	5.549	5.605	5.661	5.717	5.774	5.832	5.890	5.949
<b>Pembangkit</b>	<b>Jumlah Bahan Bakar Per Tahun (ton)</b>										
PLTU 2 Banten (Labuan)	1.967.382	1.947.903	1.928.617	1.909.522	1.890.616	1.871.897	1.853.363	1.835.013	1.816.845	1.798.856	1.781.046
PLTU 1 Jateng (Rembang)	1.967.382	1.947.903	1.928.617	1.909.522	1.890.616	1.871.897	1.853.363	1.835.013	1.816.845	1.798.856	1.781.046
PLTU 1 Jabar (Indramayu)	2.185.980	2.164.337	2.142.908	2.121.691	2.100.684	2.079.885	2.059.292	2.038.903	2.018.716	1.998.729	1.978.940
Total	6.120.745	6.060.144	6.000.142	5.940.735	5.881.916	5.823.679	5.766.019	5.708.929	5.652.405	5.596.441	5.541.031

NCV (kcal/kg)	6.009	6.069	6.130	6.191	6.253	6.315	6.379	6.442	6.507	6.572	6.638
<b>Pembangkit</b>	<b>Jumlah Bahan Bakar Per Tahun (ton)</b>										
PLTU 2 Banten (Labuan)	1.763.411	1.745.952	1.728.665	1.711.550	1.694.604	1.677.825	1.661.213	1.644.766	1.628.481	1.612.357	1.596.393
PLTU 1 Jateng (Rembang)	1.763.411	1.745.952	1.728.665	1.711.550	1.694.604	1.677.825	1.661.213	1.644.766	1.628.481	1.612.357	1.596.393
PLTU 1 Jabar (Indramayu)	1.959.346	1.939.947	1.920.739	1.901.722	1.882.893	1.864.251	1.845.793	1.827.517	1.809.423	1.791.508	1.773.770
Total	5.486.169	5.431.850	5.378.070	5.324.822	5.272.101	5.219.901	5.168.219	5.117.049	5.066.385	5.016.223	4.966.557

NCV (kcal/kg)	6.704	6.771	6.839	6.907	6.976	7.046	7.116	7.187	7.259	7.332	7.405
<b>Pembangkit</b>	<b>Jumlah Bahan Bakar Per Tahun (ton)</b>										
PLTU 2 Banten (Labuan)	1.580.587	1.564.938	1.549.444	1.534.103	1.518.914	1.503.875	1.488.985	1.474.242	1.459.646	1.445.194	1.430.885
PLTU 1 Jateng (Rembang)	1.580.587	1.564.938	1.549.444	1.534.103	1.518.914	1.503.875	1.488.985	1.474.242	1.459.646	1.445.194	1.430.885
PLTU 1 Jabar (Indramayu)	1.756.208	1.738.820	1.721.604	1.704.559	1.687.682	1.670.972	1.654.428	1.638.047	1.621.829	1.605.771	1.589.872
Total	4.917.383	4.868.696	4.820.491	4.772.764	4.725.509	4.678.722	4.632.398	4.586.532	4.541.121	4.496.159	4.451.643

NCV (kcal/kg)	7.479	7.554	7.630	7.706	7.783	7.861	7.939
<b>Pembangkit</b>	<b>Jumlah Bahan Bakar Per Tahun (ton)</b>						
PLTU 2 Banten (Labuan)	1.416.718	1.402.691	1.388.803	1.375.053	1.361.438	1.347.959	1.334.613
PLTU 1 Jateng (Rembang)	1.416.718	1.402.691	1.388.803	1.375.053	1.361.438	1.347.959	1.334.613
PLTU 1 Jabar (Indramayu)	1.574.131	1.558.546	1.543.115	1.527.836	1.512.709	1.497.732	1.482.903
Total	4.407.567	4.363.928	4.320.721	4.277.941	4.235.586	4.193.649	4.152.128

## Energi Dihasilkan BBM

	2007
HSD/IDO	19.501,78 GWh
MFO	3.659,87 GWh

## Energi Dihasilkan BBM Setelah Digantikan Batubara

	2007
HSD/IDO	5.766,10 GWh
MFO	3.659,87 GWh

## Pemakaian HSD/IDO Setelah Digantikan Batubara

HSD/IDO	1.424.557 kl
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(Lanjutan)

## Perhitungan Operating Margin (OM)

Penghitungan Emisi CO<sub>2</sub> Operating Margin Tahun 2005

Jenis Bahan Bakar	A		B			C	D	E	F	G	H	I
	Jumlah Bahan Bakar (FC <sub>i,y</sub> )		Net Calorific Value (NCV <sub>i,y</sub> )			Kandungan Karbon	Faktor Oksidasi Karbon	Kandungan Karbon Per Satuan Jumlah Bahan Bakar	Faktor Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar (EFCO <sub>2,i,y</sub> )	Density	Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar (cair)	Emisi CO <sub>2</sub> Per Jenis Bahan Bakar (FC <sub>i,y</sub> *NCV <sub>i,y</sub> *EFCO <sub>2,i,y</sub> )
			TJ/kt	tC/TJ	tC/kt	tCO <sub>2</sub> /kt		tCO <sub>2</sub> /kl	tCO <sub>2</sub>			
			PERTAMINA	DJMBO	IPCC	IPCC	IPCC	B*C*D	E*44/12	kt/kl	F*G	
HSD/IDO	5.161.009,02	kilo liter	43,244			20,2	1	873,529	3.202,939	0,000845	2,706	13.968.184,907
MFO	1.933.927,72	kilo liter	41,178			21,1	1	868,854	3.185,799	0,000990	3,154	6.099.493,021
Batubara	24.435.126,12	ton		24,969		26,2	1	654,175	2.398,641			58.611.096,841
Gas Alam	118.991,41	MMSCF			48	15,3	1	734,400	2.692,800			7.679.187,361
<b>Emisi CO<sub>2</sub> Total</b>												86.357.962,129

Penghitungan Emisi CO<sub>2</sub> Operating Margin Tahun 2006

Jenis Bahan Bakar	A		B			C	D	E	F	G	H	I
	Jumlah Bahan Bakar (FC <sub>i,y</sub> )		Net Calorific Value (NCV)			Kandungan Karbon	Faktor Oksidasi Karbon	Kandungan Karbon Per Satuan Jumlah Bahan Bakar	Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar	Density	Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar (cair)	Emisi CO <sub>2</sub> Per Jenis Bahan Bakar (FC <sub>i,y</sub> *NCV <sub>i,y</sub> *EFCO <sub>2,i,y</sub> )
			TJ/kt	tC/TJ	tC/kt	tCO <sub>2</sub> /kt		tCO <sub>2</sub> /kl	tCO <sub>2</sub>			
			PERTAMINA	DJMBO	IPCC	IPCC	IPCC	B*C*D	E*44/12	kt/kl	F*G	
HSD/IDO	4.219.142,00	kilo liter	43,244			20,2	1	873,529	3.202,939	0,000845	2,706	11.419.037,513
MFO	2.059.780,84	kilo liter	41,178			21,1	1	868,854	3.185,799	0,000990	3,154	6.496.426,277
Batubara	27.135.395,84	ton		24,969		26,2	1	654,175	2.398,641			65.088.074,684
Gas Alam	130.499,02	MMSCF			48,000	15,3	1	734,400	2.692,800			8.421.838,263
<b>Emisi CO<sub>2</sub> Total</b>												91.425.376,737



Penghitungan Emisi CO<sub>2</sub> Operating Margin Tahun 2007

Jenis Bahan Bakar	A						B			C	D	
	Jumlah Bahan Bakar (FC <sub>i,y</sub> )						Net Calorific Value (NCV)			Kandungan Karbon	Faktor Oksidasi Karbon	
							TJ/kt			tC/TJ	IPCC	
							PERTAMINA	DJMBP	IPCC	IPCC	IPCC	
HSD/IDO	1.424.557,26						kilo liter	43,244			20,2	1
MFO	2.222.120,08						kilo liter	41,178			21,1	1
Batubara	37.878.931,63	37.089.064,71	36.381.088,25	35.746.512,16	35.177.726,56	34.667.910,54	ton	24,969			26,2	1
	37.803.500,06	37.021.453,60	36.320.486,81	35.692.193,66	35.129.039,60	34.624.271,26						
	37.728.815,34	36.954.511,92	36.260.485,39	35.638.412,96	35.080.834,68	34.581.064,05						
	37.654.870,07	36.888.233,02	36.201.078,04	35.585.164,74	35.033.107,04	34.538.284,63						
	37.581.656,93	36.822.610,35	36.142.258,89	35.532.443,74	34.985.851,96	34.495.928,78						
	37.509.168,68	36.757.637,41	36.084.022,10	35.480.244,72	34.939.064,74	34.453.992,29						
	37.437.398,13	36.693.307,76	36.026.361,91	35.428.562,53	34.892.740,77	34.412.471,01						
	37.366.338,18	36.629.615,04	35.969.272,62	35.377.392,04	34.846.875,44							
	37.295.981,80	36.566.552,94	35.912.748,56	35.326.728,19	34.801.464,23							
	37.226.322,01	36.504.115,22	35.856.784,16	35.276.565,97	34.756.502,64							
37.157.351,92	36.442.295,70	35.801.373,85	35.226.900,39	34.711.986,21								
Gas Alam	139.060,16						MMSCF		48,000	15,3	1	
<b>Emisi CO<sub>2</sub> Total</b>												

(Lanjutan)



E	F	G	H	I					
Kandungan Karbon Per Satuan Jumlah Bahan Bakar	Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar	Density	Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar (cair)	Emisi CO <sub>2</sub> Per Jenis Bahan Bakar (FC <sub>i,y</sub> *NCV <sub>i,y</sub> *EFCO <sub>2i,y</sub> )					
tC/kt	tCO <sub>2</sub> /kt		tCO <sub>2</sub> /kl	tCO <sub>2</sub>					
B*C*D	E*44/12	kt/kl	F*G						
873,529	3.202,939	0,000845	2,706	3.855.540,477					
868,854	3.185,799	0,000990	3,154	7.008.434,586					
654,175	2.398,641			90.857.960,768	88.963.353,534	87.265.172,135	85.743.051,870	84.378.739,375	83.155.873,728
				90.677.027,511	88.801.178,765	87.119.811,042	85.612.761,275	84.261.956,825	83.051.198,759
				90.497.885,673	88.640.609,686	86.975.889,169	85.483.760,686	84.146.330,538	82.947.560,175
				90.320.517,516	88.481.630,400	86.833.392,264	85.356.037,331	84.031.849,065	82.844.947,716
				90.144.905,479	88.324.225,166	86.692.306,220	85.229.578,563	83.918.501,072	82.743.351,222
				89.971.032,175	88.168.378,400	86.552.617,067	85.104.371,863	83.806.275,337	82.642.760,633
				89.798.880,389	88.014.074,672	86.414.310,976	84.980.404,832	83.695.160,748	82.543.165,992
				89.628.433,077	87.861.298,703	86.277.374,251	84.857.665,198	83.585.146,303	
				89.459.673,361	87.710.035,367	86.141.793,336	84.736.140,808	83.476.221,110	
				89.292.584,534	87.560.269,688	86.007.554,806	84.615.819,630	83.368.374,384	
		89.127.150,051	87.411.986,838	85.874.645,370	84.496.689,751	83.261.595,447			
734,400	2.692,800			8.974.336,844					
				110.696.272,676	108.801.665,441	107.103.484,042	105.581.363,777	104.217.051,282	102.994.185,635
				110.515.339,419	108.639.490,672	106.958.122,949	105.451.073,182	104.100.268,732	102.889.510,666
				110.336.197,580	108.478.921,593	106.814.201,076	105.322.072,593	103.984.642,445	102.785.872,082
				110.158.829,423	108.319.942,307	106.671.704,171	105.194.349,238	103.870.160,972	102.683.259,623
				109.983.217,386	108.162.537,073	106.530.618,127	105.067.890,470	103.756.812,980	102.581.663,129
				109.809.344,082	108.006.690,307	106.390.928,975	104.942.683,770	103.644.587,244	102.481.072,541
				109.637.192,297	107.852.386,579	106.252.622,883	104.818.716,740	103.533.472,655	102.381.477,899
				109.466.744,984	107.699.610,610	106.115.686,158	104.695.977,106	103.423.458,210	
				109.297.985,268	107.548.347,274	105.980.105,243	104.574.452,716	103.314.533,017	
				109.130.896,441	107.398.581,595	105.845.866,713	104.454.131,537	103.206.686,291	
				108.965.461,959	107.250.298,745	105.712.957,277	104.335.001,658	103.099.907,355	

(Lanjutan)

## Energi Dari Setiap Jenis Bahan Bakar

Jenis Bahan Bakar	Satuan	2005	2006	2007
Air/Hidro	GWh	6.952	5.267	5.874
Panas Bumi		6.320	6.334	6.673
Gas Alam		14.807	14.071	16.128
Minyak		22.978	23.543	21.981
Batubara		46.416	52.961	57.319
<b>Energi Netto Total (EG<sub>y</sub>)</b>		<b>97.473</b>	<b>102.176</b>	<b>107.975</b>

## Faktor Emisi OM

Definisi	Satuan	2005	2006	2007					
Emisi CO <sub>2</sub> Total	tCO <sub>2</sub>	86.357.962,129	91.425.376,737						
Energi Netto Total (EG <sub>y</sub> )	MWh	98.038.451,329	101.611.200,752	107.975.000,000					
EF <sub>grid,OM,y</sub>	tCO <sub>2</sub> /MWh	0,881	0,900	1,025	1,008	0,992	0,978	0,965	0,954
				1,024	1,006	0,991	0,977	0,964	0,953
				1,022	1,005	0,989	0,975	0,963	0,952
				1,020	1,003	0,988	0,974	0,962	0,951
				1,019	1,002	0,987	0,973	0,961	0,950
				1,017	1,000	0,985	0,972	0,960	0,949
				1,015	0,999	0,984	0,971	0,959	0,948
				1,014	0,997	0,983	0,970	0,958	
				1,012	0,996	0,982	0,969	0,957	
				1,011	0,995	0,980	0,967	0,956	
				1,009	0,993	0,979	0,966	0,955	

(Lanjutan)

Faktor Emisi <i>Operatin Margin (OM) Grid JAMALI 2007</i>	0,935	0,929	0,924	0,919	0,915	0,911	tCO <sub>2</sub> /MWh
	0,935	0,929	0,924	0,919	0,915	0,911	
	0,934	0,928	0,923	0,919	0,915	0,911	
	0,934	0,928	0,923	0,918	0,914	0,911	
	0,933	0,927	0,922	0,918	0,914	0,910	
	0,933	0,927	0,922	0,918	0,914	0,910	
	0,932	0,926	0,922	0,917	0,913	0,910	
	0,931	0,926	0,921	0,917	0,913		
	0,931	0,926	0,921	0,916	0,912		
	0,930	0,925	0,920	0,916	0,912		
	0,930	0,925	0,920	0,916	0,912		

(Lanjutan)



## Perhitungan Build Margin (BM)

## Daftar Pembangkit BM

Pembangkit	Tahun Operasi	Energi (MWh)	Jenis Bahan Bakar	Jumlah-Bahan-Bakar-1	Jumlah-Bahan-Bakar-2	Jumlah-Bahan-Bakar-3	Jumlah-Bahan-Bakar-4	Jumlah-Bahan-Bakar-5	Jumlah-Bahan-Bakar-6	Jumlah-Bahan-Bakar-7	Jumlah-Bahan-Bakar-8	Jumlah-Bahan-Bakar-9	Jumlah-Bahan-Bakar-10	Jumlah-Bahan-Bakar-11
Kamojang Unit V	2007	20.314,734	Panas Bumi											
Darajat Unit III	2007	453.907,708	Panas Bumi											
PT Sakti Prima (Cilacap)	2006	3.134.154,352	Batubara	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207
Tanjung Jati B	2006	8.572.535,509	Batubara	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238
Cilegon	2006	1.383.975,683	Gas Alam	13.839,757	13.839,757	13.839,757	13839,75683	13.839,757	13.839,757	13.839,757	13.839,757	13839,75683	13839,75683	13839,75683
Muara Tawar	2004	1.567.014,719	MFO	415.856,256	415.856,256	415.856,256	415856,2561	415.856,256	415.856,256	415.856,256	415.856,256	415856,2561	415856,2561	415856,2561
PLTU Labuan	2007	4.415.040,000	Batubara	2.448.831,985	2.424.586,124	2.400.580,321	2.376.812,199	2.353.279,405	2.329.979,609	2.306.910,504	2.284.069,806	2.261.455,253	2.239.064,607	2.216.895,650
PLTU Rembang	2007	4.415.040,000	Batubara	2.448.831,985	2.424.586,124	2.400.580,321	2.376.812,199	2.353.279,405	2.329.979,609	2.306.910,504	2.284.069,806	2.261.455,253	2.239.064,607	2.216.895,650
PLTU Indramayu	2007	4.905.600,000	Batubara	2.720.924,428	2.693.984,582	2.667.311,468	2.640.902,443	2.614.754,894	2.588.866,232	2.563.233,893	2.537.855,339	2.512.728,059	2.487.849,563	2.463.217,389
<b>Total Energi</b>		<b>28.867.582,705</b>												

Pembangkit	Tahun Operasi	Energi (MWh)	Jenis Bahan Bakar	Jumlah-Bahan-Bakar-12	Jumlah-Bahan-Bakar-13	Jumlah-Bahan-Bakar-14	Jumlah-Bahan-Bakar-15	Jumlah-Bahan-Bakar-16	Jumlah-Bahan-Bakar-17	Jumlah-Bahan-Bakar-18	Jumlah-Bahan-Bakar-19	Jumlah-Bahan-Bakar-20	Jumlah-Bahan-Bakar-21	Jumlah-Bahan-Bakar-22
Kamojang Unit V	2007	20.314,734	Panas Bumi											
Darajat Unit III	2007	453.907,708	Panas Bumi											
PT Sakti Prima (Cilacap)	2006	3.134.154,352	Batubara	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207
Tanjung Jati B	2006	8.572.535,509	Batubara	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238
Cilegon	2006	1.383.975,683	Gas Alam	13.839,757	13.839,757	13.839,757	13839,75683	13.839,757	13.839,757	13.839,757	13.839,757	13839,75683	13839,75683	13839,75683
Muara Tawar	2004	1.567.014,719	MFO	415.856,256	415.856,256	415.856,256	415856,2561	415.856,256	415.856,256	415.856,256	415.856,256	415856,2561	415856,2561	415856,2561
PLTU Labuan	2007	4.415.040,000	Batubara	2.194.946,189	2.173.214,048	2.151.697,077	2.130.393,146	2.109.300,144	2.088.415,985	2.067.738,599	2.047.265,939	2.026.995,979	2.006.926,712	1.987.056,151
PLTU Rembang	2007	4.415.040,000	Batubara	2.194.946,189	2.173.214,048	2.151.697,077	2.130.393,146	2.109.300,144	2.088.415,985	2.067.738,599	2.047.265,939	2.026.995,979	2.006.926,712	1.987.056,151
PLTU Indramayu	2007	4.905.600,000	Batubara	2.438.829,098	2.414.682,276	2.390.774,530	2.367.103,495	2.343.666,827	2.320.462,205	2.297.487,332	2.274.739,932	2.252.217,755	2.229.918,569	2.207.840,168
<b>Total Energi</b>		<b>28.867.582,705</b>												

Pembangkit	Tahun Operasi	Energi (MWh)	Jenis Bahan Bakar	Jumlah-Bahan-Bakar-23	Jumlah-Bahan-Bakar-24	Jumlah-Bahan-Bakar-25	Jumlah-Bahan-Bakar-26	Jumlah-Bahan-Bakar-27	Jumlah-Bahan-Bakar-28	Jumlah-Bahan-Bakar-29	Jumlah-Bahan-Bakar-30	Jumlah-Bahan-Bakar-31	Jumlah-Bahan-Bakar-32	Jumlah-Bahan-Bakar-33
Kamojang Unit V	2007	20.314,734	Panas Bumi											
Darajat Unit III	2007	453.907,708	Panas Bumi											
PT Sakti Prima (Cilacap)	2006	3.134.154,352	Batubara	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207
Tanjung Jati B	2006	8.572.535,509	Batubara	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238
Cilegon	2006	1.383.975,683	Gas Alam	13.839,757	13.839,757	13.839,757	13839,75683	13.839,757	13.839,757	13.839,757	13.839,757	13839,75683	13839,75683	13839,75683
Muara Tawar	2004	1.567.014,719	MFO	415.856,256	415.856,256	415.856,256	415856,2561	415.856,256	415.856,256	415.856,256	415.856,256	415856,2561	415856,2561	415856,2561
PLTU Labuan	2007	4.415.040,000	Batubara	1.967.382,327	1.947.903,295	1.928.617,123	1.909.521,904	1.890.615,747	1.871.896,779	1.853.363,148	1.835.013,017	1.816.844,572	1.798.856,012	1.781.045,556
PLTU Rembang	2007	4.415.040,000	Batubara	1.967.382,327	1.947.903,295	1.928.617,123	1.909.521,904	1.890.615,747	1.871.896,779	1.853.363,148	1.835.013,017	1.816.844,572	1.798.856,012	1.781.045,556
PLTU Indramayu	2007	4.905.600,000	Batubara	2.185.980,364	2.164.336,994	2.142.907,915	2.121.691,005	2.100.684,163	2.079.885,310	2.059.292,386	2.038.903,353	2.018.716,191	1.998.728,902	1.978.939,507
<b>Total Energi</b>		<b>28.867.582,705</b>												

Pembangkit	Tahun Operasi	Energi (MWh)	Jenis Bahan Bakar	Jumlah-Bahan-Bakar-34	Jumlah-Bahan-Bakar-35	Jumlah-Bahan-Bakar-36	Jumlah-Bahan-Bakar-37	Jumlah-Bahan-Bakar-38	Jumlah-Bahan-Bakar-39	Jumlah-Bahan-Bakar-40	Jumlah-Bahan-Bakar-41	Jumlah-Bahan-Bakar-42	Jumlah-Bahan-Bakar-43	Jumlah-Bahan-Bakar-44
Kamojang Unit V	2007	20.314,734	Panas Bumi											
Darajat Unit III	2007	453.907,708	Panas Bumi											
PT Sakti Prima (Cilacap)	2006	3.134.154,352	Batubara	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207
Tanjung Jati B	2006	8.572.535,509	Batubara	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238
Cilegon	2006	1.383.975,683	Gas Alam	13.839,757	13.839,757	13.839,757	13839,75683	13.839,757	13.839,757	13.839,757	13.839,757	13839,75683	13839,75683	13839,75683
Muara Tawar	2004	1.567.014,719	MFO	415.856,256	415.856,256	415.856,256	415856,2561	415.856,256	415.856,256	415.856,256	415.856,256	415856,2561	415856,2561	415856,2561
PLTU Labuan	2007	4.415.040,000	Batubara	1.763.411,442	1.745.951,922	1.728.665,270	1.711.549,772	1.694.603,735	1.677.825,480	1.661.213,346	1.644.765,689	1.628.480,881	1.612.357,308	1.596.393,374
PLTU Rembang	2007	4.415.040,000	Batubara	1.763.411,442	1.745.951,922	1.728.665,270	1.711.549,772	1.694.603,735	1.677.825,480	1.661.213,346	1.644.765,689	1.628.480,881	1.612.357,308	1.596.393,374
PLTU Indramayu	2007	4.905.600,000	Batubara	1.959.346,046	1.939.946,580	1.920.739,188	1.901.721,969	1.882.893,038	1.864.250,533	1.845.792,607	1.827.517,433	1.809.423,201	1.791.508,119	1.773.770,415
<b>Total Energi</b>		<b>28.867.582,705</b>												

Pembangkit	Tahun Operasi	Energi (MWh)	Jenis Bahan Bakar	Jumlah-Bahan-Bakar-45	Jumlah-Bahan-Bakar-46	Jumlah-Bahan-Bakar-47	Jumlah-Bahan-Bakar-48	Jumlah-Bahan-Bakar-49	Jumlah-Bahan-Bakar-50	Jumlah-Bahan-Bakar-51	Jumlah-Bahan-Bakar-52	Jumlah-Bahan-Bakar-53	Jumlah-Bahan-Bakar-54	Jumlah-Bahan-Bakar-55
Kamojang Unit V	2007	20.314,734	Panas Bumi											
Darajat Unit III	2007	453.907,708	Panas Bumi											
PT Sakti Prima (Cilacap)	2006	3.134.154,352	Batubara	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1537559,207	1537559,207	1537559,207
Tanjung Jati B	2006	8.572.535,509	Batubara	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4205530,238	4205530,238	4205530,238
Cilegon	2006	1.383.975,683	Gas Alam	13.839,757	13.839,757	13.839,757	13839,75683	13.839,757	13.839,757	13.839,757	13.839,757	13839,75683	13839,75683	13839,75683
Muara Tawar	2004	1.567.014,719	MFO	415.856,256	415.856,256	415.856,256	415856,2561	415.856,256	415.856,256	415.856,256	415.856,256	415856,2561	415856,2561	415856,2561
PLTU Labuan	2007	4.415.040,000	Batubara	1.580.587,499	1.564.938,118	1.549.443,681	1.534.102,654	1.518.913,519	1.503.874,771	1.488.984,922	1.474.242,497	1.459.646,037	1.445.194,096	1.430.885,243
PLTU Rembang	2007	4.415.040,000	Batubara	1.580.587,499	1.564.938,118	1.549.443,681	1.534.102,654	1.518.913,519	1.503.874,771	1.488.984,922	1.474.242,497	1.459.646,037	1.445.194,096	1.430.885,243
PLTU Indramayu	2007	4.905.600,000	Batubara	1.756.208,332	1.738.820,131	1.721.604,090	1.704.558,505	1.687.681,688	1.670.971,968	1.654.427,691	1.638.047,219	1.621.828,930	1.605.771,218	1.589.872,493
<b>Total Energi</b>		<b>28.867.582,705</b>												

Pembangkit	Tahun Operasi	Energi (MWh)	Jenis Bahan Bakar	Jumlah-Bahan-Bakar-56	Jumlah-Bahan-Bakar-57	Jumlah-Bahan-Bakar-58	Jumlah-Bahan-Bakar-59	Jumlah-Bahan-Bakar-60	Jumlah-Bahan-Bakar-61	Jumlah-Bahan-Bakar-62
Kamojang Unit V	2007	20.314,734	Panas Bumi							
Darajat Unit III	2007	453.907,708	Panas Bumi							
PT Sakti Prima (Cilacap)	2006	3.134.154,352	Batubara	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207	1.537.559,207
Tanjung Jati B	2006	8.572.535,509	Batubara	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238	4.205.530,238
Cilegon	2006	1.383.975,683	Gas Alam	13.839,757	13.839,757	13.839,757	13839,75683	13.839,757	13.839,757	13.839,757
Muara Tawar	2004	1.567.014,719	MFO	415.856,256	415.856,256	415.856,256	415856,2561	415.856,256	415.856,256	415.856,256
PLTU Labuan	2007	4.415.040,000	Batubara	1.416.718,063	1.402.691,151	1.388.803,120	1.375.052,594	1.361.438,212	1.347.958,626	1.334.612,501
PLTU Rembang	2007	4.415.040,000	Batubara	1.416.718,063	1.402.691,151	1.388.803,120	1.375.052,594	1.361.438,212	1.347.958,626	1.334.612,501
PLTU Indramayu	2007	4.905.600,000	Batubara	1.574.131,181	1.558.545,724	1.543.114,578	1.527.836,216	1.512.709,124	1.497.731,806	1.482.902,779
<b>Total Energi</b>		<b>28.867.582,705</b>								

<b>Energi Total Tersalur ke Sistem Tahun 2007</b>	107.974.850,120	MWh
<b>Energi Yang Dihasilkan Pembangkit <i>Build Margin</i></b>	28.867.582,705	MWh
<b>Kontribusi Pembangkit BM Terhadap Sistem</b>	26,74	%

(Lanjutan)

Penghitungan Emisi CO<sub>2</sub> Build Margin Tahun 2007

Jenis Bahan Bakar	A							B	C	D	E	F	G	H							
	Jumlah Bahan Bakar (FC <sub>i,y</sub> )														Net Calorific Value (NCV)	Kandungan Karbon	Faktor Oksidasi Karbon	Kandungan Karbon Per Satuan Jumlah Bahan Bakar	Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar	Density	Emisi CO <sub>2</sub> Per Satuan Jumlah Bahan Bakar (cair)
							PERTAMINA	DJMBP	IPCC	IPCC	IPCC	B*C*D	E*44/12	kt/kl	F*G						
MFO	415.856,26							kilo liter	41,178												
Batubara	13.361.677,84	12.571.810,92	11.863.834,46	11.229.258,37	10.660.472,77	10.150.656,75															
	13.286.246,27	12.504.199,82	11.803.233,03	11.174.939,87	10.611.785,81	10.107.017,47															
	13.211.561,55	12.437.258,13	11.743.231,61	11.121.159,17	10.563.580,90	10.063.810,26															
	13.137.616,29	12.370.979,23	11.683.824,26	11.067.910,96	10.515.853,26	10.021.030,85															
	13.064.403,15	12.305.356,56	11.625.005,10	11.015.189,95	10.468.598,17	9.978.674,99															
	12.991.914,89	12.240.383,62	11.566.768,31	10.962.990,94	10.421.810,96	9.936.738,50															
	12.920.144,34	12.176.053,97	11.509.108,13	10.911.308,74	10.375.486,98	9.895.217,22															
	12.849.084,40	12.112.361,26	11.452.018,83	10.860.138,26	10.329.621,66																
	12.778.728,01	12.049.299,16	11.395.494,78	10.809.474,41	10.284.210,45																
	12.709.068,22	11.986.861,44	11.339.530,37	10.759.312,18	10.239.248,85																
12.640.098,13	11.925.041,91	11.284.120,06	10.709.646,61	10.194.732,42																	
Gas Alam	13.839,76						MSCF			48,000	15,3	1	734,400	2.692,800							
<b>Emisi CO<sub>2</sub> Total</b>																					

Jenis Bahan Bakar	I						
	Emisi CO <sub>2</sub> Per Jenis Bahan Bakar (FC <sub>i,y</sub> *NCV <sub>i,y</sub> *EFCO <sub>2,i,y</sub> )						
	tCO <sub>2</sub>						
MFO	1.311.585,901						
Batubara	32.049.869,123	30.155.261,889	28.457.080,489	26.934.960,224	25.570.647,730	24.347.782,083	
	31.868.935,866	29.993.087,119	28.311.719,397	26.804.669,630	25.453.865,180	24.243.107,113	
	31.689.794,027	29.832.518,040	28.167.797,523	26.675.669,041	25.338.238,892	24.139.468,530	
	31.512.425,870	29.673.538,755	28.025.300,619	26.547.945,686	25.223.757,420	24.036.856,071	
	31.336.813,834	29.516.133,521	27.884.214,575	26.421.486,918	25.110.409,427	23.935.259,576	
	31.162.940,530	29.360.286,755	27.744.525,422	26.296.280,217	24.998.183,692	23.834.668,988	
	30.990.788,744	29.205.983,026	27.606.219,330	26.172.313,187	24.887.069,102	23.735.074,346	
	30.820.341,431	29.053.207,057	27.469.282,606	26.049.573,553	24.777.054,657		
	30.651.581,716	28.901.943,722	27.333.701,691	25.928.049,163	24.668.129,464		
	30.484.492,889	28.752.178,043	27.199.463,161	25.807.727,985	24.560.282,739		
30.319.058,406	28.603.895,193	27.066.553,725	25.688.598,106	24.453.503,802			
Gas Alam	893.157,631						
<b>Emisi CO<sub>2</sub> Total</b>	34.254.612,655	32.360.005,421	30.661.824,021	29.139.703,756	27.775.391,262	26.552.525,615	
	34.073.679,398	32.197.830,651	30.516.462,929	29.009.413,162	27.658.608,712	26.447.850,646	
	33.894.537,560	32.037.261,573	30.372.541,055	28.880.412,573	27.542.982,424	26.344.212,062	
	33.717.169,403	31.878.282,287	30.230.044,151	28.752.689,218	27.428.500,952	26.241.599,603	
	33.541.557,366	31.720.877,053	30.088.958,107	28.626.230,450	27.315.152,959	26.140.003,109	
	33.367.684,062	31.565.030,287	29.949.268,954	28.501.023,750	27.202.927,224	26.039.412,520	
	33.195.532,276	31.410.726,558	29.810.962,862	28.377.056,719	27.091.812,634	25.939.817,878	
	33.025.084,964	31.257.950,590	29.674.026,138	28.254.317,085	26.981.798,190		
	32.856.325,248	31.106.687,254	29.538.445,223	28.132.792,695	26.872.872,996		
	32.689.236,421	30.956.921,575	29.404.206,693	28.012.471,517	26.765.026,271		
	32.523.801,938	30.808.638,725	29.271.297,257	27.893.341,638	26.658.247,334		



(Lanjutan)

<b>Faktor Emisi <i>Build Margin</i> (BM) Grid JAMALI 2007</b>	1,187	1,121	1,062	1,009	0,962	0,920	<b>tCO<sub>2</sub>/MWh</b>
	1,180	1,115	1,057	1,005	0,958	0,916	
	1,174	1,110	1,052	1,000	0,954	0,913	
	1,168	1,104	1,047	0,996	0,950	0,909	
	1,162	1,099	1,042	0,992	0,946	0,906	
	1,156	1,093	1,037	0,987	0,942	0,902	
	1,150	1,088	1,033	0,983	0,938	0,899	
	1,144	1,083	1,028	0,979	0,935		
	1,138	1,078	1,023	0,975	0,931		
	1,132	1,072	1,019	0,970	0,927		
	1,127	1,067	1,014	0,966	0,923		

Perhitungan *Combine Margin* (CM)

$$EF_{\text{grid,CM,y}} = EF_{\text{grid,OM,y}} \times W_{\text{OM}} + EF_{\text{grid,BM,y}} \times W_{\text{BM}}$$

$W_{\text{OM}}$	=	0,5
$W_{\text{BM}}$	=	0,5

Faktor Emisi <i>Combine Margin</i> (CM) Grid JAMALI 2007 ( $EF_{\text{grid,CM,y}}$ )	1,061	1,025	0,993	0,964	0,939	0,916	tCO <sub>2</sub> /MWh
	1,058	1,022	0,990	0,962	0,937	0,914	
	1,054	1,019	0,988	0,960	0,934	0,912	
	1,051	1,016	0,985	0,957	0,932	0,910	
	1,047	1,013	0,982	0,955	0,930	0,908	
	1,044	1,010	0,980	0,952	0,928	0,906	
	1,041	1,007	0,977	0,950	0,926	0,904	
	1,038	1,004	0,975	0,948	0,924	0,000	
	1,035	1,002	0,972	0,945	0,922	0,000	
	1,031	0,999	0,969	0,943	0,920	0,000	
	1,028	0,996	0,967	0,941	0,918	0,000	

Lampiran 6: Jumlah dan Nilai Certified of Emission Reduction (CER)

Jumlah CER

NCV (kcal/kg)	4.327	4.370	4.414	4.458	4.503	4.548	4.593	4.639	4.686
60% (tCO <sub>2</sub> )	916.810,675	914.218,429	911.651,848	909.110,680	906.594,671	904.103,574	901.637,141	899.195,128	896.777,293
70% (tCO <sub>2</sub> )	923.040,815	920.193,855	917.375,084	914.584,221	911.820,990	909.085,118	906.376,334	903.694,369	901.038,959
80% (tCO <sub>2</sub> )	928.717,819	925.642,704	922.598,036	919.583,513	916.598,836	913.643,711	910.717,845	907.820,947	904.952,732
NCV (kcal/kg)	4.732	4.780	4.827	4.876	4.925	4.974	5.024	5.074	5.124
60% (tCO <sub>2</sub> )	894.383,397	892.013,204	889.666,477	887.342,986	885.042,499	882.764,789	880.509,631	878.276,802	876.066,079
70% (tCO <sub>2</sub> )	898.409,839	895.806,751	893.229,436	890.677,639	888.151,107	885.649,590	883.172,841	880.720,614	878.292,666
80% (tCO <sub>2</sub> )	902.112,915	899.301,215	896.517,353	893.761,055	891.032,046	888.330,058	885.654,821	883.006,073	880.383,549
NCV (kcal/kg)	5.176	5.227	5.280	5.333	5.386	5.440	5.494	5.549	5.605
60% (tCO <sub>2</sub> )	873.877,245	871.710,082	869.564,377	867.439,916	865.336,489	863.253,889	861.191,908	859.150,343	857.128,991
70% (tCO <sub>2</sub> )	875.888,758	873.508,650	871.152,109	868.818,899	866.508,790	864.221,554	861.956,963	859.714,794	857.494,825
80% (tCO <sub>2</sub> )	877.786,991	875.216,142	872.670,746	870.150,553	867.655,312	865.184,776	862.738,701	860.316,845	857.918,967
NCV (kcal/kg)	5.661	5.717	5.774	5.832	5.890	5.949	6.009	6.069	6.130
60% (tCO <sub>2</sub> )	855.127,653	853.146,130	851.184,226	849.241,747	847.318,500	845.414,295	843.528,944	841.662,260	839.814,058
70% (tCO <sub>2</sub> )	855.296,836	853.120,609	850.965,929	848.832,582	846.720,358	844.629,047	842.558,441	840.508,337	838.478,531
80% (tCO <sub>2</sub> )	855.544,831	853.194,201	850.866,844	848.562,531	846.281,033	844.022,123	841.785,579	839.571,180	837.378,705
NCV (kcal/kg)	6.191	6.253	6.315	6.379	6.442	6.507	6.572	6.638	6.704
60% (tCO <sub>2</sub> )	837.984,154	836.172,369	834.378,522	832.602,436	830.843,935	829.102,845	827.378,993	825.672,209	823.982,324
70% (tCO <sub>2</sub> )	836.468,822	834.479,011	832.508,901	830.558,297	828.627,006	826.714,837	824.821,600	822.947,108	821.091,176
80% (tCO <sub>2</sub> )	835.207,937	833.058,663	830.930,668	828.823,743	826.737,678	824.672,267	822.627,306	820.602,592	818.597,925
NCV (kcal/kg)	6.771	6.839	6.907	6.976	7.046	7.116	7.187	7.259	7.332
60% (tCO <sub>2</sub> )	822.309,171	820.652,583	819.012,398	817.388,452	815.780,584	814.188,636	812.612,450	811.051,869	809.506,740
70% (tCO <sub>2</sub> )	819.253,619	817.434,255	815.632,905	813.849,391	812.083,534	810.335,162	808.604,100	806.890,178	805.193,224
80% (tCO <sub>2</sub> )	816.613,106	814.647,938	812.702,228	810.775,782	808.868,410	806.979,923	805.110,134	803.258,857	801.425,910
NCV (kcal/kg)	7.405	7.479	7.554	7.630	7.706	7.783	7.861	7.939	
60% (tCO <sub>2</sub> )	807.976,909	806.462,225	804.962,538	803.477,700	802.007,562	800.551,981	799.110,811	797.683,910	
70% (tCO <sub>2</sub> )	803.513,073	801.849,556	800.202,511	798.571,772	796.957,179	795.358,573	793.775,794	792.208,686	
80% (tCO <sub>2</sub> )	799.611,111	797.814,280	796.035,240	794.273,814	792.529,827	790.803,108	789.093,485	787.400,789	

(Lanjutan)

## Nilai CER

NCV (kcal/kg)	4.327	4.370	4.414	4.458	4.503	4.548	4.593	4.639	4.686
60% (US\$)	13.174.349,407	13.137.099,454	13.100.218,312	13.063.702,330	13.027.547,893	12.991.751,420	12.956.309,368	12.921.218,227	12.886.474,524
70% (US\$)	13.263.875,027	13.222.964,903	13.182.459,831	13.142.355,798	13.102.648,835	13.063.335,011	13.024.410,432	12.985.871,245	12.947.713,635
80% (US\$)	13.345.452,219	13.301.263,554	13.257.512,400	13.214.194,426	13.171.305,343	13.128.840,904	13.086.796,906	13.045.169,184	13.003.953,618
NCV (kcal/kg)	4.732	4.780	4.827	4.876	4.925	4.974	5.024	5.074	5.124
60% (US\$)	12.852.074,817	12.818.015,702	12.784.293,805	12.750.905,789	12.717.848,347	12.685.118,206	12.652.712,127	12.620.626,899	12.588.859,347
70% (US\$)	12.909.933,822	12.872.528,067	12.835.492,666	12.798.823,952	12.762.518,295	12.726.572,099	12.690.981,807	12.655.743,893	12.620.854,870
80% (US\$)	12.963.146,127	12.922.742,671	12.882.739,249	12.843.131,900	12.803.916,703	12.765.089,776	12.726.647,273	12.688.585,390	12.650.900,356
NCV (kcal/kg)	5.176	5.227	5.280	5.333	5.386	5.440	5.494	5.549	5.605
60% (US\$)	12.557.406,326	12.526.264,720	12.495.431,447	12.464.903,454	12.434.677,718	12.404.751,247	12.375.121,078	12.345.784,277	12.316.737,939
70% (US\$)	12.586.311,283	12.552.109,712	12.518.246,770	12.484.719,104	12.451.523,396	12.418.656,358	12.386.114,736	12.353.895,309	12.321.994,885
80% (US\$)	12.613.588,442	12.576.645,953	12.540.069,231	12.503.854,655	12.467.998,639	12.432.497,633	12.397.348,122	12.362.546,626	12.328.089,699
NCV (kcal/kg)	5.661	5.717	5.774	5.832	5.890	5.949	6.009	6.069	6.130
60% (US\$)	12.287.979,189	12.259.505,179	12.231.313,089	12.203.400,129	12.175.763,536	12.148.400,571	12.121.308,528	12.094.484,722	12.067.926,499
70% (US\$)	12.290.410,308	12.259.138,449	12.228.176,212	12.197.520,533	12.167.168,375	12.137.116,733	12.107.362,632	12.077.903,126	12.048.735,299
80% (US\$)	12.293.973,930	12.260.195,941	12.226.752,387	12.193.639,958	12.160.855,375	12.128.395,391	12.096.256,793	12.064.436,400	12.032.931,059
NCV (kcal/kg)	6.191	6.253	6.315	6.379	6.442	6.507	6.572	6.638	6.704
60% (US\$)	12.041.631,228	12.015.596,306	11.989.819,156	11.964.297,226	11.939.027,987	11.914.008,939	11.889.237,605	11.864.711,531	11.840.428,290
70% (US\$)	12.019.856,262	11.991.263,156	11.962.953,150	11.934.923,441	11.907.171,254	11.879.693,842	11.852.488,482	11.825.552,483	11.798.883,177
80% (US\$)	12.001.737,653	11.970.853,092	11.940.274,319	11.909.998,307	11.880.022,056	11.850.342,601	11.820.957,001	11.791.862,348	11.763.055,760
NCV (kcal/kg)	6.771	6.839	6.907	6.976	7.046	7.116	7.187	7.259	7.332
60% (US\$)	11.816.385,477	11.792.580,711	11.769.011,636	11.745.675,919	11.722.571,248	11.699.695,336	11.677.045,918	11.654.620,752	11.632.417,618
70% (US\$)	11.772.477,923	11.746.334,108	11.720.449,142	11.694.820,463	11.669.445,533	11.644.321,841	11.619.446,897	11.594.818,240	11.570.433,432
80% (US\$)	11.734.534,387	11.706.295,403	11.678.336,013	11.650.653,449	11.623.244,970	11.596.107,861	11.569.239,437	11.542.637,037	11.516.298,027
NCV (kcal/kg)	7.405	7.479	7.554	7.630	7.706	7.783	7.861	7.939	
60% (US\$)	11.610.434,316	11.588.668,671	11.567.118,527	11.545.781,751	11.524.656,230	11.503.739,873	11.483.030,609	11.462.526,386	
70% (US\$)	11.546.290,057	11.522.385,725	11.498.718,070	11.475.284,748	11.452.083,439	11.429.111,846	11.406.367,695	11.383.848,733	
80% (US\$)	11.490.219,800	11.464.399,772	11.438.835,388	11.413.524,118	11.388.463,453	11.363.650,915	11.339.084,044	11.314.760,411	

