

BAB 6

KESIMPULAN DAN SARAN

6.1. Kesimpulan

Berdasarkan analisis dan perhitungan dari data yang sudah dilakukan, maka dapat disimpulkan bahwa, diketahui pabrik pupuk organik granul di Yogyakarta layak untuk didirikan ditinjau dari aspek pasar, teknis, finansial, dan lingkungan :

1. Dari segi aspek pasar, menunjukkan bahwa untuk 6 tahun mendatang kebutuhan pupuk organik baik nasional maupun regional akan terus meningkat dan suplai pupuk organik sangat dibutuhkan karena ketersediaan pupuk organik yang masih terbatas.
2. Dari aspek teknis, menunjukan bahwa tersedianya kotoran sapi yang melimpah di Gunungkidul, serta dekatnya Kecamatan Playen ke pasar di Wonosari, maka pabrik pupuk organik granul layak untuk didirikan di Kecamatan Playen, Gunungkidul.
3. Dari segi aspek finansial, diketahui bahwa pendapatan setiap tahunnya meningkat dengan periode pengembalian selama 4,000664 tahun dan nilai NPV > 0.
4. Analisis sensitivitas menunjukan investasi pendirian pabrik pupuk organik granul ini sensitif terhadap perubahan nilai investasi awal, dan perubahan harga jual pupuk organik granul.
5. Ditinjau dari aspek lingkungan, pabrik pupuk organik granul tidak termasuk perusahaan yang wajib dilengkapi AMDAL.

6.2. Saran

Peneliti selanjutnya dapat menganalisis kelayakan pabrik pupuk organik dengan bentuk pupuk organik, bahan baku dan lokasi pendirian pabrik yang berbeda.





DAFTAR PUSTAKA

- Darsono, Valentinus, Ms., 1994, *Pengantar Ilmu Lingkungan*, Edisi Revisi, Penerbitan Universitas Atma Jaya Yogyakarta, Yogyakarta
- Hadisuwito, S., 2007, *Membuat Pupuk Kompos Cair*, Agro Media, Jakarta
- Hapitupulu, R, Budihardjo, dan Waldiyono, 1984, *Ekonomi Teknik*, Andi Offset, Yogyakarta
- Husnan, S., dan Suwarsono, 2000, *Studi Kelayakan Proyek*, Edisi Keempat, Unit Penerbit dan Percetakan AMP YKPN, Yogyakarta
- Ika, Dharma, 2010, *Analisis Kelayakan Pendirian Kandang Sapi dan Instalasi Biogas*, Skripsi, Program Teknik Industri, Fakultas Teknologi Industri, Universitas Atma Jaya Yogyakarta, Yogyakarta
- Isroi, Yuliarti, N., 2009, *Kompos Cara Mudah, Murah dan Cepat Menghasilkan Kompos*, Andi Offset, Yogyakarta
- Parulian, P.P., 2010, *Analisis Kelayakan Pabrik Pupuk Organik*, Skripsi, Program Teknik Industri, Fakultas Teknologi Industri, Universitas Atma Jaya Yogyakarta, Yogyakarta
- Pujawan, I.N., 2004, *Ekonomi Teknik*, Penerbit Guna Widya, Surabaya
- Putranto, L, 2010, *Perancangan Tata Letak Pabrik Pupuk Organik Granul*, Skripsi, Program Teknik Industri, Fakultas Teknologi Industri, Universitas Atma Jaya Yogyakarta, Yogyakarta
- Ridwan, MS, 2006, *Kotoran Ternak Sebagai Pupuk dan Sumber Energi*, Harian Independen Singgalang 1Februari 2006
- Soeharto, I., 2002, *Studi Kelayakan Proyek Industri*, Erlangga, Jakarta
- Suratmo, F.G., 1991, *Analisis Mengenai Dampak Lingkungan*, Universitas Gajah Mada, Yogyakarta

Sutojo, S., 2002, *Studi Kelayakan Proyek, Konsep, Teknik, dan Kasus*, Edisi Baru, PT. Damar Mulia Pustaka, Jakarta

Suwahyono, U., 2011, *Petunjuk Praktis Penggunaan Pupuk Organik Secara Efektif dan Efisien*, Penebar Swadaya, Jakarta

bi.go.id

bataviase.co.id/node/607747

<http://id.wikipedia.org/wiki/Watt>

sriwahyono.blogspot.com/2011/02/kebutuhan-pog-nasional.html

www.bps.go.id

[www.bhinneka.com/products/sku00010763/hp deskjet ink advantage all-in-one %28k209a%29.aspx](http://www.bhinneka.com/products/sku00010763/hp_deskjet_ink_advantage_all-in-one_%28k209a%29.aspx)

www.dieselgeneratorcn.com/genset/Perkins-diesel-generator.html

www.distributorplastik.com

[www.easybarrow.co.uk/hand%20trucks/big page 1402.html](http://www.easybarrow.co.uk/hand%20trucks/big_page_1402.html)

www.hargajualgenset.com

www.hino.co.id

[www.indonetwork.co.id/BBS Palangka Raya/2594107/gerobak-artco-merah-original.htm](http://www.indonetwork.co.id/BBS_Palangka_Raya/2594107/gerobak-artco-merah-original.htm)

www.jasa.tokobagus.com/peluang-bisnis/industri-pertambangan/pallet-kayu-supplier-pallet-kayu-isp-non-isp-710086.html

www.kpindo.com/produkdetail49-Hand-Pallet.html

www.pajak.go.id/index.php?Itemid=167&id=5006&option=com_content&view=article&limitstart=1

www.pertamina.co.id

www.pln.co.id

www.produkanda.com/sell/201010/SekopLancip_2042.html

www.sinarmastool.indonetwork.co.id/1891328/skop-pasir-dan-gerobak-pasir.htm

www.sinartani.com/index.php?option=com_content&view=article&id=633&catid=293:sorotan&Itemid=584





RAMALAN KEBUTUHAN/PERMINTAAN PUPUK ORGANIK DI YOGYAKARTA

Simple Average (SA)

09-11-2011 Year	Actual Data	Forecast by SA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	17200								
2	19575	17200	2375	2375	2375	5640625	12.13282	1	
3	25000	18387.5	6612.5	8987.5	4493.75	2.468289E+07	19.29141	2	
4	30000	20591.67	9408.334	18395.83	6131.945	4.596084E+07	23.31464	3	
5	40444	22943.75	17500.25	35896.09	8974.021	1.110353E+08	28.30356	4	
6		26443.8							
7		26443.8							
8		26443.8							
9		26443.8							
10		26443.8							
11		26443.8							
CFE		35896.09							
MAD		8974.021							
MSE		1.110353E+08							
MAPE		28.30356							
Trk.Signal		4							
R-square									

Moving Average (MA), m = 1

09-11-2011 Year	Actual Data	Forecast by 1-MA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	17200								
2	19575	17200	2375	2375	2375	5640625	12.13282	1	
3	25000	19575	5425	7800	3900	1.753562E+07	16.91641	2	
4	30000	25000	5000	12800	4266.667	2.002375E+07	16.83316	3	
5	40444	30000	10444	23244	5811	4.22871E+07	19.08071	4	0.986784
6		40444							
7		40444							
8		40444							
9		40444							
10		40444							
11		40444							
CFE		23244							
MAD		5811							
MSE		4.22871E+07							
MAPE		19.08071							
Trk.Signal		4							
R-square		0.986784							
		m=1							

Moving Average (MA) , m = 2

09-11-2011 Year	Actual Data	Forecast by 2-MA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	17200								
2	19575								
3	25000	18387.5	6612.5	6612.5	6612.5	4.372516E+07	26.45	1	
4	30000	22287.5	7712.5	14325	7162.5	5.160391E+07	26.07917	2	
5	40444	27500	12944	27269	9089.667	9.025165E+07	28.05436	3	
6		35222							
7		35222							
8		35222							
9		35222							
10		35222							
11		35222							
CFE		27269							
MAD		9089.667							
MSE		9.025165E+07							
MAPE		28.05436							
Trk.Signal		3							
R-square									
		m=2							

Weighted Moving Average (WMA) , m = 1

09-11-2011 Year	Actual Data	Forecast by 1-WMA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	17200								
2	19575	17200	2375	2375	2375	5640625	12.13282	1	
3	25000	19575	5425	7800	3900	1.753562E+07	16.91641	2	
4	30000	25000	5000	12800	4266.667	2.002375E+07	16.83316	3	
5	40444	30000	10444	23244	5811	4.22871E+07	19.08071	4	0.986784
6		40444							
7		40444							
8		40444							
9		40444							
10		40444							
11		40444							
CFE		23244							
MAD		5811							
MSE		4.22871E+07							
MAPE		19.08071							
Trk.Signal		4							
R-square		0.986784							
		m=1							
		W(1)=1							

Weighted Moving Average(WMA), m = 2

09-11-2011 Year	Actual Data	Forecast by 2-WMA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	17200								
2	19575								
3	25000	18387.5	6612.5	6612.5	6612.5	4.372516E+07	26.45	1	
4	30000	22287.5	7712.5	14325	7162.5	5.160391E+07	26.07917	2	
5	40444	27500	12944	27269	9089.667	9.025165E+07	28.05436	3	
6		35222							
7		35222							
8		35222							
9		35222							
10		35222							
11		35222							
CFE		27269							
MAD		9089.667							
MSE		9.025165E+07							
MAPE		28.05436							
Trk.Signal		3							
R-square									
		m=2							
		w(1)=0.5							
		w(2)=0.5							

Moving Average with Linear Trend (MAT), m = 1

09-11-2011 Year	Actual Data	Forecast by 1-MAT	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	17200								
2	19575	17200	2375	2375	2375	5640625	12.13282	1	
3	25000	19575	5425	7800	3900	1.753562E+07	16.91641	2	
4	30000	25000	5000	12800	4266.667	2.002375E+07	16.83316	3	
5	40444	30000	10444	23244	5811	4.22871E+07	19.08071	4	0.986784
6		40444							
7		40444							
8		40444							
9		40444							
10		40444							
11		40444							
CFE		23244							
MAD		5811							
MSE		4.22871E+07							
MAPE		19.08071							
Trk.Signal		4							
R-square		0.986784							
		m=1							

Moving Average with Linear Trend (MAT), m = 2

09-11-2011 Year	Actual Data	Forecast by 2-MAT	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	17200								
2	19575								
3	25000	21950	3050	3050	3050	9302500	12.2	1	
4	30000	30425	-425	2625	1737.5	4741563	6.808333	1.510791	
5	40444	35000	5444	8069	2973	1.304009E+07	9.025751	2.714093	0.8807636
6		50888							
7		61332							
8		71776							
9		82220							
10		92664							
11		103108							
CFE		8069							
MAD		2973							
MSE		1.304009E+07							
MAPE		9.025751							
Trk.Signal		2.714093							
R-square		0.8807636							
		m=2							

Single Exponential Smoothing (SES)

09-17-2011 Year	Actual Data	Forecast by SES	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	17200								
2	19575	17200	2375	2375	2375	5640625	12.13282	1	
3	25000	19575	5425.002	7800.002	3900.001	1.753564E+07	16.91641	2	
4	30000	25000	5000.004	12800.01	4266.668	2.002377E+07	16.83317	3	
5	40444	30000	10444	23244.01	5811.002	4.228713E+07	19.08072	4	0.9867842
6		40443.99							
7		40443.99							
8		40443.99							
9		40443.99							
10		40443.99							
11		40443.99							
CFE		23244.01							
MAD		5811.002							
MSE		4.228713E+07							
MAPE		19.08072							
Trk.Signal		4							
R-square		0.9867842							
		Alpha=1							
		F(0)=17200							

Single Exponential Smoothing with Trend (SEST)

09-17-2011 Year	Actual Data	Forecast by SEST	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	17200								
2	19575	17200	2375	2375	2375	5640625	12.13282	1	
3	25000	21569.99	3430.006	5805.006	2902.503	8702783	12.92642	2	
4	30000	30066.2	-66.19531	5738.811	1957.067	5803316	8.691166	2.932353	
5	40444	35284.99	5159.008	10897.82	2757.552	1.100633E+07	9.707356	3.95199	0.970162
6		50057.26							
7		60083.24							
8		70109.22							
9		80135.2							
10		90161.17							
11		100187.1							
CFE		10897.82							
MAD		2757.552							
MSE		1.100633E+07							
MAPE		9.707356							
Trk.Signal		3.95199							
R-square		0.9701623							
		Alpha=0.92							
		Beta=1							
		F(0)=17200							
		T(0)=0							

Double Exponential Smoothing (DES)

09-17-2011 Year	Actual Data	Forecast by DES	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	17200								
2	19575	17200	2375	2375	2375	5640625	12.13282	1	
3	25000	19575	5425.004	7800.004	3900.002	1.753565E+07	16.91642	2	
4	30000	24999.99	5000.008	12800.01	4266.67	2.002379E+07	16.83318	3	
5	40444	29999.99	10444.01	23244.02	5811.005	4.228717E+07	19.08073	4	0.9867845
6		40443.98							
7		40443.98							
8		40443.98							
9		40443.98							
10		40443.98							
11		40443.98							
CFE		23244.02							
MAD		5811.005							
MSE		4.228717E+07							
MAPE		19.08073							
Trk.Signal		4							
R-square		0.9867845							
		Alpha=1							
		F(0)=17200							
		F'(0)=17200							

Double Exponential Smoothing with Trend (DEST)

09-17-2011 Year	Actual Data	Forecast by DEST	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	17200								
2	19575	17200	2375	2375	2375	5640625	12.13282	1	
3	25000	22553.91	2446.094	4821.094	2410.547	5812000	10.9586	2	
4	30000	30957.81	-957.8145	3863.279	1926.303	4180470	8.36997	2.005541	
5	40444	35957.81	4486.188	8349.467	2566.274	8166822	9.050564	3.253537	0.9667948
6		52359.63							
7		64275.26							
8		76190.89							
9		88106.52							
10		100022.1							
11		111937.8							
CFE		8349.467							
MAD		2566.274							
MSE		8166822							
MAPE		9.050564							
Trk.Signal		3.253537							
R-square		0.9667948							
		Alpha=1							
		F(0)=17200							
		F'(0)=17200							

Adaptive Exponential Smoothing (AES)

09-11-2011 Year	Actual Data	Forecast by AES	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	17200								
2	19575	17200	2375	2375	2375	5640625	12.13282	1	
3	25000	17675	7325	9700	4850	2.964812E+07	20.71641	2	
4	30000	19872.5	10127.5	19827.5	6609.167	5.395417E+07	25.06372	3	
5	40444	23923.5	16520.5	36348	9087	1.086974E+08	29.00975	4	
6		23923.5							
7		23923.5							
8		23923.5							
9		23923.5							
10		23923.5							
11		23923.5							
CFE		36348							
MAD		9087							
MSE		1.086974E+08							
MAPE		29.00975							
Trk.Signal		4							
R-square									
		Alpha=0.1							
		Beta=0.1							
		F(0)=17200							

Linear Regression (LR)

09-11-2011 Year	Actual Data	Forecast by LR	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	17200	15061.2	2138.797	2138.797	2138.797	4574452	12.43487	1	
2	19575	20752.5	-1177.502	961.2949	1658.149	2980482	9.225101	0.5797396	
3	25000	26443.8	-1443.801	-482.5059	1586.7	2681841	8.075135	-0.304094	
4	30000	32135.1	-2135.1	-2617.605	1723.8	3151044	7.835601	-1.518509	
5	40444	37826.4	2617.602	-3.90625E-03	1902.56	3891203	7.562913	-2.053155E-06	0.9433368
6		43517.7							
7		49209							
8		54900.3							
9		60591.59							
10		66282.89							
11		71974.19							
CFE		-3.90625E-03							
MAD		1902.56							
MSE		3891203							
MAPE		7.562913							
Trk. Signal		-2.053155E-06							
R-square		0.9433368							
		Y-intercept=9369.904							
		Slope=5691.299							

Holt-Winters Additive Algorithm (HWA)

09-17-2011 Year	Actual Data	Forecast by HWA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	17200								
2	19575	17200	2375	2375	2375	5640625	12.13282	1	
3	25000	21569.99	3430.006	5805.006	2902.503	8702783	12.92642	2	
4	30000	30066.2	-66.19531	5738.811	1957.067	5803316	8.691166	2.932353	
5	40444	35284.99	5159.008	10897.82	2757.552	1.100633E+07	9.707356	3.95199	0.970162
6		50057.26							
7		60083.23							
8		70109.22							
9		80135.2							
10		90161.17							
11		100187.2							
CFE		10897.82							
MAD		2757.552							
MSE		1.100633E+07							
MAPE		9.707356							
Trk. Signal		3.95199							
R-square		0.9701623							
		c=1							
		Alpha=0.92							
		Beta=1							
		Gamma=0							
		F(0)=17200							
		T(0)=0							
		S(1)=0							

Holt-Winter Multiplicative Alogarithm (HWM)

09-17-2011 Year	Actual Data	Forecast by HWM	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	17200								
2	19575	17200	2375	2375	2375	5640625	12.13282	1	
3	25000	21569.99	3430.006	5805.006	2902.503	8702783	12.92642	2	
4	30000	30066.2	-66.19531	5738.811	1957.067	5803316	8.691166	2.932353	
5	40444	35284.99	5159.008	10897.82	2757.552	1.100633E+07	9.707356	3.95199	0.970162
6		50057.26							
7		60083.23							
8		70109.22							
9		80135.2							
10		90161.17							
11		100187.2							
CFE		10897.82							
MAD		2757.552							
MSE		1.100633E+07							
MAPE		9.707356							
Trk.Signal		3.95199							
R-square		0.9701623							
		c=1							
		Alpha=0.92							
		Beta=1							
		Gamma=0							
		F(0)=17200							
		T(0)=0							
		S(1)=1							

LAMPIRAN 2

RAMALAN KETERSEDIAAN/PENAWARAN PUPUK ORGANIK NASIONAL

Simple Average (SA)

09-11-2011 Tahun	Actual Data	Forecast by SA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	345000								
2	450000	345000	105000	105000	105000	1.1025E+10	23.33333	1	
3	750000	397500	352500	457500	228750	6.764062E+10	35.16667	2	
4	835000	515000	320000	777500	259166.7	7.922708E+10	36.2189	3	
5		595000							
6		595000							
7		595000							
8		595000							
9		595000							
CFE		777500							
MAD		259166.7							
MSE		7.922708E+10							
MAPE		36.2189							
Trk.Signal		3							
R-square									

Moving Average (MA), m = 1

09-11-2011 Tahun	Actual Data	Forecast by 1-MA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	345000								
2	450000	345000	105000	105000	105000	1.1025E+10	23.33333	1	
3	750000	450000	300000	405000	202500	5.05125E+10	31.66667	2	
4	835000	750000	85000	490000	163333.3	3.608334E+10	24.50433	3	
5		835000							
6		835000							
7		835000							
8		835000							
9		835000							
CFE		490000							
MAD		163333.3							
MSE		3.608334E+10							
MAPE		24.50433							
Trk.Signal		3							
R-square									
		m=1							

Moving Average (MA) , m = 2

09-11-2011 Tahun	Actual Data	Forecast by 2-MA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	345000								
2	450000								
3	750000	397500	352500	352500	352500	1.242562E+11	47	1	
4	835000	600000	235000	587500	293750	8.974062E+10	37.57186	2	
5		792500							
6		792500							
7		792500							
8		792500							
9		792500							
CFE		587500							
MAD		293750							
MSE		8.974062E+10							
MAPE		37.57186							
Trk.Signal		2							
R-square									
		m=2							

Weighted Moving Average (WMA) , m = 1

09-11-2011 Tahun	Actual Data	Forecast by 1-WMA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	345000								
2	450000	345000	105000	105000	105000	1.1025E+10	23.33333	1	
3	750000	450000	300000	405000	202500	5.05125E+10	31.66667	2	
4	835000	750000	85000	490000	163333.3	3.608334E+10	24.50433	3	
5		835000							
6		835000							
7		835000							
8		835000							
9		835000							
CFE		490000							
MAD		163333.3							
MSE		3.608334E+10							
MAPE		24.50433							
Trk.Signal		3							
R-square									
		m=1							
		W(1)=1							

Weighted Moving Average(WMA), m = 2

09-11-2011 Tahun	Actual Data	Forecast by 2-WMA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	345000								
2	450000								
3	750000	397500	352500	352500	352500	1.242562E+11	47	1	
4	835000	600000	235000	587500	293750	8.974062E+10	37.57186	2	
5		792500							
6		792500							
7		792500							
8		792500							
9		792500							
CFE		587500							
MAD		293750							
MSE		8.974062E+10							
MAPE		37.57186							
Trk.Signal		2							
R-square									
		m=2							
		W(1)=0.5							
		W(2)=0.5							

Moving Average with Linear Trend (MAT), m = 1

09-11-2011 Tahun	Actual Data	Forecast by 1-MAT	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	345000								
2	450000	345000	105000	105000	105000	1.1025E+10	23.33333	1	
3	750000	450000	300000	405000	202500	5.05125E+10	31.66667	2	
4	835000	750000	85000	490000	163333.3	3.608334E+10	24.50433	3	
5		835000							
6		835000							
7		835000							
8		835000							
9		835000							
CFE		490000							
MAD		163333.3							
MSE		3.608334E+10							
MAPE		24.50433							
Trk.Signal		3							
R-square									
		m=1							

Moving Average with Linear Trend (MAT), m = 2

09-11-2011 Tahun	Actual Data	Forecast by 2-MAT	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	345000								
2	450000								
3	750000	555000	195000	195000	195000	3.8025E+10	26	1	
4	835000	1050000	-215000	-20000	205000	4.2125E+10	25.87425	-9.756097E-02	
5		920000							
6		1005000							
7		1090000							
8		1175000							
9		1260000							
CFE		-20000							
MAD		205000							
MSE		4.2125E+10							
MAPE		25.87425							
Trk.Signal		-9.756097E-02							
R-square									
		m=2							

Single Exponential Smoothing (SES)

09-18-2011 Year	Actual Data	Forecast by SES	Forecast Error	CFE	MAD	MSE	MAPE (%)
1	345000						
2	450000	345000	105000	105000	105000	1.1025E+10	23.3333
3	750000	449999.9	300000.1	405000.1	202500	5.051252E+10	31.6666
4	835000	749999.8	85000.19	490000.3	163333.4	3.608336E+10	24.5043
5		834999.9					
6		834999.9					
7		834999.9					
8		834999.9					
9		834999.9					
CFE		490000.3					
MAD		163333.4					
MSE		3.608336E+10					
MAPE		24.50434					
Trk.Signal		3					
R-square							
		Alpha=1					
		F(0)=345000					

Single Exponential Smoothing with Trend(SEST)

09-18-2011 Year	Actual Data	Forecast by SEST	Forecast Error	CFE	MAD	MSE	MAPE (%)
1	345000						
2	450000	345000	105000	105000	105000	1.1025E+10	23.3333
3	750000	500399.9	249600.1	354600.1	177300.1	3.666261E+10	28.3061
4	835000	920207.7	-85207.69	269392.4	146602.6	2.686186E+10	22.2726
5		964308.3					
6		1093617					
7		1222925					
8		1352233					
9		1481541					
CFE		269392.4					
MAD		146602.6					
MSE		2.686186E+10					
MAPE		22.27262					
Trk.Signal		1.837569					
R-square							
		Alpha=1					
		Beta=0.48					

Double Exponential Smoothing(DES)

09-18-2011 Year	Actual Data	Forecast by DES	Forecast Error	CFE	MAD	MSE	MAPE (%)
1	345000						
2	450000	345000	105000	105000	105000	1.1025E+10	23.3333
3	750000	449999.9	300000.1	405000.1	202500.1	5.051254E+10	31.6666
4	835000	749999.6	85000.38	490000.5	163333.5	3.608338E+10	24.5043
5		834999.9					
6		834999.9					
7		834999.9					
8		834999.9					
9		834999.9					
CFE		490000.5					
MAD		163333.5					
MSE		3.608338E+10					
MAPE		24.50435					
Trk.Signal		3					
R-square							
		Alpha=1					
		F(0)=345000					

Double Exponential Smoothing with Trend (DEST)

09-18-2011 Year	Actual Data	Forecast by DEST	Forecast Error	CFE	MAD	MSE	MAPE (%)
1	345000						
2	450000	345000	105000	105000	105000	1.1025E+10	23.3333
3	750000	500400	249600	354600	177300	3.666259E+10	28.3061
4	835000	927305.8	-92305.81	262294.2	148968.6	2.728185E+10	22.5559
5		984872.2					
6		1128505					
7		1272137					
8		1415769					
9		1559401					
CFE		262294.2					
MAD		148968.6					
MSE		2.728185E+10					
MAPE		22.55598					
Trk.Signal		1.760735					
R-square							
		Alpha=0.74					
		F(0)=345000					

Adaptive Exponential Smoothing (AES)

09-11-2011 Tahun	Actual Data	Forecast by AES	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	345000								
2	450000	345000	105000	105000	105000	1.1025E+10	23.33333	1	
3	750000	366000	384000	489000	244500	7.92405E+10	37.26667	2	
4	835000	481200	353800	842800	280933.3	9.455181E+10	38.9682	3	
5		481200							
6		481200							
7		481200							
8		481200							
9		481200							
CFE		842800							
MAD		280933.3							
MSE		9.455181E+10							
MAPE		38.9682							
Trk.Signal		3							
R-square									
		Alpha=0.1							
		Beta=0.1							
		F(0)=345000							

Linear Regression (LR)

09-11-2011 Tahun	Actual Data	Forecast by LR	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	345000	329500	15500	15500	15500	2.4025E+08	4.492754	1	
2	450000	506500	-56500	-41000	36000	1.71625E+09	8.524155	-1.138889	
3	750000	683500	66500	25500	46166.67	2.61825E+09	8.638326	0.5523465	0.7116554
4	835000	860500	-25500	0	41000	2.12625E+09	7.242217	0	0.9485013
5		1037500							
6		1214500							
7		1391500							
8		1568500							
9		1745500							
CFE		0							
MAD		41000							
MSE		2.12625E+09							
MAPE		7.242217							
Trk.Signal		0							
R-square		0.9485013							
		Y-intercept=152500							
		Slope=177000							

Holt-Winters Additive Algorithm (HWA)

09-18-2011 Year	Actual Data	Forecast by HWA	Forecast Error	CFE	MAD	MSE	MAPE (%)
1	345000						
2	450000	345000	105000	105000	105000	1.1025E+10	23.3333
3	750000	500714.9	249285.1	354285.1	177142.5	3.658402E+10	28.2850
4	835000	921119.4	-86119.44	268165.6	146801.5	2.686153E+10	22.2950
5		964523.9					
6		1094048					
7		1223572					
8		1353096					
9		1482619					
CFE		268165.6					
MAD		146801.5					
MSE		2.686153E+10					
MAPE		22.29502					
Trk.Signal		1.826723					
R-square							
		c=1					
		Alpha=0.69					

Holt-Winter Multiplicative Alogarithm (HWM)

09-18-2011 Year	Actual Data	Forecast by HWM	Forecast Error	CFE	MAD	MSE	MAPE (%)
1	345000						
2	450000	345000	105000	105000	105000	1.1025E+10	23.3333
3	750000	500399.9	249600.1	354600.1	177300	3.66626E+10	28.3060
4	835000	920207.8	-85207.81	269392.3	146602.6	2.686185E+10	22.2720
5		964308.3					
6		1093617					
7		1222925					
8		1352233					
9		1481541					
CFE		269392.3					
MAD		146602.6					
MSE		2.686185E+10					
MAPE		22.27262					
Trk.Signal		1.837568					
R-square							
		c=1					
		Alpha=1					



LAMPIRAN 3

RAMALAN KETRSEDIAAN/PENAWARAN PUPUK ORGANIK DI YOGYAKARTA

Simple Average (SA)

09-11-2011 Year	Actual Data	Forecast by SA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	15000								
2	14000	15000	-1000	-1000	1000	1000000	7.142857	-1	
3	15000	14500	500	-500	750	625000	5.238095	-0.6666667	0.5
4	18000	14666.67	3333.333	2833.333	1611.111	4120370	9.664903	1.758621	0.3237181
5	20000	15500	4500	7333.333	2333.333	8152777	12.87368	3.142857	0.6166055
6		16400							
7		16400							
8		16400							
9		16400							
10		16400							
11		16400							
CFE		7333.333							
MAD		2333.333							
MSE		8152777							
MAPE		12.87368							
Trk.Signal		3.142857							
R-square		0.6166055							

Moving Average (MA), m = 1

09-11-2011 Year	Actual Data	Forecast by 1-MA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	15000								
2	14000	15000	-1000	-1000	1000	1000000	7.142857	-1	
3	15000	14000	1000	0	1000	1000000	6.904762	0	1
4	18000	15000	3000	3000	1666.667	3666667	10.15873	1.8	0.4230771
5	20000	18000	2000	5000	1750	3750000	10.11905	2.857143	0.6703297
6		20000							
7		20000							
8		20000							
9		20000							
10		20000							
11		20000							
CFE		5000							
MAD		1750							
MSE		3750000							
MAPE		10.11905							
Trk.Signal		2.857143							
R-square		0.6703297							
		m=1							

Moving Average (MA) , m = 2

09-11-2011 Year	Actual Data	Forecast by 2-MA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	15000								
2	14000								
3	15000	14500	500	500	500	250000	3.333333	1	
4	18000	14500	3500	4000	2000	6250000	11.38889	2	
5	20000	16500	3500	7500	2500	8250000	13.42593	3	
6		19000							
7		19000							
8		19000							
9		19000							
10		19000							
11		19000							
CFE		7500							
MAD		2500							
MSE		8250000							
MAPE		13.42593							
Trk.Signal		3							
R-square									
		m=2							

Weighted Moving Average (WMA) , m = 1

09-11-2011 Year	Actual Data	Forecast by 1-WMA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	15000								
2	14000	15000	-1000	-1000	1000	1000000	7.142857	-1	
3	15000	14000	1000	0	1000	1000000	6.904762	0	1
4	18000	15000	3000	3000	1666.667	3666667	10.15873	1.8	0.4230771
5	20000	18000	2000	5000	1750	3750000	10.11905	2.857143	0.6703297
6		20000							
7		20000							
8		20000							
9		20000							
10		20000							
11		20000							
CFE		5000							
MAD		1750							
MSE		3750000							
MAPE		10.11905							
Trk.Signal		2.857143							
R-square		0.6703297							
		m=1							
		W(1)=1							

Weighted Moving Average (WMA), m = 2

09-11-2011 Year	Actual Data	Forecast by 2-WMA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	15000								
2	14000								
3	15000	14500	500	500	500	250000	3.333333	1	
4	18000	14500	3500	4000	2000	6250000	11.38889	2	
5	20000	16500	3500	7500	2500	8250000	13.42593	3	
6		19000							
7		19000							
8		19000							
9		19000							
10		19000							
11		19000							
CFE		7500							
MAD		2500							
MSE		8250000							
MAPE		13.42593							
Trk.Signal		3							
R-square									
		m=2							
		W(1)=0.5							
		W(2)=0.5							

Moving Average with Linear Trend (MAT), m = 1

09-11-2011 Year	Actual Data	Forecast by 1-MAT	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	15000								
2	14000	15000	-1000	-1000	1000	1000000	7.142857	-1	
3	15000	14000	1000	0	1000	1000000	6.904762	0	1
4	18000	15000	3000	3000	1666.667	3666667	10.15873	1.8	0.4230771
5	20000	18000	2000	5000	1750	3750000	10.11905	2.857143	0.6703297
6		20000							
7		20000							
8		20000							
9		20000							
10		20000							
11		20000							
CFE		5000							
MAD		1750							
MSE		3750000							
MAPE		10.11905							
Trk.Signal		2.857143							
R-square		0.6703297							
		m=1							

Moving Average with Linear Trend (MAT), m = 2

09-11-2011 Year	Actual Data	Forecast by 2-MAT	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	15000								
2	14000								
3	15000	13000	2000	2000	2000	4000000	13.33333	1	
4	18000	16000	2000	4000	2000	4000000	12.22222	2	
5	20000	21000	-1000	3000	1666.667	3000000	9.814815	1.8	
6		22000							
7		24000							
8		26000							
9		28000							
10		30000							
11		32000							
CFE		3000							
MAD		1666.667							
MSE		3000000							
MAPE		9.814815							
Trk.Signal		1.8							
R-square									
		m=2							

Single Exponential Smoothing (SES)

09-18-2011 Year	Forecast by SES	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-sq
1								
2	15000	-1000	-1000	1000	1000000	7.142857	-1	
3	14000	999.999	-9.765625E-04	999.9995	999999	6.904758	-9.76563E-07	0.99
4	15000	3000.001	3000	1666.667	3666668	10.15873	1.8	0.42
5	18000	2000.002	5000.002	1750	3750003	10.11905	2.857143	0.670
6	20000							
7	20000							
8	20000							
9	20000							
10	20000							
11	20000							
CFE	5000.002							
MAD	1750							
MSE	3750003							
MAPE	10.11905							
Trk.Signal	2.857143							
R-square	0.6703294							
	Alpha=1							

Single Exponential Smoothing with Trend(SEST)

09-18-2011 Year	Forecast by SEST	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1								
2	15000	-1000	-1000	1000	1000000	7.142857	-1	
3	13000	1999.997	999.9971	1499.999	2499994	10.23809	0.6666654	
4	16000	2000.004	3000.001	1666.667	3000001	10.5291	1.8	0.8846135
5	21000	-999.9961	2000.005	1499.999	2499999	9.146821	1.333337	
6	22000							
7	24000							
8	26000.01							
9	28000.01							
10	30000.01							
11	32000.01							
CFE	2000.005							
MAD	1499.999							
MSE	2499999							
MAPE	9.146821							
Trk.Signal	1.333337							
R-square								
	Alpha=1							

Double Exponential Smoothing(DES)

09-18-2011 Year	Forecast by DES	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R- square
1								
2	15000	-1000	-1000	1000	1000000	7.142857	-1	
3	14000	999.998	-1.953125E-03	999.999	999998.1	6.904756	-1.953127E-06	0.9
4	15000	3000.002	3000	1666.667	3666669	10.15873	1.8	0.4
5	18000	2000.004	5000.004	1750.001	3750006	10.11905	2.857143	0.
6	20000							
7	20000							
8	20000							
9	20000							
10	20000							
11	20000							
CFE	5000.004							
MAD	1750.001							
MSE	3750006							
MAPE	10.11905							
Trk.Signal	2.857143							
R-square	0.670329							
	Alpha=1							

Double Exponential Smoothing with Trend (DEST)

09-18-2011 Year	Forecast by DEST	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1								
2	15000	-1000	-1000	1000	1000000	7.142857	-1	
3	13020.03	1979.974	979.9736	1489.987	2460148	10.17134	0.6577063	
4	15960.25	2039.748	3019.722	1673.241	3026956	10.55821	1.804715	0.8694627
5	20959.35	-959.3535	2060.368	1494.769	2500307	9.117846	1.378386	
6	22019.41							
7	24038.72							
8	26058.04							
9	28077.35							
10	30096.66							
11	32115.97							
CFE	2060.368							
MAD	1494.769							
MSE	2500307							
MAPE	9.117846							
Trk.Signal	1.378386							
R-square								
	Alpha=0.99							

Adaptive Exponential Smoothing (AES)

09-11-2011 Year	Actual Data	Forecast by AES	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	15000								
2	14000	15000	-1000	-1000	1000	1000000	7.142857	-1	
3	15000	15000	0	-1000	500	500000	3.571429	-2	1
4	18000	15000	3000	2000	1333.333	3333333	7.936508	1.5	0.1538463
5	20000	15300	4700	6700	2175	8022500	11.82738	3.08046	0.4962637
6		15300							
7		15300							
8		15300							
9		15300							
10		15300							
11		15300							
CFE		6700							
MAD		2175							
MSE		8022500							
MAPE		11.82738							
Trk.Signal		3.08046							
R-square		0.4962637							
		Alpha=0.1							
		Beta=0.1							
		F(0)=15000							

Linear Regression (LR)

09-11-2011 Year	Actual Data	Forecast by LR	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	15000	13600	1400	1400	1400	1960000	9.333333	1	
2	14000	15000	-1000	400	1200	1480000	8.238095	0.3333333	
3	15000	16400	-1400	-1000	1266.667	1640000	8.603175	-0.7894737	
4	18000	17800	200	-800	1000	1240000	6.730159	-0.8	
5	20000	19200	800	0	960	1120000	6.184127	0	0.7777778
6		20600							
7		22000							
8		23400							
9		24800							
10		26200							
11		27600							
CFE		0							
MAD		960							
MSE		1120000							
MAPE		6.184127							
Trk.Signal		0							
R-square		0.7777778							
		Y-intercept=12200							
		Slope=1400							

Holt-Winters Additive Algorithm (HWA)

09-18-2011 Year	Forecast by HWA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1								
2	15000	-1000	-1000	1000	1000000	7.142857	-1	
3	13000	1999.998	999.998	1499.999	2499996	10.23809	0.6666658	
4	16000	2000.002	3000	1666.667	3000000	10.5291	1.8	0.8846142
5	21000	-999.9961	2000.004	1499.999	2499998	9.14682	1.333337	
6	22000							
7	24000							
8	26000							
9	28000							
10	30000							
11	32000							
CFE	2000.004							
MAD	1499.999							
MSE	2499998							
MAPE	9.14682							
Trk.Signal	1.333337							
R-square								
	c=1							

Holt-Winter Multiplicative Alogarithm (HWM)

09-18-2011 Year	Forecast by HWM	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1								
2	15000	-1000	-1000	1000	1000000	7.142857	-1	
3	13053.38	1946.618	946.6182	1473.309	2394661	10.06016	0.6425116	
4	15908.56	2091.437	3038.055	1679.352	3054476	10.5798	1.809064	0.8460251
5	20912.35	-912.3457	2125.709	1487.6	2498951	9.075283	1.428952	
6	22040.96							
7	24081.93							
8	26122.89							
9	28163.86							
10	30204.82							
11	32245.78							
CFE	2125.709							
MAD	1487.6							
MSE	2498951							
MAPE	9.075283							
Trk.Signal	1.428952							
R-square								
	c=1							



LAMPIRAN 4

RAMALAN POPULASI TERNAK SAPI DI GUNUNGKIDUL

Simple Average (SA)

09-11-2011 Year	Actual Data	Forecast by SA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	109187								
2	111502	109187	2315	2315	2315	5359225	2.076196	1	
3	114375	110344.5	4030.5	6345.5	3172.75	1.080208E+07	2.800065	2	
4	115428	111688	3740	10085.5	3361.833	1.186392E+07	2.946748	3	
5	121469	112623	8846	18931.5	4732.875	2.846087E+07	4.030691	4	
6		114392.2							
7		114392.2							
8		114392.2							
9		114392.2							
10		114392.2							
11		114392.2							
12		114392.2							
CFE		18931.5							
MAD		4732.875							
MSE		2.846087E+07							
MAPE		4.030691							
Trk.Signal		4							
R-square									

Moving Average (MA), m = 1

09-11-2011 Year	Actual Data	Forecast by 1-MA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	109187								
2	111502	109187	2315	2315	2315	5359225	2.076196	1	
3	114375	111502	2873	5188	2594	6806677	2.294054	2	
4	115428	114375	1053	6241	2080.333	4907388	1.833455	3	
5	121469	115428	6041	12282	3070.5	1.280396E+07	2.618413	4	
6		121469							
7		121469							
8		121469							
9		121469							
10		121469							
11		121469							
12		121469							
CFE		12282							
MAD		3070.5							
MSE		1.280396E+07							
MAPE		2.618413							
Trk.Signal		4							
R-square									
		m=1							

Moving Average (MA) , m = 2

09-11-2011 Year	Actual Data	Forecast by 2-MA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	109187								
2	111502								
3	114375	110344.5	4030.5	4030.5	4030.5	1.624493E+07	3.523934	1	
4	115428	112938.5	2489.5	6520	3260	1.122127E+07	2.840345	2	
5	121469	114901.5	6567.5	13087.5	4362.5	2.18582E+07	3.695807	3	
6		118448.5							
7		118448.5							
8		118448.5							
9		118448.5							
10		118448.5							
11		118448.5							
12		118448.5							
CFE		13087.5							
MAD		4362.5							
MSE		2.18582E+07							
MAPE		3.695807							
Trk.Signal		3							
R-square									
		m=2							

Weighted Moving Average (WMA) , m = 1

09-11-2011 Year	Actual Data	Forecast by 1-WMA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	109187								
2	111502	109187	2315	2315	2315	5359225	2.076196	1	
3	114375	111502	2873	5188	2594	6806677	2.294054	2	
4	115428	114375	1053	6241	2080.333	4907388	1.833455	3	
5	121469	115428	6041	12282	3070.5	1.280396E+07	2.618413	4	
6		121469							
7		121469							
8		121469							
9		121469							
10		121469							
11		121469							
12		121469							
CFE		12282							
MAD		3070.5							
MSE		1.280396E+07							
MAPE		2.618413							
Trk.Signal		4							
R-square									
		m=1							
		W(1)=1							

Weighted Moving Average(WMA), m = 2

09-11-2011 Year	Actual Data	Forecast by 2-WMA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	109187								
2	111502								
3	114375	110344.5	4030.5	4030.5	4030.5	1.624493E+07	3.523934	1	
4	115428	112938.5	2489.5	6520	3260	1.122127E+07	2.840345	2	
5	121469	114901.5	6567.5	13087.5	4362.5	2.18582E+07	3.695807	3	
6		118448.5							
7		118448.5							
8		118448.5							
9		118448.5							
10		118448.5							
11		118448.5							
12		118448.5							
CFE		13087.5							
MAD		4362.5							
MSE		2.18582E+07							
MAPE		3.695807							
Trk.Signal		3							
R-square									
		m=2							
		w(1)=0.5							
		w(2)=0.5							

Moving Average with Linear Trend (MAT), m = 1

09-11-2011 Year	Actual Data	Forecast by 1-MAT	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	109187								
2	111502	109187	2315	2315	2315	5359225	2.076196	1	
3	114375	111502	2873	5188	2594	6806677	2.294054	2	
4	115428	114375	1053	6241	2080.333	4907388	1.833455	3	
5	121469	115428	6041	12282	3070.5	1.280396E+07	2.618413	4	
6		121469							
7		121469							
8		121469							
9		121469							
10		121469							
11		121469							
12		121469							
CFE		12282							
MAD		3070.5							
MSE		1.280396E+07							
MAPE		2.618413							
Trk.Signal		4							
R-square									
		m=1							

Moving Average with Linear Trend (MAT), m = 2

09-11-2011 Year	Actual Data	Forecast by 2-MAT	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	109187								
2	111502								
3	114375	113817	558	558	558	311364	0.4878688	1	
4	115428	117248	-1820	-1262	1189	1811882	1.032305	-1.061396	
5	121469	116481	4988	3726	2455.333	9501303	2.057002	1.517513	0.3791764
6		127510							
7		133551							
8		139592							
9		145633							
10		151674							
11		157715							
12		163756							
CFE		3726							
MAD		2455.333							
MSE		9501303							
MAPE		2.057002							
Trk.Signal		1.517513							
R-square		0.3791764							
		m=2							

Single Exponential Smoothing (SES)

09-18-2011 Year	Actual Data	Forecast by SES	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal
1	109187							
2	111502	109187	2315	2315	2315	5359225	2.076196	1
3	114375	111502	2873	5188	2594	6806677	2.294054	2
4	115428	114375	1053	6241	2080.333	4907388	1.833455	3
5	121469	115428	6041	12282	3070.5	1.280396E+07	2.618413	4
6		121469						
7		121469						
8		121469						
9		121469						
10		121469						
11		121469						
12		121469						
CFE		12282						
MAD		3070.5						
MSE		1.280396E+07						
MAPE		2.618413						
Trk.Signal		4						
R-square								

Single Exponential Smoothing with Trend(SEST)

09-18-2011 Year	Actual Data	Forecast by SEST	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	109187								
2	111502	109187	2315	2315	2315	5359225	2.076196	1	
3	114375	112057.6	2317.406	4632.406	2316.203	5364799	2.051172	2	
4	115428	116366.5	-938.4688	3693.938	1856.958	3870107	1.638459	1.989241	
5	121469	118074.9	3394.148	7088.086	2241.256	5782641	1.927407	3.162551	
6		124573.8							
7		128968.4							
8		133363							
9		137757.7							
10		142152.3							
11		146546.9							
12		150941.5							
CFE		7088.086							
MAD		2241.256							
MSE		5782641							
MAPE		1.927407							
Trk.Signal		3.162551							
R-square									
		Alpha=0.62							
		Beta=1							
		F(0)=109187							
		T(0)=0							

Double Exponential Smoothing(DES)

09-18-2011 Year	Actual Data	Forecast by DES	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	109187								
2	111502	109187	2315	2315	2315	5359225	2.076196	1	
3	114375	111502	2873	5188	2594	6806677	2.294054	2	
4	115428	114375	1053	6241	2080.333	4907388	1.833455	3	
5	121469	115428	6041	12282	3070.5	1.280396E+07	2.618413	4	
6		121469							
7		121469							
8		121469							
9		121469							
10		121469							
11		121469							
12		121469							
CFE		12282							
MAD		3070.5							
MSE		1.280396E+07							
MAPE		2.618413							
Trk.Signal		4							
R-square									
		Alpha=1							
		F(0)=109187							
		F'(0)=109187							

Double Exponential Smoothing with Trend (DEST)

09-18-2011 Year	Actual Data	Forecast by DEST	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	109187								
2	111502	109187	2315	2315	2315	5359225	2.076196	1	
3	114375	112566.9	1808.102	4123.102	2061.551	4314228	1.828525	2	
4	115428	116440.4	-1012.383	3110.719	1711.828	3217792	1.511373	1.817191	
5	121469	117159.5	4309.492	7420.211	2361.244	7056275	2.020483	3.1425	
6		125109.1							
7		129063.3							
8		133017.5							
9		136971.7							
10		140925.9							
11		144880.2							
12		148834.4							
CFE		7420.211							
MAD		2361.244							
MSE		7056275							
MAPE		2.020483							
Trk.Signal		3.1425							
R-square									
		Alpha=0.73							
		F(0)=109187							
		F'(0)=109187							

Adaptive Exponential Smoothing (AES)

09-11-2011 Year	Actual Data	Forecast by AES	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	109187								
2	111502	109187	2315	2315	2315	5359225	2.076196	1	
3	114375	109650	4725	7040	3520	1.384243E+07	3.103672	2	
4	115428	111067.5	4360.5	11400.5	3800.167	1.556627E+07	3.328341	3	
5	121469	112811.7	8657.297	20057.8	5014.449	3.04119E+07	4.278047	4	
6		112811.7							
7		112811.7							
8		112811.7							
9		112811.7							
10		112811.7							
11		112811.7							
12		112811.7							
CFE		20057.8							
MAD		5014.449							
MSE		3.04119E+07							
MAPE		4.278047							
Trk.Signal		4							
R-square									
		Alpha=0.1							
		Beta=0.1							
		F(0)=109187							

Linear Regression (LR)

09-11-2011 Year	Actual Data	Forecast by LR	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	109187	108694.2	492.7891	492.7891	492.7891	242841.1	0.4513258	1	
2	111502	111543.2	-41.21094	451.5781	267	122269.7	0.2441428	1.691304	
3	114375	114392.2	-17.20313	434.375	183.7344	81611.78	0.1677755	2.364147	
4	115428	117241.2	-1813.203	-1378.828	591.1016	883135.3	0.5185447	-2.332642	
5	121469	120090.2	1378.805	-0.0234375	748.6422	1086729	0.6418574	-3.130668E-05	0.9372546
6		122939.2							
7		125788.2							
8		128637.2							
9		131486.2							
10		134335.2							
11		137184.2							
12		140033.2							
CFE		-0.0234375							
MAD		748.6422							
MSE		1086729							
MAPE		0.6418574							
Trk.Signal		-3.130668E-05							
R-square		0.9372546							
		Y-intercept=105845.2							
		Slope=2848.995							

Holt-Winters Additive Algorithm (HWA)

09-18-2011 Year	Actual Data	Forecast by HWA	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	109187								
2	111502	109187	2315	2315	2315	5359225	2.076196	1	
3	114375	112057.6	2317.406	4632.406	2316.203	5364799	2.051172	2	
4	115428	116366.5	-938.4688	3693.938	1856.958	3870107	1.638459	1.989241	
5	121469	118074.9	3394.148	7088.086	2241.256	5782641	1.927407	3.162551	
6		124573.8							
7		128968.4							
8		133363							
9		137757.7							
10		142152.3							
11		146546.9							
12		150941.5							
CFE		7088.086							
MAD		2241.256							
MSE		5782641							
MAPE		1.927407							
Trk.Signal		3.162551							
R-square									
		c=1							
		Alpha=0.62							
		Beta=1							
		Gamma=0							
		F(0)=109187							
		T(0)=0							
		S(1)=0							

Holt-Winter Multiplicative Alogarithm (HWM)

09-18-2011 Year	Actual Data	Forecast by HWM	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-square
1	109187								
2	111502	109187	2315	2315	2315	5359225	2.076196	1	
3	114375	112057.6	2317.406	4632.406	2316.203	5364799	2.051172	2	
4	115428	116366.5	-938.4688	3693.938	1856.958	3870107	1.638459	1.989241	
5	121469	118074.9	3394.148	7088.086	2241.256	5782641	1.927407	3.162551	
6		124573.8							
7		128968.4							
8		133363							
9		137757.7							
10		142152.3							
11		146546.9							
12		150941.5							
CFE		7088.086							
MAD		2241.256							
MSE		5782641							
MAPE		1.927407							
Trk. Signal		3.162551							
R-square									
		c=1							
		Alpha=0.62							
		Beta=1							
		Gamma=0							
		F(0)=109187							
		T(0)=0							
		S(1)=1							



LAMPIRAN 5



PT. KHALIFAH NIAGA LANTABURA

JL. Mulungan Baru No 15, Gondanganpenen, Sendanghati, Mlati, Sleman – Yogyakarta, Indonesia.

Telp/Fax.62-274-4360789 Email : support@anekamesin.com

<http://www.anekamesin.com>, <http://www.anekaindustri.com>

To : Bpk / Ibu Dessy	Date : 24 Juni 2010
Hal : Penawaran Mesin Pembuat Pupuk Organik Granul	Exp.Date :
Phone : -	Pages : 02
Fax : -	Ref : 15.635/Q/KNL/VI/10

Dengan hormat,

Kami sampaikan terima kasih telah mengunjungi toko online kami <http://www.anekamesin.com>

Bersama ini kami memberikan penawaran harga untuk

1. Mesin Pencacah Kompos Spesifikasi : - Dimensi : 1730 x 1050 x 1530 mm - Diameter drum dg pisau : 505 mm - Lebar dan tebal pisau : 50 mm, 12 mm - Jumlah hammer : 36 buah - Material : Plat eisyer 3-4 mm - Speed reducer type 100 - Pengerak : Diesel 5,5 PK - Kapasitas : 12 ton/ 8 jam - Harga Rp 30.000.000,-	4. Mesin Pan Granulator Spesifikasi : - 3000 x 3000 x 3000 mm - Material : Plate eisyer 3 mm - Bahan konstruksi : besi kanal - Penggerak : Diesel 8,3 PK - Kapasitas : 8 ton/ 8 jam - Harga : Rp 50.000.000,00
2. Mesin Penumbuk Spesifikasi : - Dimensi : 1700 X 900 X 1400 mm - Dimensi pengaduk : Ø 560 x 800 mm - Material Plate : Mild Steel - Material pengaduk : Plate 6 mm - Material dudukan motor : Plate 10 mm - Pengerak : Diesel 7 PK + Gear Box - Kapasitas : 5 ton / 8 jam - Harga Rp 38.000.000,-	5. Pengereng Pupuk Granula, Pelet Spesifikasi : - Dimensi : 8000 X 760 X 1200 mm - Unit pemutar pipa - Pemanas: Burner + blower - Material Plate : Mild Steel - Pengerak : Diesel 11 PK + Gear Box - Kapasitas 5 ton / 8 jam - Harga : Rp 52.000.000,-



PT. KHALIFAH NIAGA LANTABURA

JL. Mulungan Baru No 15, Gondanganpenen, Sendanghati, Mlati, Sleman – Yogyakarta, Indonesia.

Telp/Fax.62-274-4360789 Email : support@anekamesin.com

<http://www.anekamesin.com>, <http://www.anekaindustri.com>

3. Mesin Pencampur

Spesifikasi :

- Dimensi : 1200 x 790 x 840 mm
- Diameter penghancur : Ø 500 x 800 mm
- Material kerangka : siku 40 x 40 x 4 mm
- Material drum : Plate 6 mm
- Material corong : Plate 2 mm
- Penggerak : Diesel 9 PK
- Kapasitas : 5 ton / 8 jam
- Harga : Rp 45.000.000,-

6. Mesin Pengayak

Spesifikasi :

- Dimensi : 5000 x 1000 x 2000 mm
- Diameter pengaduk : Ø 1150, Ø 490
- Material kerangka : UNP
- Material frame pengayak : Siku 40 x 40 x 4mm
- Penggerak : Diesel 5,5 PK
- Kapasitas : 5 ton / 8 jam
- Harga : Rp 30.000.000,-

KETERANGAN :

a. Harga sudah termasuk termasuk :

- Biaya kirim dan packing khusus wilayah Yogyakarta
- Biaya instalasi (biaya akomodasi dan transportasi teknisi)

b. Waktu pengiriman sesuai dengan jadwal ekspedisi

d. Garansi servis 6 bulan

e. Masa Indent 3 - 5 Minggu

SISTEM PEMBAYARAN :

- Down Payment 60%
- Pelunasan 40% (barang jadi siap kirim)
- Pembayaran ditransfer ke rekening kami Bank **BCA No Rek 1911367276 an Sri Jabat Kaban**
- Konfirmasikan transfer anda kepada kami lewat telp. 0274 - 4360 789
- Setelah transfer bukti pembayaran difakskan 0274 - 4360 789
- Setelah transfer sudah masuk, mesin kami kerjakan.

Demikian surat penawaran dan penjelasan kami, atas perhatiannya kami sampaikan terimakasih

Hormat kami



Ferry Saputro, S. TP

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30

1.7500

3.1000

5 KG - 35X50CM

[illegible]

1.7000

3.1000

5 kg

T= 5 cm
34 tumpuk

10 kg

T= 10 cm
17 tumpuk

50 kg

T= 20 cm
8 tumpuk

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20

1.7500

3.1000

10 KG - 40X60CM

KEBUTUHAN

$$5 \text{ kg} = 800$$
$$10 \text{ kg} = 400$$
$$50 \text{ kg} = 240$$

**JUMLAH MUATAN
MAKSIMAL**

$$5 \text{ kg} = 30 \times 34 = 1020$$
$$10 \text{ kg} = 20 \times 17 = 340$$
$$50 \text{ kg} = 9 \times 8 = 72$$

1	2	3
4	5	6
7	8	9

1.7500

3.1000

50 KG - 56X90CM

LAMPIRAN 7



ALIRAN KAS TAHUN 2011-2016

(Satuan Rp)							
Keterangan	0	2011	2012	2013	2014	2015	2016
1. Aliran kas awal							
Investasi awal	(3,208,153,725.00)						
2. Aliran kas operasional							
Pendapatan kotor		4,553,220,000.00	4,936,145,802.00	5,351,275,663.95	5,801,317,947.29	6,289,208,786.65	6,818,131,245.61
Pengeluaran							
- Biaya tetap							
Biaya gaji tenaga kerja tidak langsung		(547,365,000.00)	(574,733,250.00)	(603,469,912.50)	(633,643,408.13)	(665,325,578.53)	(698,591,857.46)
Biaya listrik		(18,270,175.38)	(19,806,697.13)	(21,472,440.36)	(23,278,272.59)	(25,235,975.32)	(27,358,320.84)
Bahan bakar genset		(912,112.07)	(969,826.76)	(1,031,193.40)	(1,096,443.07)	(1,165,821.46)	(1,239,589.84)
Perawatan mesin produksi		(81,307,500.00)	(88,145,460.75)	(95,558,494.00)	(103,594,963.34)	(112,307,299.76)	(121,752,343.67)
Perawatan kendaraan		(9,779,848.89)	(13,999,305.51)	(18,261,700.89)	(22,570,646.15)	(26,930,056.16)	(31,344,174.99)
- Biaya variabel							
Bahan baku		(1,528,581,000.00)	(1,657,134,662.10)	(1,796,499,687.18)	(1,947,585,310.87)	(2,111,377,235.52)	(2,288,944,061.03)
Kemasan		(233,081,500.00)	(252,683,654.15)	(273,934,349.46)	(296,972,228.25)	(321,947,592.65)	(349,023,385.19)
Bahan bakar mesin produksi		(488,127,073.32)	(519,013,741.85)	(551,854,791.41)	(586,773,887.17)	(623,902,519.34)	(663,380,498.25)
Bahan bakar kendaraan		(151,182,732.56)	(152,940,671.31)	(154,719,051.21)	(156,518,109.94)	(158,338,087.97)	(160,179,228.52)
Biaya listrik mesin produksi		(19,541,603.26)	(21,185,052.10)	(22,966,714.98)	(24,898,215.71)	(26,992,155.65)	(29,262,195.94)
Biaya gaji tenaga kerja langsung		(731,640,000.00)	(768,222,000.00)	(806,633,100.00)	(846,964,755.00)	(889,312,992.75)	(933,778,642.39)
Total pengeluaran		(3,809,788,545.48)	(4,068,834,321.66)	(4,346,401,435.39)	(4,643,896,240.22)	(4,962,835,315.11)	(5,304,854,298.12)
Depresiasi		(545,192,500.00)	(409,527,178.57)	(312,832,594.22)	(243,176,203.47)	(192,382,921.15)	(154,834,964.65)
Pendapatan sebelum pajak		198,238,954.52	457,784,301.77	692,041,634.34	914,245,503.60	1,133,990,550.39	1,358,441,982.84
Pajak pendapatan							
Pajak 25%		(49,559,738.63)	(114,446,075.44)	(173,010,408.59)	(228,561,375.90)	(283,497,637.60)	(339,610,495.71)
Pendapatan setelah pajak		148,679,215.89	343,338,226.33	519,031,225.76	685,684,127.70	850,492,912.79	1,018,831,487.13
Depresiasi		545,192,500.00	409,527,178.57	312,832,594.22	243,176,203.47	192,382,921.15	154,834,964.65
Total aliran kas operasional		693,871,715.89	752,865,404.90	831,863,819.98	928,860,331.17	1,042,875,833.94	1,173,666,451.78
3. Aliran kas terminal							
Nilai sisa							971,278,637.94
Pajak 25%							(242,819,659.49)
Total aliran kas terminal							728,458,978.46
Aliran kas bersih	(3,208,153,725.00)	693,871,715.89	752,865,404.90	831,863,819.98	928,860,331.17	1,042,875,833.94	1,902,125,430.24

LAMPIRAN 8



Kondisi yang diharapkan

Keterangan	0	1	2	3	4	5	6
Aliran Kas Bersih/Neto (Rp)	(3,208,153,725.00)	693,871,715.89	752,865,404.90	831,863,819.98	928,860,331.17	1,042,875,833.94	1,902,125,430.24
17.77%	1.00000	0.84911	0.72099	0.61220	0.51983	0.44139	0.37479
PV (Rp)	(3,208,153,725.00)	589,175,270.35	542,810,188.98	509,270,137.57	482,849,421.76	460,319,347.15	712,904,082.16
NPV (Rp)	89,174,722.97						
Neto kumulatif (Rp)		(2,514,282,009.11)	(1,761,416,604.21)	(929,552,784.24)	(692,453.07)	1,042,183,380.88	2,944,308,811.11
PP (Tahun)	4.001						

Investasi naik 30 %

Keterangan	0	1	2	3	4	5	6
Aliran Kas Bersih/Neto (Rp)	(4,170,599,842.50)	693,871,715.89	752,865,404.90	831,863,819.98	928,860,331.17	1,042,875,833.94	1,902,125,430.24
17.77%	1.00000	0.84911	0.72099	0.61220	0.51983	0.44139	0.37479
PV (Rp)	(4,170,599,842.50)	589,175,270.35	542,810,188.98	509,270,137.57	482,849,421.76	460,319,347.15	712,904,082.16
NPV (Rp)	(873,271,394.53)						
Neto kumulatif (Rp)		(3,476,728,126.61)	(2,723,862,721.71)	(1,891,998,901.74)	(963,138,570.57)	79,737,263.37	1,981,862,693.61
PP (Tahun)							

Investasi naik 20 %

Keterangan	0	1	2	3	4	5	6
Aliran Kas Bersih/Neto (Rp)	(3,849,784,470.00)	693,871,715.89	752,865,404.90	831,863,819.98	928,860,331.17	1,042,875,833.94	1,902,125,430.24
17.77%	1.00000	0.84911	0.72099	0.61220	0.51983	0.44139	0.37479
PV (Rp)	(3,849,784,470.00)	589,175,270.35	542,810,188.98	509,270,137.57	482,849,421.76	460,319,347.15	712,904,082.16
NPV (Rp)	(552,456,022.03)						
Neto kumulatif (Rp)		(3,155,912,754.11)	(2,403,047,349.21)	(1,571,183,529.24)	(642,323,198.07)	400,552,635.87	2,302,678,066.11
PP (Tahun)							

Investasi naik 10 %

Keterangan	0	1	2	3	4	5	6
Aliran Kas Bersih/Neto (Rp)	(3,528,969,097.50)	693,871,715.89	752,865,404.90	831,863,819.98	928,860,331.17	1,042,875,833.94	1,902,125,430.24
17.77%	1.00000	0.84911	0.72099	0.61220	0.51983	0.44139	0.37479
PV (Rp)	(3,528,969,097.50)	589,175,270.35	542,810,188.98	509,270,137.57	482,849,421.76	460,319,347.15	712,904,082.16
NPV (Rp)	(231,640,649.53)						
Neto kumulatif (Rp)		(2,835,097,381.61)	(2,082,231,976.71)	(1,250,368,156.74)	(321,507,825.57)	721,368,008.37	2,623,493,438.61
PP (Tahun)							

Investasi turun 10 %

Keterangan	0	1	2	3	4	5	6
Aliran Kas Bersih/Neto (Rp)	(2,887,338,352.50)	693,871,715.89	752,865,404.90	831,863,819.98	928,860,331.17	1,042,875,833.94	1,902,125,430.24
17.77%	1.00000	0.84911	0.72099	0.61220	0.51983	0.44139	0.37479
PV (Rp)	(2,887,338,352.50)	589,175,270.35	542,810,188.98	509,270,137.57	482,849,421.76	460,319,347.15	712,904,082.16
NPV (Rp)	409,990,095.47						
Neto kumulatif (Rp)		(2,193,466,636.61)	(1,440,601,231.71)	(608,737,411.74)	320,122,919.43	1,362,998,753.38	3,265,124,183.61
PP (Tahun)	3.732						

Investasi turun 20%

Keterangan	0	1	2	3	4	5	6
Aliran Kas Bersih/Neto (Rp)	(2,566,522,980.00)	693,871,715.89	752,865,404.90	831,863,819.98	928,860,331.17	1,042,875,833.94	1,902,125,430.24
17.77%	1.00000	0.84911	0.72099	0.61220	0.51983	0.44139	0.37479
PV (Rp)	(2,566,522,980.00)	589,175,270.35	542,810,188.98	509,270,137.57	482,849,421.76	460,319,347.15	712,904,082.16
NPV (Rp)	730,805,467.97						
Neto kumulatif (Rp)		(1,872,651,264.11)	(1,119,785,859.21)	(287,922,039.24)	640,938,291.93	1,683,814,125.88	3,585,939,556.11
PP (Tahun)	3.346						

Investasi turun 30%

Keterangan	0	1	2	3	4	5	6
Aliran Kas Bersih/Neto (Rp)	(2,245,707,607.50)	693,871,715.89	752,865,404.90	831,863,819.98	928,860,331.17	1,042,875,833.94	1,902,125,430.24
17.77%	1.00000	0.84911	0.72099	0.61220	0.51983	0.44139	0.37479
PV (Rp)	(2,245,707,607.50)	589,175,270.35	542,810,188.98	509,270,137.57	482,849,421.76	460,319,347.15	712,904,082.16
NPV (Rp)	1,051,620,840.47						
Neto kumulatif (Rp)		(1,551,835,891.61)	(798,970,486.71)	32,893,333.26	961,753,664.43	2,004,629,498.38	3,906,754,928.61
PP (Tahun)	2.960						

LAMPIRAN 9



Kondisi yang diharapkan

Keterangan	0	1	2	3	4	5	6
Pendapatan Kotor		4,553,220,000.00	4,936,145,802.00	5,351,275,663.95	5,801,317,947.29	6,289,208,786.65	6,818,131,245.61
Aliran Kas Bersih/Neto (Rp)	(3,208,153,725.00)	693,871,715.89	752,865,404.90	831,863,819.98	928,860,331.17	1,042,875,833.94	1,902,125,430.24
17.77%	1.00000	0.84911	0.72099	0.61220	0.51983	0.44139	0.37479
PV (Rp)	(3,208,153,725.00)	589,175,270.35	542,810,188.98	509,270,137.57	482,849,421.76	460,319,347.15	712,904,082.16
NPV (Rp)	89,174,722.97						
Neto kumulatif (Rp)		(2,514,282,009.11)	(1,761,416,604.21)	(929,552,784.24)	(692,453.07)	1,042,183,380.88	2,944,308,811.11
PP (Tahun)	4.001						

Harga jual naik 30%

Keterangan	0	1	2	3	4	5	6
Pendapatan Kotor		5,919,186,000.00	6,416,989,542.60	6,956,658,363.14	7,541,713,331.48	8,175,971,422.65	8,863,570,619.29
Aliran Kas Bersih/Neto (Rp)	(3,208,153,725.00)	2,619,413,799.68	3,187,030,359.92	3,891,146,211.76	4,702,229,104.68	5,748,523,203.58	8,671,847,868.86
17.77%	1.00000	0.84911	0.72099	0.61220	0.51983	0.44139	0.37479
PV (Rp)	(3,208,153,725.00)	2,224,177,464.28	2,297,824,472.61	2,382,174,244.14	2,444,359,531.76	2,537,364,815.67	3,250,151,460.72
NPV (Rp)	11,927,898,264.18						
Neto kumulatif (Rp)		(588,739,925.32)	2,598,290,434.60	6,489,436,646.36	11,191,665,751.04	16,940,188,954.62	25,612,036,823.48
PP (Tahun)	1.185						

Harga jual naik 20%

Keterangan	0	1	2	3	4	5	6
Pendapatan Kotor		5,463,864,000.00	5,923,374,962.40	6,421,530,796.74	6,961,581,536.75	7,547,050,543.98	8,181,757,494.73
Aliran Kas Bersih/Neto (Rp)	(3,208,153,725.00)	2,243,773,149.68	2,739,075,128.39	3,356,955,118.60	4,065,201,609.34	4,988,859,894.21	7,765,943,224.65
17.77%	1.00000	0.84911	0.72099	0.61220	0.51983	0.44139	0.37479
PV (Rp)	(3,208,153,725.00)	1,905,216,226.27	1,974,852,182.61	2,055,140,461.72	2,113,213,559.17	2,202,053,834.97	2,910,624,367.17
NPV (Rp)	9,952,946,906.91						
Neto kumulatif (Rp)		(964,380,575.32)	1,774,694,553.07	5,131,649,671.67	9,196,851,281.01	14,185,711,175.22	21,951,654,399.87
PP (Tahun)	1.471						

Harga jual naik 10%

Keterangan	0	1	2	3	4	5	6
Pendapatan Kotor		5,008,542,000.00	5,429,760,382.20	5,886,403,230.35	6,381,449,742.02	6,918,129,665.32	7,499,944,370.17
Aliran Kas Bersih/Neto (Rp)	(3,208,153,725.00)	1,868,132,499.68	2,291,119,896.86	2,822,764,025.45	3,428,174,114.01	4,229,196,584.83	6,860,038,580.44
17.77%	1.00000	0.84911	0.72099	0.61220	0.51983	0.44139	0.37479
PV (Rp)	(3,208,153,725.00)	1,586,254,988.26	1,651,879,892.61	1,728,106,679.31	1,782,067,586.58	1,866,742,854.27	2,571,097,273.61
NPV (Rp)	7,977,995,549.64						
Neto kumulatif (Rp)		(1,340,021,225.32)	951,098,671.53	3,773,862,696.98	7,202,036,811.00	11,431,233,395.83	18,291,271,976.27
PP (Tahun)	1.663						

Harga jual turun 10%

Keterangan	0	1	2	3	4	5	6
Pendapatan Kotor		4,097,898,000.00	4,442,531,221.80	4,816,148,097.56	5,221,186,152.56	5,660,287,907.99	6,136,318,121.05
Aliran Kas Bersih/Neto (Rp)	(3,208,153,725.00)	1,116,851,199.68	1,395,209,433.79	1,754,381,839.14	2,154,119,123.35	2,709,869,966.08	5,048,229,292.02
17.77%	1.00000	0.84911	0.72099	0.61220	0.51983	0.44139	0.37479
PV (Rp)	(3,208,153,725.00)	948,332,512.25	1,005,935,312.61	1,074,039,114.48	1,119,775,641.40	1,196,120,892.87	1,892,043,086.50
NPV (Rp)	4,028,092,835.11						
Neto kumulatif (Rp)		(2,091,302,525.32)	(696,093,091.53)	1,058,288,747.61	3,212,407,870.96	5,922,277,837.04	10,970,507,129.06
PP (Tahun)	2.509						

Harga jual turun 20%

Keterangan	0	1	2	3	4	5	6
Pendapatan Kotor		3,642,576,000.00	3,948,916,641.60	4,281,020,531.16	4,641,054,357.83	5,031,367,029.32	5,454,504,996.49
Aliran Kas Bersih/Neto (Rp)	(3,208,153,725.00)	741,210,549.68	947,254,202.26	1,220,190,745.99	1,517,091,628.02	1,950,206,656.71	4,142,324,647.81
17.77%	1.00000	0.84911	0.72099	0.61220	0.51983	0.44139	0.37479
PV (Rp)	(3,208,153,725.00)	629,371,274.24	682,963,022.60	747,005,332.07	788,629,668.81	860,809,912.17	1,552,515,992.95
NPV (Rp)	2,053,141,477.85						
Neto kumulatif (Rp)		(2,466,943,175.32)	(1,519,688,973.06)	(299,498,227.07)	1,217,593,400.94	3,167,800,057.65	7,310,124,705.46
PP (Tahun)	3.197						

Harga jual turun 30%

Keterangan	0	1	2	3	4	5	6
Pendapatan Kotor		3,187,254,000.00	3,455,302,061.40	3,745,892,964.77	4,060,922,563.10	4,402,446,150.66	4,772,691,871.93
Aliran Kas Bersih/Neto (Rp)	(3,208,153,725.00)	(1,708,006,738.06)	(1,925,946,998.29)	(2,138,194,939.75)	(2,441,309,613.63)	(2,664,444,825.77)	1,830,979.98
17.77%	1.00000	0.84911	0.72099	0.61220	0.51983	0.44139	0.37479
PV (Rp)	(3,208,153,725.00)	(1,450,290,174.12)	(1,388,593,030.46)	(1,309,010,928.21)	(1,269,065,860.30)	(1,176,070,499.29)	686,239.24
NPV (Rp)	(9,800,497,978.13)						
Neto kumulatif (Rp)		(4,916,160,463.06)	(6,842,107,461.36)	(8,980,302,401.11)	(11,421,612,014.74)	(14,086,056,840.51)	(14,084,225,860.53)
PP (Tahun)							

LAMPIRAN 10



**JENIS RENCANA USAHA DAN/ATAU KEGIATAN YANG WAJIB DILENGKAPI
DENGAN ANALISIS MENGENAI DAMPAK
LINGKUNGAN HIDUP**

1. Pendahuluan

Jenis rencana usaha dan/atau kegiatan yang wajib dilengkapi dengan Analisis Mengenai Dampak Lingkungan Hidup (AMDAL) ditetapkan berdasarkan:

a. Potensi dampak penting

Sesuai Pasal 3 ayat (2) Peraturan Pemerintah Nomor 27 Tahun 1999, jenis usaha dan/atau kegiatan yang berpotensi menimbulkan dampak penting terhadap lingkungan hidup wajib dilengkapi dengan AMDAL. Potensi dampak penting bagi setiap jenis usaha dan/atau kegiatan tersebut ditetapkan berdasarkan:

- (1) Keputusan Kepala BAPEDAL Nomor 056 Tahun 1994 tentang Pedoman Mengenai Ukuran Dampak Penting.
 - (2) Referensi internasional yang diterapkan oleh beberapa negara sebagai landasan kebijakan tentang AMDAL.
- b. Ketidakpastian kemampuan teknologi yang tersedia untuk menanggulangi dampak penting negatif yang akan timbul.**

2. Jenis Rencana Usaha dan/atau Kegiatan Yang Wajib Dilengkapi dengan Analisis Mengenai Dampak Lingkungan Hidup

- A.** Bidang Pertahanan
- B.** Bidang Pertanian
- C.** Bidang Perikanan
- D.** Bidang Kehutanan
- E.** Bidang Perhubungan
- F.** Bidang Teknologi Satelit

G. Bidang Perindustrian

No.	Jenis Kegiatan	Skala/Besaran	Alasan Ilmiah Khusus
1.	Industri Semen (yang dibuat melalui produksi klinker)	Semua Besaran	semen dengan Proses Klinker adalah industri semen yang kegiatannya bersatu dengan kegiatan penambangan, dimana terdapat proses penyiapan bahan baku, penggilingan bahan baku (<i>raw mill process</i>), penggilingan batubara (<i>coal mill</i>) serta proses pembakaran dan pendinginan klinker (<i>Rotary Kiln and Clinker Cooler</i>). Umumnya dampak yang ditimbulkan disebabkan oleh: debu yang keluar dari cerobong, penggunaan lahan yang luas, kebutuhan air cukup besar (3,5 ton semen membutuhkan 1 ton air), kebutuhan energi cukup besar baik tenaga listrik (110 – 140 kWh/ton) dan tenaga panas (800 – 900 Kcal/ton), tenaga kerja besar (+ 1-2 TK/3000 ton produk), potensi berbagai jenis limbah: padat (<i>tailing</i>), debu (CaO, SiO₂, Al₂O₃, FeO₂) dengan radius 2-3 km, limbah cair (sisa <i>cooling</i> mengandung minyak pelumasan/lubrikasi), limbah gas (CO₂, SO_x, NO_x) dari pembakaran energi batubara, minyak dan gas.
2.	Industri pulp atau industry kertas yang terintegrasi dengan industri pulp, kecuali pulp dari kertas bekas dan pulp untuk kertas budaya.	Semua besaran	Proses pembuatan pulp meliputi kegiatan penyiapan bahan baku, pemasakan serpihan kayu, pencucian pulp, pemutihan pulp (<i>bleaching</i>) dan pembentukan lembaran pulp yang dalam prosesnya banyak menggunakan bahan-bahan kimia, sehingga berpotensi menghasilkan limbah cair (BOD, COD, TSS), limbah gas (H₂S, SO₂, NO_x, Cl₂) dan limbah padat (ampas kayu, serat pulp, lumpur kering). Umumnya dampak yang ditimbulkan disebabkan oleh: penggunaan lahan yang luas (0,2 ha/1000 ton produk), tenaga kerja besar, kebutuhan energi besar (0,2 MW/1000 ton produk).

3.	Industri petrokimia hulu	Semua besaran	Industri petrokimia hulu adalah industri yang mengolah hasil tambang mineral (kondensat) terdiri dari Pusat Olefin yang menghasilkan Benzena, Propilena dan Butadiena serta Pusat Aromatik yang menghasilkan Benzena, Toluena, Xylena, dan Etil Benzena. Umumnya dampak yang ditimbulkan disebabkan oleh: kebutuhan lahan yang luas, kebutuhan air cukup besar (untuk pendingin 1l/dt/1000 ton produk), tenaga kerja besar, kebutuhan energi relative besar (6-7 kW/ton produk) disamping bersumber dari listrik juga energi gas, potensi berbagai limbah: gas (SO ₂ dan NO _x), debu (SiO ₂), limbah cair (TSS, BOD, COD, NH ₄ Cl) dan limbah sisa katalis bekasyang bersifat B3.
4.	Kawasan Industri (termasuk kompleks industri yang terintegrasi)	Semua besaran	Kawasan industri (<i>industrial estate</i>) merupakan lokasi yang dipersiapkan untuk berbagai jenis industri manufaktur yang masih prediktif, sehingga dalam pengembangannya diperkirakan akan menimbulkan berbagai dampak penting antara lain disebabkan: <i>kegiatan grading</i> (pembentukan muka tanah) dan <i>run off</i> (air larian), pengadaan dan pengoperasian alat-alat berat, mobilisasi tenaga kerja (90 – 110 TK/ha), kebutuhan pemukiman dan fasilitas social, kebutuhan air bersih dengan tingkat kebutuhan rata-rata 0,55 – 0,75 l/dt/ha, kebutuhan energi listrik cukup besar baik dalam kaitan dengan jenis pembangkit ataupun <i>trace</i> jaringan (0,1 MW/ha), potensi berbagai jenis limbah dan cemaran yang masih prediktif terutama dalam hal cara pengelolaannya, bangkitan lalu lintas.
5.	Industri galangan kapal dengan sistem <i>graving dock</i>	≥ 50.000 DWT	Sistem <i>graving dock</i> adalah galangan kapal yang dilengkapi dengan kolam perbaikan dengan ukuran panjang 150 m, lebar 30 m, dan kedalaman 10 m dengan sistem sirkulasi. Pembuatan kolam <i>graving</i> ini dilakukan dengan mengeruk laut yang dikhawatirkan akan menyebabkan longsor atau abrasi

			pantai. Perbaikan kapal berpotensi menghasilkan limbah cair (air <i>ballast</i> , pengecatan lambung kapal dan bahan kimia B3) maupun limbah gas dan debu dari kegiatan <i>sand blasting</i> dan pengecatan.
6.	Industri amunisi dan bahan peledak	Semua besaran	Industri amunisi dan bahan peledak merupakan industry yang dalam proses produksinya menggunakan 12 bahan-bahan kimia yang bersifat B3, disamping kegiatannya membutuhkan tingkat keamanan yang tinggi.
7.	Kegiatan industri yang tidak termasuk angka 1 s/d 6 Penggunaan areal: a. Urban: - Metropolitan, luas - Kota besar, luas - Kota sedang, luas - Kota kecil, luas b. Rural/pedesaan, luas	ha > 10 ha > 15 ha > 20 ha > 30 ha	Besaran untuk masing-masing tipologi kota diperhitungkan berdasarkan: tingkat pembebasan lahan, daya dukung lahan; seperti daya dukung tanah, kapasitas resapan air tanah, tingkat kepadatan bangunan per hektar, dan lain-lain. Umumnya dampak yang ditimbulkan berupa: bangkitan lalu lintas, konflik social, penurunan kualitas lingkungan.

- H.** Bidang Pekerjaan Umum
- I.** Bidang Sumber Daya Energi dan Mineral
- J.** Bidang Pariwisata
- K.** Bidang Pengembangan Nuklir
- L.** Bidang Pengelolaan Limbah B3
- M.** Bidang Rekayasa Genetika

Daftar Singkatan:

m = meter

m₂ = meter persegi

m₃ = meter kubik

km = kilometer

km₂ = kilometer persegi

ha = hektar

l = liter

dt = detik

kW = kilowatt
kWh = kilowatt hour
kV = kilovolt
MW = megawatt
TBq = Terra Becquerel
BOPD = *barrel oil per day* = minyak barrel per hari
MMSCFD = *million metric square cubic feet per day* = juta metrik persegi kaki
kubik per hari
DWT = *dead weight tonnage* = bobot mati
KK = kepala keluarga
LPG = *Liquefied Petroleum Gas* = gas minyak bumi yang dicairkan
LNG = *Liquefied Natural Gas* = gas alam yang dicairkan
ROW = *right of way* = daerah milik jalan (damija)
BOD = *biological oxygen demand* = kebutuhan oksigen biologis
COD = *chemical oxygen demand* = kebutuhan oksigen kimiawi
DO = *dissolved oxygen* = oksigen terlarut
TSS = *total suspended solid* = total padatan tersuspensi
TDS = *total dissolved solid* = total padatan terlarut

Menteri Negara
Lingkungan Hidup,
ttd
Ir. Rachmat Witoelar.

Salinan sesuai dengan aslinya
Deputi MENLH Bidang
Penaatan Lingkungan,
Hoetomo, MPA.