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LAMPIRAN

Pertanian

Tahun	Total Konsumsi Pupuk	Faktor Urea	Emisi Karbon
2023	52.687,51	0,2	10.537,5
2022	61.067,3		12.213,46
2021	60.985,28		12.197,06
2020	66.746,93		13.349,39
2019	60.530,63		12.106,13
2018	61.350,27		12.270,05
2017	64.862,03		12.972,41
2016	70.323,49		14.064,7
2015	67.368,78		13.473,76
2014	70.158,58		14.031,72
2013	70.703,82		14.140,76
2012	66.343,84		13.268,77
2011	70.674,96		14.134,99
2010	76.319,76		15.263,95
2009	68.748,18		13.749,64

Sumber: Dinas Pertanian dan Ketahanan Pangan Provinsi DIY, 2024

Transportasi

	D	E	F	G	H	I	J	K	L	M
Tahun	Total Motor Gasoline (kl)	Total Diesel Oil (kl)	Faktor Konversi (GJ/l)	Total Motor Gasoline (GJ)	Total Diesel Oil (GJ)	Faktor Emisi CO ₂ (kg/TJ)		Emisi CO ₂ (ton)		Total CO ₂
Rumus	A/C	B/C	-	D*F	E*F	-	-	G*I	H*J	
2023	676.243	191.461	0,0330	22.316,03	6.318,20	69.300	74.100	1.546.500.938	468.178.698	2.014.679.636
2022	663.970	173.032	0,0330	21.911,00	5.710,06	69.300	74.100	1.518.432.195	423.115.810	1.941.548.005
2021	565.389	14.534	0,0330	18.657,82	479,62	69.300	74.100	1.292.987.194	35.539.699	1.328.526.893
2020	543.815	141.508	0,0330	17.945,91	4.669,78	69.300	74.100	1.243.651.324	346.030.442	1.589.681.766
2017	638.390	137.748	0,0330	21.066,87	4.545,68	69.300	74.100	1.459.934.091	336.835.184	1.796.769.275
2016	615.032	129.137	0,0330	20.296,06	4.261,52	69.300	74.100	1.406.516.681	315.778.706	1.722.295.387
2015	580.926	130.641	0,0330	19.170,56	4.311,15	69.300	74.100	1.328.519.669	319.456.437	1.647.976.107
2014	560.989	141.094	0,0330	18.512,64	4.656,10	69.300	74.100	1.282.925.744	345.017.158	1.627.942.902
2013	548.486	129.490	0,0330	18.100,04	4.273,17	69.300	74.100	1.254.332.633	316.641.897	1.570.974.530
2012	513.148	122.908	0,0330	16.933,88	4.055,96	69.300	74.100	1.173.518.161	300.546.932	1.474.065.094

Sumber: Dinas Pekerjaan Umum Perumahan dan Energi Sumber Daya Mineral Provinsi DIY, 2024 ; Liani, 2018

Industri

2022							
A	B	C	D	E	F	G	H
Jenis Bahan Bakar	Konsumsi (Ton)	Berat Jenis (kg/l)	NCV	Equivalen Konsumsi (GJ)	FE CO ₂ (g/GJ)	Total	Emisi CO ₂ (Ton)
Rumus	-	-	-	(B/C)*D	-	E*F	/10 ⁶
Bensin	2.281.337	0,711	0,033	105.885	69.300	7.337.819.389	7.338
Solar	5.506.184	0,832	0,038	251.484	74.100	18.634.991.475	18.635
Minyak Tanah	-	0,8201	0,0431	-	71.900	-	-
Batu Bara	11.122	-	18,9	210.206	97.500	20.495.065.500	20.495
LPG	1.296.935	-	47,3	61.345.026	63.100	3.870.871.109.050	3.870.871
						Total	3.917.339

2015							
A	B	C	D	E	F	G	H
Jenis Bahan Bakar	Konsumsi (liter)	Berat Jenis (kg/l)	NCV	Equivalen Konsumsi (GJ)	FE CO ₂ (g/GJ)	Total	Emisi CO ₂ (Ton)
Rumus	-	-	-	(B/C)*D	-	E*F	/10 ⁶
Bensin	4.875.313	0,711	0,033	226.280	69.300	15.681.228.270	15.681
Solar	11.031.669	0,832	0,038	503.850	74.100	37.335.304.772	37.335
Minyak Tanah	282.303	0,8201	0,0431	14.836	71.900	1.066.730.818	1.067
Batu Bara	38.758.790	-	18,9	732.541.131	97.500	71.422.760.272.500	71.422.760
LPG	5.403.419	-	47,3	255.581.719	63.100	16.127.206.449.970	16.127.206
						Total	87.604.050

2014							
A	B	C	D	E	F	G	H
Jenis Bahan Bakar	Konsumsi (liter)	Berat Jenis (kg/l)	NCV	Equivalen Konsumsi (GJ)	FE CO ₂ (g/GJ)	Total	Emisi CO ₂ (Ton)
Rumus	-	-	-	(B/C)*D	-	E*F	/10 ⁶
Bensin	10.158.631	0,711	0,033	471.498	69.300	32.674.786.546	32.675
Solar	15.206.240	0,832	0,038	694.516	74.100	51.463.618.500	51.464
Minyak Tanah	513.350	0,8201	0,0431	26.979	71.900	1.939.781.955	1.940
Batu Bara	16.273.204	-	18,9	307.563.556	97.500	29.987.446.671.000	29.987.447
LPG	-	-	47,3	-	63.100	-	-
						Total	30.073.525

2013							
A	B	C	D	E	F	G	H
Jenis Bahan Bakar	Konsumsi (liter)	Berat Jenis (kg/l)	NCV	Equivalen Konsumsi (GJ)	FE CO ₂ (g/GJ)	Total	Emisi CO ₂ (Ton)
Rumus	-	-	-	(B/C)*D	-	E*F	/10 ⁶
Bensin	17.493.297	0,711	0,033	811.925	69.300	56.266.414.781	56.266
Solar	71.424.817	0,832	0,038	3.262.191	74.100	241.728.365.034	241.728

Minyak Tanah	2.277.889	0,8201	0,0431	119.713	71.900	8.607.398.419	8.607
Batu Bara	25.986.598	-	18,9	491.146.702	97.500	47.886.803.464.500	47.886.803
LPG	18.286.215	-	47,3	864.937.970	63.100	54.577.585.875.450	54.577.586
						Total	102.770.992
2012							
A	B	C	D	E	F	G	H
Jenis Bahan Bakar	Konsumsi (liter)	Berat Jenis (kg/l)	NCV	Equivalen Konsumsi (GJ)	FE CO2 (g/GJ)	Total	Emisi CO2 (Ton)
Rumus	-	-	-	(B/C)*D	-	E*F	/10^6
Bensin	15.748.327	0,711	0,033	730.935	69.300	50.653.796.085	50.654
Solar	100.409.015	0,832	0,038	4.585.989	74.100	339.821.760.141	339.822
Minyak Tanah	6.170.025	0,8201	0,0431	324.263	71.900	23.314.508.928	23.315
Batu Bara	158.900.373	-	18,9	3.003.217.050	97.500	292.813.662.345.750	292.813.662
LPG	-	-	47,3	-	63.100	-	-
						Total	293.227.452
2011							
A	B	C	D	E	F	G	H
Jenis Bahan Bakar	Konsumsi (liter)	Berat Jenis (kg/l)	NCV	Equivalen Konsumsi (GJ)	FE CO2 (g/GJ)	Total	Emisi CO2 (Ton)
Rumus	-	-	-	(B/C)*D	-	E*F	/10^6
Bensin	10.158.631	0,711	0,033	471.498	69.300	32.674.786.546	32.675
Solar	163.704.943	0,832	0,038	7.476.908	74.100	554.038.916.466	554.039
Minyak Tanah	6.000.209	0,8201	0,0431	315.338	71.900	22.672.829.738	22.673
Batu Bara	268.797.872	-	18,9	5.080.279.781	97.500	495.327.278.628.000	495.327.279
LPG	-	-	47,3	-	63.100	-	-
						Total	495.936.665
2010							
A	B	C	D	E	F	G	H
Jenis Bahan Bakar	Konsumsi (Ton)	Berat Jenis (kg/l)	NCV	Equivalen Konsumsi (GJ)	FE CO2 (g/GJ)	Total	Emisi CO2 (Ton)
Rumus	-	-	-	(B/C)*D	-	E*F	/10^6
Bensin	10.648.922	0,711	0,033	494.253,764	69.300	34.251.785.825	34.252
Solar	41.634.370	0,832	0,038	1.901.569,784	74.100	140.906.320.969	140.906
Minyak Tanah	2.785.594	0,8201	0,0431	146.395,685	71.900	10.525.849.763	10.526
Batu Bara	22.634.283	-	18,9	427.787.949	97.500	41.709.324.998.250	41.709.325
LPG	-	-	47,3	-	63.100	-	-
						Total	41.895.009
2009							
A	B	C	D	E	F	G	H
Jenis Bahan Bakar	Konsumsi (liter)	Berat Jenis (kg/l)	NCV	Equivalen Konsumsi (GJ)	FE CO2 (g/GJ)	Total	Emisi CO2 (Ton)
Rumus	-	-	-	(B/C)*D	-	E*F	/10^6

Bensin	9.781.657	0,711	0,033	454.001	69.300	31.462.266.376	31.462
Solar	54.719.657	0,832	0,038	2.499.215	74.100	185.191.839.159	185.192
Minyak Tanah	4.820.253	0,8201	0,0431	253.326	71.900	18.214.161.467	18.214
Batu Bara	12.048.803	-	18,9	227.722.377	97.500	22.202.931.728.250	22.202.932
LPG	-	-	47,3	-	63.100	-	-
						Total	22.437.800
2008							
A	B	C	D	E	F	G	H
Jenis Bahan Bakar	Konsumsi (Ton)	Berat Jenis (kg/l)	NCV	Equivalen Konsumsi (GJ)	FE CO2 (g/GJ)	Total	Emisi CO2 (Ton)
Rumus	-	-	-	(B/C)*D	-	E*F	/10^6
Bensin	2.205.929	0,711	0,033	102.384.890	69.300	7.095.272.897	7.095
Solar	9.874.327	0,832	0,038	450.990.897	74.100	33.418.425.441	33.418
Minyak Tanah	828.287	0,8201	0,0431	43.530.264	71.900	3.129.825.999	3.130
Batu Bara	12.329.315	-	18,9	233.024.054	97.500	22.719.845.216.250	22.719.845
LPG	-	-	47,3	-	63.100	-	-
						Total	22.763.489
2007							
A	B	C	D	E	F	G	H
Jenis Bahan Bakar	Konsumsi (liter)	Berat Jenis (kg/l)	NCV	Equivalen Konsumsi (GJ)	FE CO2 (g/GJ)	Total	Emisi CO2 (Ton)
Rumus	-	-	-	(B/C)*D	-	E*F	/10^6
Bensin	1.745.541	0,711	0,033	81.017	69.300	5.614.455.292	5.614
Solar	9.710.972	0,832	0,038	443.530	74.100	32.865.570.863	32.866
Minyak Tanah	1.854.241	0,8201	0,0431	97.449	71.900	7.006.571.019	7.007
Batu Bara	8.274.962	-	18,9	156.396.782	97.500	15.248.686.225.500	15.248.686
LPG	-	-	47,3	-	63.100	-	-
						Total	15.294.173
2006							
A	B	C	D	E	F	G	H
Jenis Bahan Bakar	Konsumsi (Ton)	Berat Jenis (kg/l)	NCV	Equivalen Konsumsi (GJ)	FE CO2 (g/GJ)	Total	Emisi CO2 (Ton)
Rumus	-	-	-	(B/C)*D	-	E*F	/10^6
Bensin	2.014.846	0,711	0,033	93.516,059	69.300	6.480.662.894	6.481
Solar	5.579.313	0,832	0,038	254.824,392	74.100	18.882.487.434	18.882
Minyak Tanah	846.716	0,8201	0,0431	44.498,792	71.900	3.199.463.169	3.199
Batu Bara	3.031.049	-	18,9	57.286.826	97.500	5.585.465.544.750	5.585.466
LPG	-	-	47,3	-	63.100	-	-
						Total	5.614.028
2005							
A	B	C	D	E	F	G	H

Jenis Bahan Bakar	Konsumsi (Ton)	Berat Jenis (kg/l)	NCV	Equivalen Konsumsi (GJ)	FE CO ₂ (g/GJ)	Total	Emisi CO ₂ (Ton)
Rumus	-	-	-	(B/C)*D	-	E*F	/10⁶
Bensin	1.767.857	0,711	0,033	82.052,435	69.300	5.686.233.718	5.686
Solar	15.960.835	0,832	0,038	728.980,445	74.100	54.017.450.953	54.017
Minyak Tanah	2.449.900	0,8201	0,0431	128.753,433	71.900	9.257.371.797	9.257
Batu Bara	895.437	-	18,9	16.923.759	97.500	1.650.066.531.750	1.650.067
LPG	-	-	47,3		63.100	-	-
						Total	1.719.028

2004							
A	B	C	D	E	F	G	H
Jenis Bahan Bakar	Konsumsi (Ton)	Berat Jenis (kg/l)	NCV	Equivalen Konsumsi (GJ)	FE CO ₂ (g/GJ)	Total	Emisi CO ₂ (Ton)
Rumus	-	-	-	(B/C)*D	-	E*F	/10⁶
Bensin	2.128.881	0,711	0,033	98.808,823	69.300	6.847.451.419	6.847
Solar	15.973.201	0,832	0,038	729.545,238	74.100	54.059.302.134	54.059
Minyak Tanah	1.483.130	0,8201	0,0431	77.945,254	71.900	5.604.263.780	5.604
Batu Bara	1.793.992	-	18,9	33.906.449	97.500	3.305.878.758.000	3.305.879
LPG	-	-	47,3	-	63.100	-	-
						Total	3.372.390

2003							
A	B	C	D	E	F	G	H
Jenis Bahan Bakar	Konsumsi (liter)	Berat Jenis (kg/l)	NCV	Equivalen Konsumsi (GJ)	FE CO ₂ (g/GJ)	Total	Emisi CO ₂ (Ton)
Rumus	-	-	-	(B/C)*D	-	E*F	/10⁶
Bensin	1.788.762	0,711	0,033	83.023	69.300	5.753.473.724	5.753
Solar	17.106.172	0,832	0,038	781.292	74.100	57.893.700.863	57.894
Minyak Tanah	1.900.241	0,8201	0,0431	99.866	71.900	7.180.389.992	7.180
Batu Bara	1.005.832	-	18,9	19.010.225	97.500	1.853.496.918.000	1.853.497
LPG	-	-	47,3	-	63.100	-	-
						Total	1.924.324

2002							
A	B	C	D	E	F	G	H
Jenis Bahan Bakar	Konsumsi (Ton)	Berat Jenis (kg/l)	NCV	Equivalen Konsumsi (GJ)	FE CO ₂ (g/GJ)	Total	Emisi CO ₂ (Ton)
Rumus	-	-	-	(B/C)*D	-	E*F	/10⁶
Bensin	2.128.136	0,711	0,033	98.774,245	69.300	6.845.055.159	6.845
Solar	24.463.869	0,832	0,038	1.117.340,171	74.100	82.794.906.647	82.795
Minyak Tanah	-	0,8201	0,0431	-	71.900	-	-
Batu Bara	-	-	18,9	-	97.500	-	-
LPG	-	-	47,3	-	63.100	-	-
						Total	89.640

2001							
A	B	C	D	E	F	G	H
Jenis Bahan Bakar	Konsumsi (Ton)	Berat Jenis (kg/l)	NCV	Equivalen Konsumsi (GJ)	FE CO2 (g/GJ)	Total	Emisi CO2 (Ton)
Rumus	-	-	-	(B/C)*D	-	E*F	/10^6
Bensin	1.819.325	0,711	0,033	84.441,245	69.300	5.851.778.259	5.852
Solar	24.071.138	0,832	0,038	1.099.402,938	74.100	81.465.757.669	81.466
Minyak Tanah	18.819.122	0,8201	0,0431	989.030,799	71.900	71.111.314.443	71.111
Batu Bara	540.000	-	18,9	10.206.000	97.500	995.085.000.000	995.085
LPG	1.582.273	-	47,3	74.841.513	63.100	4.722.499.463.990	4.722.499
						Total	5.876.013

2000							
A	B	C	D	E	F	G	H
Jenis Bahan Bakar	Konsumsi (Ton)	Berat Jenis (kg/l)	NCV	Equivalen Konsumsi (GJ)	FE CO2 (g/GJ)	Total	Emisi CO2 (Ton)
Rumus	-	-	-	(B/C)*D	-	E*F	/10^6
Bensin	1.307	0,711	0,033	60,662	69.300	4.203.908	4
Solar	25.551.398	0,832	0,038	1.167.010,966	74.100	86.475.512.606	86.476
Minyak Tanah	18.819.122	0,8201	0,0431	989.030,799	71.900	71.111.314.443	71.111
Batu Bara	540.000	-	18,9	10.206.000	97.500	995.085.000.000	995.085
LPG	1.582.273	-	47,3	74.841.513	63.100	4.722.499.463.990	4.722.499
						Total	5.875.175

Sumber: BPS, 2024

IPPU

	A	B	C	D	E	F	G	H
	-	A*FK	B*NCV	-	-	-	C*D*E*F	G/1000
Tahun	Konsumsi pelummas (TJ)	Faktor Konversi (kg/l)	NCV	Kandungan Karbon (kg C/GJ)	Faktor ODU	CO2/C rasio massa	Total	Beban emisi (tonCO2/tahun)
		0,9389	40,2	20	0,2	3,67		1000
2022	108.797	102.150	4.106.410	14,68			60.282.099	60.282
2015	2.831.012	2.658.037	106.853.094				1.568.603.421	1.568.603
2014	674.338	633.136	25.452.065				373.636.316	373.636
2013	13.827.889	12.983.005	521.916.800				7.661.738.628	7.661.739
2012	8.659.144	8.130.070	326.828.826				4.797.847.168	4.797.847
2011	10.627.659	9.978.309	401.128.023				5.888.559.381	5.888.559
2010	7.188.075	6.748.884	271.305.121				3.982.759.182	3.982.759
2009	4.610.683	4.328.970	174.024.605				2.554.681.198	2.554.681
2008	326.774	306.808	12.333.686				181.058.510	181.059
2007	313.122	293.990	11.818.408				173.494.228	173.494
2006	289.492	271.804	10.926.522				160.401.348	160.401

2005	333.138	312.783	12.573.887		184.584.667	184.585
2004	1.615.800	1.517.075	60.986.400		895.280.348	895.280
2003	879.791	826.036	33.206.638		487.473.445	487.473
2002	332.263	311.962	12.540.862		184.099.848	184.100
2001	313.759	294.588	11.842.451		173.847.176	173.847
2000	334.799	314.343	12.636.580		185.504.991	185.505

Sumber: BPS, 2024

Intensitas Karbon

	A	B	C
Tahun	GDP	Total Emisi Karbon	Intensitas Emisi Karbon
Rumus	-	-	A*B
2023	118.626.840.000	18.613.725,06	6.373,08
2022	112.901.320.000	6.729.573,75	16.776,89
2021	107.372.560.000	18.239.539,70	5.886,80
2020	101.698.520.000	18.175.797,45	5.595,27
2019	104.485.460.000	18.180.149,00	5.747,23
2018	98.024.000.000	18.032.909,94	5.435,84
2017	92.300.000.000	17.924.490,04	5.149,38
2016	87.686.000.000	17.903.931,22	4.897,58
2015	83.474.000.000	91.231.914,24	914,96
2014	79.536.000.000	32.412.667,42	2.453,86
2013	75.627.000.000	112.132.164,77	674,45
2012	71.702.000.000	299.721.750,07	239,23
2011	68.050.000.000	503.379.657,28	135,19
2010	64.679.000.000	47.298.500,09	1.367,46
2009	20.064.257.000	26.306.775,88	762,70
2008	19.212.481.000	24.178.547,08	794,61
2007	18.291.512.000	16.597.978,08	1.102,03
2006	17.535.749.000	6.894.644,80	2.543,39
2005	16.910.877.000	2.942.424,47	5.747,26
2004	16.146.444.000	5.213.004,60	3.097,34
2003	15.361.277.000	3.357.132,41	4.575,71
2002	5.395.054.000	1.192.558,23	4.523,93
2001	5.124.370.000	6.859.960,81	747,00
2000	5.017.709.000	6.853.233,91	732,17

Sumber: Analisis Penulis, 2024

Pemodelan LMDI

Data Emisi Karbon

Sektor	AFOLU	ENERGI			IPPU	Total Emisi CO2 (tonCO2)
Sub Sektor	Pertanian	Transportasi	Stasioner		Pelumnas	
Tahun	Penggunaan Pupuk Urea	Bahan Bakar Kendaraan	Konsumsi Listrik	Industri		
2023	10.537,50	2.014,68	2.933.363,74	15.294.172,82	373.636,32	18.613.725
2022	12.213,46	1.941,55	2.737.797,66	3.917.338,99	60.282,10	6.729.574
2021	12.197,06	1.328,53	2.558.204,97	15.294.172,82	373.636,32	18.239.540
2020	13.349,39	1.589,68	2.493.049,25	15.294.172,82	373.636,32	18.175.797
2019	12.106,13	1.478,21	2.498.755,52	15.294.172,82	373.636,32	18.180.149
2018	12.270,05	1.478,21	2.351.352,53	15.294.172,82	373.636,32	18.032.910
2017	12.972,41	1.460,27	2.242.248,22	15.294.172,82	373.636,32	17.924.490
2016	14.064,70	1.406,83	2.220.650,55	15.294.172,82	373.636,32	17.903.931
2015	13.473,76	1.328,84	2.044.458,23	87.604.049,99	1.568.603,42	91.231.914
2014	14.031,72	1.283,27	1.950.191,26	30.073.524,86	373.636,32	32.412.667
2013	14.140,76	1.254,65	1.684.039,21	102.770.991,52	7.661.738,63	112.132.165
2012	13.268,77	1.173,82	1.682.007,91	293.227.452,41	4.797.847,17	299.721.750
2011	14.134,99	1.478,21	1.538.819,53	495.936.665,16	5.888.559,38	503.379.657
2010	15.263,95	1.478,21	1.403.989,79	41.895.008,95	3.982.759,18	47.298.500
2009	13.749,64	1.478,21	1.299.066,83	22.437.800,00	2.554.681,20	26.306.776
2008	13.184,95	1.478,21	1.219.336,67	22.763.488,74	181.058,51	24.178.547
2007	13.184,95	1.478,21	1.115.647,87	15.294.172,82	173.494,23	16.597.978
2006	13.184,95	1.478,21	1.105.552,13	5.614.028,16	160.401,35	6.894.645
2005	13.184,95	1.478,21	1.024.149,05	1.719.027,59	184.584,67	2.942.424
2004	13.184,95	1.478,21	930.671,32	3.372.389,78	895.280,35	5.213.005
2003	13.184,95	1.478,21	930.671,32	1.924.324,48	487.473,45	3.357.132
2002	13.184,95	1.478,21	904.155,26	89.639,96	184.099,85	1.192.558
2001	13.184,95	1.478,21	795.437,15	5.876.013,31	173.847,18	6.859.961
2000	13.184,95	1.478,21	777.890,26	5.875.175,49	185.504,99	6.853.234

Sumber: Analisis Penulis, 2024

Data Penggunaan Lahan

Tahun	Perumahan	Jasa	Perusahaan	Industri	Pertanian	Non Produktif	Lainnya	Total
2022	2.103,21	284,95	312,16	52,23	96,28	12,82	388,35	3.250,00
2021	2.102,05	284,67	311,87	52,23	97,32	13,66	388,19	
2020	2.102,60	284,75	311,84	52,23	96,87	13,49	388,22	
2019	2.101,57	281,58	311,69	52,23	97,48	14,29	388,16	
2018	2.101,24	281,84	311,54	52,23	100,45	14,53	388,16	
2017	2.101,19	281,59	311,06	52,23	101,1	14,67	388,16	
2016	2.101,79	281,33	309,77	52,23	101,1	15,62	388,16	
2015	2.099,93	281,33	307,99	52,23	102,77	17,59	388,16	
2014	2.102,12	281,06	303,25	52,23	1055,6	17,59	388,16	
2013	2.100,72	280,57	300,73	52,23	109,15	18,43	388,16	
2012	2.105,07	279,59	294,19	52,23	111,81	18,94	388,16	
2011	2.104,31	279,64	289,58	52,23	115,96	20,11	388,16	
2010	2.105,39	279,37	286,14	52,23	118,59	20,11	388,16	
2009	2.105,11	275,71	284,50	52,23	124,17	20,11	388,12	
2008	2.106,34	275,56	277,57	52,23	130,03	20,04	388,16	
2006	2.104,52	274,72	273,45	52,23	136,80	20,11	388,16	
2005	2.103,19	274,67	273,03	52,23	138,52	20,21	388,16	
2004	2.103,27	272,63	263,53	52,23	145,40	24,78	388,16	
2003	2.099,26	272,63	263,53	52,23	151,86	22,29	388,16	
2002	2.095,61	272,63	263,53	52,23	157,87	19,58	388,16	
2001	2.092,20	272,50	263,49	52,23	167,26	14,15	388,10	

Sumber: BPS, 2024

Data Konsumsi Energi

Tahun	Total Konsumsi Energi (TOE)
2023	928.567,60

2022	896.293,00
2021	782.916,10
2020	891.277,20
2017	1.135.000,00
2016	1.053.000,00
2015	997.000,00

Sumber: Dinas PUPESDM DIY, 2024 ; Perda DIY, 2020

Data PRDB

Tahun	Atas Dasar Harga Konstan (Miliar Rupiah)	Perkapita (Rupiah)
2023	118.626,840	31.748,000
2022	112.901,320	30.411,000
2021	107.372,560	29.116,000
2020	101.698,520	27.754,000
2019	104.485,460	27.010,000
2018	98.024,000	25.776,000
2017	92.300,000	24.534,000
2016	87.686,000	23.566,000
2015	83.474,000	22.688,000
2014	79.536,000	21.868,000
2013	75.627,000	21.038,000
2012	71.702,000	20.183,900
2011	68.050,000	19.387,000
2010	64.679,000	18.653,000
2009	20.064,257	5.845,931
2008	19.212,481	5.662,383
2007	18.291,512	5.325,762
2006	17.53,749	5.157,411
2005	16.910,877	5.057,608
2004	16.146,444	4.895,780
2003	15.361,277	4.816,287
2002	5.395,054	1.703,682
2001	5.124,370	1.629,826
2000	5.017,709	1.607,364

Sumber: BPS, 2024

Data Populasi

Tahun	Populasi (Ribuan)	Tahun	Populasi (Ribuan)
2023	3.736.489,00	2011	3.509.997,00

2022	3.761.870,00	2010	3.457.491,00
2021	3.712.896,00	2009	3.501.869,00
2020	3.668.719,00	2008	3.468.502,00
2019	3.842.932,00	2007	3.434.534,00
2018	3.802.872,00	2006	3.400.107,00
2017	3.762.167,00	2005	3.356.506,00
2016	3.720.912,00	2004	3.315.267,00
2015	3.679.176,00	2003	3.265.778,00
2014	3.637.116,00	2002	3.217.028,00
2013	3.594.854,00	2001	3.169.006,00
2012	3.552.462,00	2000	3.120.478,00

Sumber: BPS, 2024

Perhitungan LMDI

ΔEI = Perubahan Penggunaan Lahan

Tahun	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	$\Sigma L(E^t, E^0)$						$\ln(E^t \cdot u / E^0)$									ΔEI
	E^t	E^0	A-B	$\ln E^t$	$\ln E^0$	D-E	E^t	At	G/H	E^0	A^0	J/K	C/F	I/L	$\ln(N)$	N°O
2023-2022	18.613.725,06	6.729.573,75	11.884.151,31	16,739	15,722	1,017	18.613.725,06	32,50	572.730,00	6.729.573,75	32,50	207.063,81	11.685.497,85	2,766	9,274	25,65
2022-2021	6.729.573,75	18.239.539,70	- 11.509.965,95	15,722	16,719	- 0,997	6.729.573,75	32,50	207.063,81	18.239.539,70	32,50	561.216,61	11.544.599,75	0,369	- 2,302	- 0,85
2021-2020	18.239.539,70	18.175.797,45	63.742,24	16,719	16,715	0,004	18.239.539,70	32,50	561.216,61	18.175.797,45	32,50	559.255,31	15.935.560,49	1,004	6,908	6,93
2020-2019	18.175.797,45	18.180.149,00	- 4.351,55	16,715	16,715	0	18.175.797,45	32,50	559.255,31	18.180.149,00	32,50	559.389,20	#DIV/0!	1,000	6,907	6,91
2019-2018	18.180.149,00	18.032.909,94	147.239,06	16,715	16,707	0,008	18.180.149,00	32,50	559.389,20	18.032.909,94	32,50	554.858,77	18.404.882,98	1,008	6,909	6,97
2018-2017	18.032.909,94	17.924.490,04	108.419,90	16,707	16,701	0,006	18.032.909,94	32,50	554.858,77	17.924.490,04	32,50	551.522,77	18.069.982,79	1,006	6,909	6,95
2017-2016	17.924.490,04	17.903.931,22	20.558,82	16,701	16,700	0,001	17.924.490,04	32,50	551.522,77	17.903.931,22	32,50	550.890,19	20.558.817,27	1,001	6,907	6,91
2016-2015	17.903.931,22	91.231.914,24	- 73.327.983,01	16,700	18,328	- 1,628	17.903.931,22	32,50	550.890,19	91.231.914,24	32,50	2.807.135,82	45.041.758,61	0,196	- 0,223	- 0,04
2015-2014	91.231.914,24	32.412.667,42	58.819.246,81	18,328	17,294	1,034	91.231.914,24	32,50	2.807.135,82	32.412.667,42	32,50	997.312,84	56.885.151,66	2,815	7,942	22,35
2014-2013	32.412.667,42	112.132.164,77	- 79.719.497,35	17,294	18,535	- 1,241	32.412.667,42	32,50	997.312,84	112.132.164,77	32,50	3.450.220,45	64.238.112,29	0,289	- 1,203	- 0,35
2013-2012	112.132.164,77	299.721.750,07	- 187.589.585,30	18,535	19,518	- 0,983	112.132.164,77	32,50	3.450.220,45	299.721.750,07	32,50	9.222.207,69	190.833.759,21	0,374	- 0,916	- 0,34
2012-2011	299.721.750,07	503.379.657,28	- 203.657.907,21	19,518	20,036	- 0,518	299.721.750,07	32,50	9.222.207,69	503.379.657,28	32,50	15.488.604,84	393.161.983,02	0,595	- 0,510	- 0,30

2011-2010	503.379.657,28	47.298.500,09	456.081.157,19	20,036	17,671	2,365	503.379.657,28	32,50	15.488.604,84	47.298.500,09	32,50	1.455.338,46	192.846.155,26	10,643	9,272	98,68
2010-2009	47.298.500,09	26.306.775,88	20.991.724,21	17,671	17,085	0,586	47.298.500,09	32,50	1.455.338,46	26.306.775,88	32,50	809.439,26	35.822.054,97	1,798	7,494	13,47
2009-2008	26.306.775,88	24.178.547,08	2.128.228,79	17,085	16,700	0,385	26.306.775,88	32,50	809.439,26	24.178.547,08	32,50	743.955,29	5.527.866,99	1,088	6,992	7,61
2008-2007	24.178.547,08	16.597.978,08	7.580.569,00	16,700	16,624	0,076	24.178.547,08	32,50	743.955,29	16.597.978,08	32,50	510.707,02	99.744.328,96	1,457	7,284	10,61
2007-2006	16.597.978,08	6.894.644,80	9.703.333,28	16,624	15,746	0,878	16.597.978,08	32,50	510.707,02	6.894.644,80	32,50	212.142,92	11.051.632,44	2,407	7,786	18,74
2006-2005	6.894.644,80	2.942.424,47	3.952.220,33	15,746	14,894	0,852	6.894.644,80	32,50	212.142,92	2.942.424,47	32,50	90.536,14	4.638.756,26	2,343	7,759	18,18
2005-2004	2.942.424,47	5.213.004,60	-2.270.580,13	14,894	15,466	-0,572	2.942.424,47	32,50	90.536,14	5.213.004,60	32,50	160.400,14	3.969.545,69	0,564	-0,510	-0,29
2004-2003	5.213.004,60	3.357.132,41	1.855.872,20	15,466	15,026	0,44	5.213.004,60	32,50	160.400,14	3.357.132,41	32,50	103.296,38	4.217.891,35	1,553	7,347	11,41
2003-2002	3.357.132,41	1.192.558,23	2.164.574,18	15,026	13,991	1,035	3.357.132,41	32,50	103.296,38	1.192.558,23	32,50	36.694,10	2.091.376,02	2,815	7,943	22,36
2002-2001	1.192.558,23	6.859.960,81	-5.667.402,58	13,991	15,741	-1,75	1.192.558,23	32,50	36.694,10	6.859.960,81	32,50	211.075,72	3.238.515,76	0,174	-1,609	-0,28
2001	6.859.960,81	6.853.233,91	6.726,90	15,741	15,740	0,001	6.859.960,81	32,50	211.075,72	6.853.233,91	32,50	210.868,74	6.726.902,01	1,001	6,908	6,91

Sumber: Analisis Penulis, 2025

Struktur Energi (ΔAI)

Tahun	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	$\sum I(E^*t/E^*0)$						$\ln(AI^*t/AI^*0)$									AAI
	Et	E0	A-B	lnEt	lnE0	D-E	At	Qt	G/H	A0	Q0	J/K	C/F	I/L	ln(N)	N*O
2023-2022	18.613.725,06	6.729.573,75	11.884.151,31	16,739	15,722	1,017	32,50	928.567,60	3,50001E-05	32,50	896.293,00	3,6260E-05	11.685.497,85	0,965	9,274	8,95
2022-2021	6.729.573,75	18.239.539,70	-11.509.965,95	15,722	16,719	-0,997	32,50	896.293,00	3,62605E-05	32,50	782.916,10	4,1511E-05	11.544.599,75	0,874	-2,302	-2,01
2021-2020	18.239.539,70	18.175.797,45	63.742,24	16,719	16,715	0,004	32,50	782.916,10	4,15115E-05	32,50	891.277,20	3,6465E-05	15.935.560,49	1,138	6,908	7,86
2020-2019	18.175.797,45	18.180.149,00	-4.351,55	16,715	16,715	0	32,50	891.277,20	3,64645E-05	32,50	954.864,84	3,4036E-05	#DIV/0!	1,071	6,907	7,40
2019-2018	18.180.149,00	18.032.909,94	147.239,06	16,715	16,707	0,008	32,50	954.864,84	3,4036E-05	32,50	954.864,84	3,4036E-05	18.404.882,98	1,000	6,909	6,91
2018-2017	18.032.909,94	17.924.490,04	108.419,90	16,707	16,701	0,006	32,50	954.864,84	3,40362E-05	32,50	1.135.000,00	2,8634E-05	18.069.982,79	1,189	6,909	8,21
2017-2016	17.924.490,04	17.903.931,22	20.558,82	16,701	16,700	0,001	32,50	1.135.000,00	2,86344E-05	32,50	1.053.000,00	3,0864E-05	20.558.817,27	0,928	6,907	6,41
2016-2015	17.903.931,22	91.231.914,24	-73.327.983,01	16,700	18,328	-1,628	32,50	1.053.000,00	3,08642E-05	32,50	997.000,00	3,2598E-05	45.041.758,61	0,947	-0,223	-0,21

2015-2014	91.231.914,24	32.412.667,42	58.819.246,81	18,32 8	17,29 4	1,034	32,5 0	997.000,00	3.25978E-05	32,5 0	954.864,84	3.4036E-05	56.885.151,66	0,95 8	7,942	7,61
2014-2013	32.412.667,42	112.132.164,7 7	- 79.719.497,35	17,29 4	18,53 5	- 1,241	32,5 0	954.864,84	3.40362E-05	32,5 0	954.864,84	3.4036E-05	64.238.112,29	1,00 0	- 1,203	- 1,20
2013-2012	112.132.164,7 7	299.721.750,0 7	- 187.589.585,30	18,53 5	19,51 8	- 0,983	32,5 0	954.864,84	3.40362E-05	32,5 0	954.864,84	3.4036E-05	190.833.759,2 1	1,00 0	- 0,916	- 0,92
2012-2011	299.721.750,0 7	503.379.657,2 8	- 203.657.907,21	19,51 8	20,03 6	- 0,518	32,5 0	954.864,84	3.40362E-05	32,5 0	954.864,84	3.4036E-05	393.161.983,0 2	1,00 0	- 0,510	- 0,51
2011-2010	503.379.657,2 8	47.298.500,09	456.081.157,19	20,03 6	17,67 1	2,365	32,5 0	954.864,84	3.40362E-05	32,5 0	954.864,84	3.4036E-05	192.846.155,2 6	1,00 0	9,272	9,27
2010-2009	47.298.500,09	26.306.775,88	20.991.724,21	17,67 1	17,08 5	0,586	32,5 0	954.864,84	3.40362E-05	32,5 0	954.864,84	3.4036E-05	35.822.054,97	1,00 0	7,494	7,49
2009-2008	26.306.775,88	24.178.547,08	2.128.228,79	17,08 5	16,70 0	0,385	32,5 0	954.864,84	3.40362E-05	32,5 0	954.864,84	3.4036E-05	5.527.866,99	1,00 0	6,992	6,99
2008-2007	24.178.547,08	16.597.978,08	7.580.569,00	16,70 0	16,62 4	0,076	32,5 0	954.864,84	3.40362E-05	32,5 0	954.864,84	3.4036E-05	99.744.328,96	1,00 0	7,284	7,28
2007-2006	16.597.978,08	6.894.644,80	9.703.333,28	16,62 4	15,74 6	0,878	32,5 0	954.864,84	3.40362E-05	32,5 0	954.864,84	3.4036E-05	11.051.632,44	1,00 0	7,786	7,79
2006-2005	6.894.644,80	2.942.424,47	3.952.220,33	15,74 6	14,89 4	0,852	32,5 0	954.864,84	3.40362E-05	32,5 0	954.864,84	3.4036E-05	4.638.756,26	1,00 0	7,759	7,76
2005-2004	2.942.424,47	5.213.004,60	- 2.270.580,13	14,89 4	15,46 6	- 0,572	32,5 0	954.864,84	3.40362E-05	32,5 0	954.864,84	3.4036E-05	3.969.545,69	1,00 0	- 0,510	- 0,51
2004-2003	5.213.004,60	3.357.132,41	1.855.872,20	15,46 6	15,02 6	0,44	32,5 0	954.864,84	3.40362E-05	32,5 0	954.864,84	3.4036E-05	4.217.891,35	1,00 0	7,347	7,35
2003-2002	3.357.132,41	1.192.558,23	2.164.574,18	15,02 6	13,99 1	1,035	32,5 0	954.864,84	3.40362E-05	32,5 0	954.864,84	3.4036E-05	2.091.376,02	1,00 0	7,943	7,94
2002-2001	1.192.558,23	6.859.960,81	- 5.667.402,58	13,99 1	15,74 1	-1,75	32,5 0	954.864,84	3.40362E-05	32,5 0	954.864,84	3.4036E-05	3.238.515,76	1,00 0	- 1,609	- 1,61
2001	6.859.960,81	6.853.233,91	6.726,90	15,74 1	15,74 0	0,001	32,5 0	954.864,84	3.40362E-05	32,5 0	954.864,84	3.4036E-05	6.726.902,01	1,00 0	6,908	6,91

Sumber: Analisis Penulis, 2025

Efisiensi Energi (ΔQI)

Tahun	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	
	$\sum L(E^*t,E^*0)$						$\ln(QI^*t/QI^*0)$										ΔQI
	Et	E0	A-B	lnEt	lnE0	D-E	Qt	GDPt	G/H	Q0	GDP0	J/K	C/F	I/L	ln(N)	N*O	
2023-2022	18.613.725,06	6.729.573,75	11.884.151,31	16,73 9	15,72 2	1,017	928.567,60	31.748.00 0	0,02 9	896.293,00	30.411.00 0	0,02 9	11.685.497,85	0,99 2	- 0,010	- 0,01	
2022-2021	6.729.573,75	18.239.539,70	- 11.509.965,95	15,72 2	16,71 9	- 0,997	896.293,00	30.411.00 0	0,02 9	782.916,10	29.116.00 0	0,02 7	11.544.599,75	1,09 6	6,999	7,67	
2021-2020	18.239.539,70	18.175.797,45	63.742,24	16,71 9	16,71 5	0,004	782.916,10	29.116.00 0	0,02 7	891.277,20	27.754.00 0	0,03 2	15.935.560,49	0,83 7	- 0,186	- 0,16	
2020-2019	18.175.797,45	18.180.149,00	- 4.351,55	16,71 5	16,71 5	0	891.277,20	27.754.00 0	0,03 2	954.864,84	27.010.00 0	0,03 5	#DIV/0!	0,90 8	- 0,020	- 0,02	

2019-2018	18.180.149,00	18.032.909,94	147.239,06	16,71 5	16,70 7	0,008	954.864,84	27.010.00 0	0,03 5	954.864,84	25.776.00 0	0,03 7	18.404.882,98	0,95 4	- 0,040	- 0,04
2018-2017	18.032.909,94	17.924.490,04	108.419,90	16,70 7	16,70 1	0,006	954.864,84	25.776.00 0	0,03 7	1.135.000,0 0	24.534.00 0	0,04 6	18.069.982,79	0,80 1	- 0,314	- 0,25
2017-2016	17.924.490,04	17.903.931,22	20.558,82	16,70 1	16,70 0	0,001	1.135.000,0 0	24.534.00 0	0,04 6	1.053.000,0 0	23.566.00 0	0,04 5	20.558.817,27	1,03 5	6,942	7,19
2016-2015	17.903.931,22	91.231.914,24	- 73.327.983,01	16,70 0	18,32 8	- 1,628	1.053.000,0 0	23.566.00 0	0,04 5	997.000,00	22.688.00 0	0,04 4	45.041.758,61	1,01 7	6,924	7,04
2015-2014	91.231.914,24	32.412.667,42	58.819.246,81	18,32 8	17,29 4	1,034	997.000,00	22.688.00 0	0,04 4	954.864,84	21.868.00 0	0,04 4	56.885.151,66	1,00 6	- 0,020	- 0,02
2014-2013	32.412.667,42	112.132.164,7 7	- 79.719.497,35	17,29 4	18,53 5	- 1,241	954.864,84	21.868.00 0	0,04 4	954.864,84	21.038.00 0	0,04 5	64.238.112,29	0,96 2	- 0,030	- 0,03
2013-2012	112.132.164,7 7	299.721.750,0 7	- 187.589.585,30	18,53 5	19,51 8	- 0,983	954.864,84	21.038.00 0	0,04 5	954.864,84	20.183.90 0	0,04 7	190.833.759,2 1	0,95 9	- 0,030	- 0,03
2012-2011	299.721.750,0 7	503.379.657,2 8	- 203.657.907,21	19,51 8	20,03 6	- 0,518	954.864,84	20.183.90 0	0,04 7	954.864,84	19.387.00 0	0,04 9	393.161.983,0 2	0,96 1	- 0,030	- 0,03
2011-2010	503.379.657,2 8	47.298.500,09	456.081.157,19	20,03 6	17,67 1	2,365	954.864,84	19.387.00 0	0,04 9	954.864,84	18.653.00 0	0,05 1	192.846.155,2 6	0,96 2	- 0,030	- 0,03
2010-2009	47.298.500,09	26.306.775,88	20.991.724,21	17,67 1	17,08 5	0,586	954.864,84	18.653.00 0	0,05 1	954.864,84	5.845.931	0,16 3	35.822.054,97	0,31 3	- 1,170	- 0,37
2009-2008	26.306.775,88	24.178.547,08	2.128.228,79	17,08 5	16,70 0	0,385	954.864,84	5.845.931	0,16 3	954.864,84	5.662.383	0,16 9	5.527.866,99	0,96 9	- 0,020	- 0,02
2008-2007	24.178.547,08	16.597.978,08	7.580.569,00	16,70 0	16,62 4	0,076	954.864,84	5.662.383	0,16 9	954.864,84	5.325.762	0,17 9	99.744.328,96	0,94 1	- 0,051	- 0,05
2007-2006	16.597.978,08	6.894.644,80	9.703.333,28	16,62 4	15,74 6	0,878	954.864,84	5.325.762	0,17 9	954.864,84	5.157.411	0,18 5	11.051.632,44	0,96 8	- 0,020	- 0,02
2006-2005	6.894.644,80	2.942.424,47	3.952.220,33	15,74 6	14,89 4	0,852	954.864,84	5.157.411	0,18 5	954.864,84	5.057.608	0,18 9	4.638.756,26	0,98 1	- 0,010	- 0,01
2005-2004	2.942.424,47	5.213.004,60	- 2.270.580,13	14,89 4	15,46 6	- 0,572	954.864,84	5.057.608	0,18 9	954.864,84	4.895.780	0,19 5	3.969.545,69	0,96 8	- 0,030	- 0,03
2004-2003	5.213.004,60	3.357.132,41	1.855.872,20	15,46 6	15,02 6	0,44	954.864,84	4.895.780	0,19 5	954.864,84	4.816.287	0,19 8	4.217.891,35	0,98 4	- 0,010	- 0,01
2003-2002	3.357.132,41	1.192.558,23	2.164.574,18	15,02 6	13,99 1	1,035	954.864,84	4.816.287	0,19 8	954.864,84	1.703.682	0,56 0	2.091.376,02	0,35 4	- 1,021	- 0,36
2002-2001	1.192.558,23	6.859.960,81	- 5.667.402,58	13,99 1	15,74 1	-1,75	954.864,84	1.703.682	0,56 0	954.864,84	1.629.826	0,58 6	3.238.515,76	0,95 7	- 0,040	- 0,04
2001	6.859.960,81	6.853.233,91	6.726,90	15,74 1	15,74 0	0,001	954.864,84	1.629.826	0,58 6	954.864,84	1.607.364	0,59 4	6.726.902,01	0,98 6	- 0,010	- 0,01

Sumber: Analisis Penulis, 2025

Tingkat Ekonomi (ΔGI)

Tahun	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	$\sum L(E^*t, E^*0)$						$\ln(GI^*t/GI^*0)$									ΔGI
	Et	E0	A-B	lnEt	lnE0	D-E	GDPt	Pt	G/H	GDP0	P0	J/K	C/F	I/L	ln(N)	N*O

2023-2022	18.613.725,06	6.729.573,75	11.884.151,31	16,73 9	15,72 2	1,017	31.748.00 0	3.736.48 9	8,49 7	30.411.00 0	3.761.87 0	8,08 4	11.685.497,85	1,05 1	6,957	7,31
2022-2021	6.729.573,75	18.239.539,70	- 11.509.965,95	15,72 2	16,71 9	- 0,997	30.411.00 0	3.761.87 0	8,08 4	29.116.00 0	3.712.89 6	7,84 2	11.544.599,75	1,03 1	6,938	7,15
2021-2020	18.239.539,70	18.175.797,45	63.742,24	16,71 9	16,71 5	0,004	29.116.00 0	3.712.89 6	7,84 2	27.754.00 0	3.668.71 9	7,56 5	15.935.560,49	1,03 7	6,944	7,20
2020-2019	18.175.797,45	18.180.149,00	- 4.351,55	16,71 5	16,71 5	0	27.754.00 0	3.668.71 9	7,56 5	27.010.00 0	3.842.93 2	7,02 8	#DIV/0!	1,07 6	6,981	7,51
2019-2018	18.180.149,00	18.032.909,94	147.239,06	16,71 5	16,70 7	0,008	27.010.00 0	3.842.93 2	7,02 8	25.776.00 0	3.802.87 2	6,77 8	18.404.882,98	1,03 7	6,944	7,20
2018-2017	18.032.909,94	17.924.490,04	108.419,90	16,70 7	16,70 1	0,006	25.776.00 0	3.802.87 2	6,77 8	24.534.00 0	3.762.16 7	6,52 1	18.069.982,79	1,03 9	6,946	7,22
2017-2016	17.924.490,04	17.903.931,22	20.558,82	16,70 1	16,70 0	0,001	24.534.00 0	3.762.16 7	6,52 1	23.566.00 0	3.720.91 2	6,33 3	20.558.817,27	1,03 0	6,937	7,14
2016-2015	17.903.931,22	91.231.914,24	- 73.327.983,01	16,70 0	18,32 8	- 1,628	23.566.00 0	3.720.91 2	6,33 3	22.688.00 0	3.679.17 6	6,16 7	45.041.758,61	1,02 7	6,934	7,12
2015-2014	91.231.914,24	32.412.667,42	58.819.246,81	18,32 8	17,29 4	1,034	22.688.00 0	3.679.17 6	6,16 7	21.868.00 0	3.637.11 6	6,01 2	56.885.151,66	1,02 6	6,933	7,11
2014-2013	32.412.667,42	112.132.164,7 7	- 79.719.497,35	17,29 4	18,53 5	- 1,241	21.868.00 0	3.637.11 6	6,01 2	21.038.00 0	3.594.85 4	5,85 2	64.238.112,29	1,02 7	6,943	7,13
2013-2012	112.132.164,7 7	299.721.750,0 7	- 187.589.585,30	18,53 5	19,51 8	- 0,983	21.038.00 0	3.594.85 4	5,85 2	20.183.90 0	3.552.46 2	5,68 2	190.833.759,2 1	1,03 0	6,937	7,15
2012-2011	299.721.750,0 7	503.379.657,2 8	- 203.657.907,21	19,51 8	20,03 6	- 0,518	20.183.90 0	3.552.46 2	5,68 2	19.387.00 0	3.509.99 7	5,52 3	393.161.983,0 2	1,02 9	6,936	7,13
2011-2010	503.379.657,2 8	47.298.500,09	456.081.157,19	20,03 6	17,67 1	2,365	19.387.00 0	3.509.99 7	5,52 3	18.653.00 0	3.457.49 1	5,39 5	192.846.155,2 6	1,02 4	6,931	7,10
2010-2009	47.298.500,09	26.306.775,88	20.991.724,21	17,67 1	17,08 5	0,586	18.653.00 0	3.457.49 1	5,39 5	5.845.931	3.501.86 9	1,66 9	35.822.054,97	3,23 2	8,080	26,1 1
2009-2008	26.306.775,88	24.178.547,08	2.128.228,79	17,08 5	16,70 0	0,385	5.845.931	3.501.86 9	1,66 9	5.662.383	3.468.50 2	1,63 3	5.527.866,99	1,02 3	6,930	7,09
2008-2007	24.178.547,08	16.597.978,08	7.580.569,00	16,70 0	16,62 4	0,076	5.662.383	3.468.50 2	1,63 3	5.325.762	3.434.53 4	1,55 1	99.744.328,96	1,05 3	6,959	7,33
2007-2006	16.597.978,08	6.894.644,80	9.703.333,28	16,62 4	15,74 6	0,878	5.325.762	3.434.53 4	1,55 1	5.157.411	3.400.10 7	1,51 7	11.051.632,44	1,02 2	6,929	7,08
2006-2005	6.894.644,80	2.942.424,47	3.952.220,33	15,74 6	14,89 4	0,852	5.157.411	3.400.10 7	1,51 7	5.057.608	3.356.50 6	1,50 7	4.638.756,26	1,00 7	6,914	6,96
2005-2004	2.942.424,47	5.213.004,60	- 2.270.580,13	14,89 4	15,46 6	- 0,572	5.057.608	3.356.50 6	1,50 7	4.895.780	3.315.26 7	1,47 7	3.969.545,69	1,02 0	6,927	7,07
2004-2003	5.213.004,60	3.357.132,41	1.855.872,20	15,46 6	15,02 6	0,44	4.895.780	3.315.26 7	1,47 7	4.816.287	3.265.77 8	1,47 5	4.217.891,35	1,00 1	6,908	6,92
2003-2002	3.357.132,41	1.192.558,23	2.164.574,18	15,02 6	13,99 1	1,035	4.816.287	3.265.77 8	1,47 5	1.703.682	3.217.02 8	0,53 0	2.091.376,02	2,78 5	7,932	22,0 9
2002-2001	1.192.558,23	6.859.960,81	- 5.667.402,58	13,99 1	15,74 1	-1,75	1.703.682	3.217.02 8	0,53 0	1.629.826	3.169.00 6	0,51 4	3.238.515,76	1,03 0	6,937	7,14
2001-2000	6.859.960,81	6.853.233,91	6.726,90	15,74 1	15,74 0	0,001	1.629.826	3.169.00 6	0,51 4	1.607.364	3.120.47 8	0,51 5	6.726.902,01	0,99 8	- 0,010	-0,01

Sumber: Analisis Penulis, 2025

Populasi (AP)

Tahun	A	B	C	D	E	F	G	H	I	M	O	P
	$\sum L(E^*t, E^*0)$						$\ln(P^*t/P^*0)$					AP
	Et	E0	A-B	lnEt	lnE0	D-E	Pt	P0	G/H	F/M	ln(I)	M*O
2023-2022	18.613.725,06	6.729.573,75	11.884.151,31	16,739	15,722	1,017	3.736.489	3.761.870	0,993	1,024	-0,100	0,10
2022-2021	6.729.573,75	18.239.539,70	- 11.509.965,95	15,722	16,719	-0,997	3.761.870	3.712.896	1,013	- 0,984	6,920	1,01
2021-2020	18.239.539,70	18.175.797,45	63.742,24	16,719	16,715	0,004	3.712.896	3.668.719	1,012	0,004	6,919	0,00
2020-2019	18.175.797,45	18.180.149,00	- 4.351,55	16,715	16,715	0	3.668.719	3.842.932	0,955	-	-0,010	-
2019-2018	18.180.149,00	18.032.909,94	147.239,06	16,715	16,707	0,008	3.842.932	3.802.872	1,011	0,008	6,918	0,01
2018-2017	18.032.909,94	17.924.490,04	108.419,90	16,707	16,701	0,006	3.802.872	3.762.167	1,011	0,006	6,918	0,01
2017-2016	17.924.490,04	17.903.931,22	20.558,82	16,701	16,700	0,001	3.762.167	3.720.912	1,011	0,001	6,918	0,00
2016-2015	17.903.931,22	91.231.914,24	- 73.327.983,01	16,700	18,328	-1,628	3.720.912	3.679.176	1,011	- 1,610	6,918	1,65
2015-2014	91.231.914,24	32.412.667,42	58.819.246,81	18,328	17,294	1,034	3.679.176	3.637.116	1,012	1,022	6,919	1,05
2014-2013	32.412.667,42	112.132.164,77	- 79.719.497,35	17,294	18,535	-1,241	3.637.116	3.594.854	1,012	- 1,227	6,919	1,26
2013-2012	112.132.164,77	299.721.750,07	- 187.589.585,30	18,535	19,518	-0,983	3.594.854	3.552.462	1,012	- 0,971	6,919	0,99
2012-2011	299.721.750,07	503.379.657,28	- 203.657.907,21	19,518	20,036	-0,518	3.552.462	3.509.997	1,012	- 0,512	6,919	0,52
2011-2010	503.379.657,28	47.298.500,09	456.081.157,19	20,036	17,671	2,365	3.509.997	3.457.491	1,015	2,330	6,922	2,40
2010-2009	47.298.500,09	26.306.775,88	20.991.724,21	17,671	17,085	0,586	3.457.491	3.501.869	0,987	0,594	-0,020	0,58
2009-2008	26.306.775,88	24.178.547,08	2.128.228,79	17,085	16,700	0,385	3.501.869	3.468.502	1,010	0,381	6,917	0,39
2008-2007	24.178.547,08	16.597.978,08	7.580.569,00	16,700	16,624	0,076	3.468.502	3.434.534	1,010	0,075	6,917	0,08
2007-2006	16.597.978,08	6.894.644,80	9.703.333,28	16,624	15,746	0,878	3.434.534	3.400.107	1,010	0,869	6,917	0,89
2006-2005	6.894.644,80	2.942.424,47	3.952.220,33	15,746	14,894	0,852	3.400.107	3.356.506	1,013	0,841	6,920	0,86
2005-2004	2.942.424,47	5.213.004,60	- 2.270.580,13	14,894	15,466	-0,572	3.356.506	3.315.267	1,012	- 0,565	6,919	0,58
2004-2003	5.213.004,60	3.357.132,41	1.855.872,20	15,466	15,026	0,44	3.315.267	3.265.778	1,015	0,433	6,922	0,45

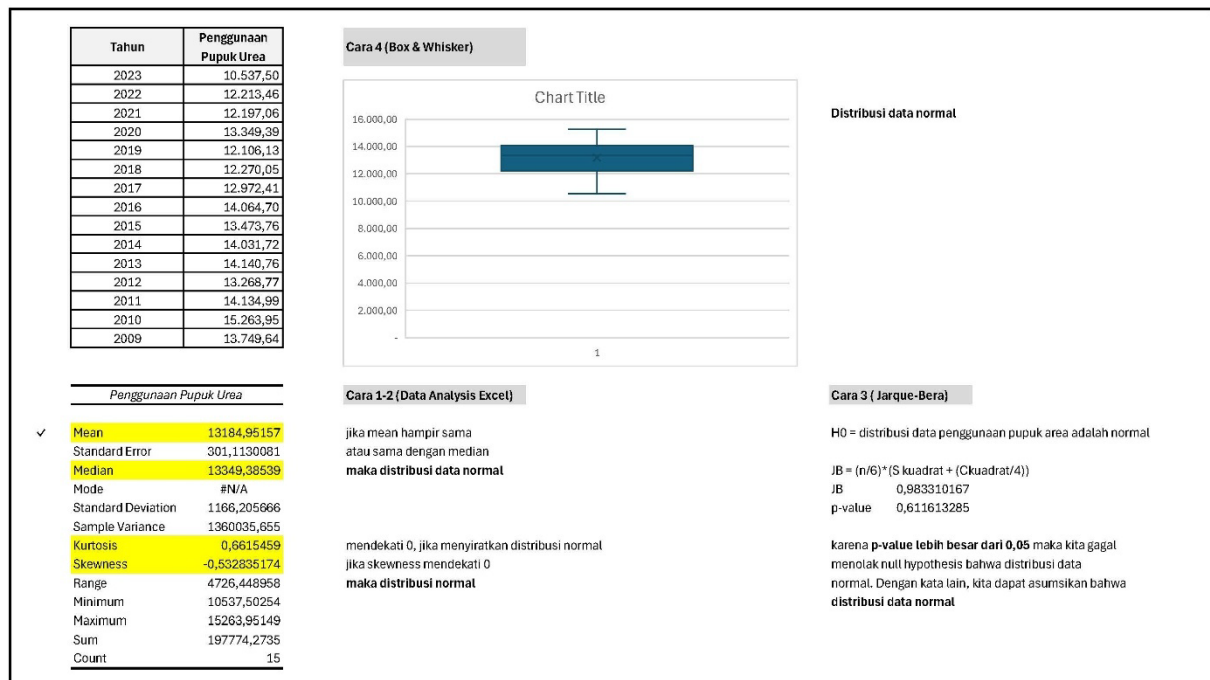
2003- 2002	3.357.132,41	1.192.558,23	2.164.574,18	15,026	13,991	1,035	3.265.778	3.217.028	1,015	1,020	6,922	1,05
2002- 2001	1.192.558,23	6.859.960,81	- 5.667.402,58	13,991	15,741	-1,75	3.217.028	3.169.006	1,015	- 1,724	6,922	- 1,78
2001- 2000	6.859.960,81	6.853.233,91	6.726,90	15,741	15,740	0,001	3.169.006	3.120.478	1,016	0,001	6,923	0,00

Sumber: Analisis Penulis, 2025



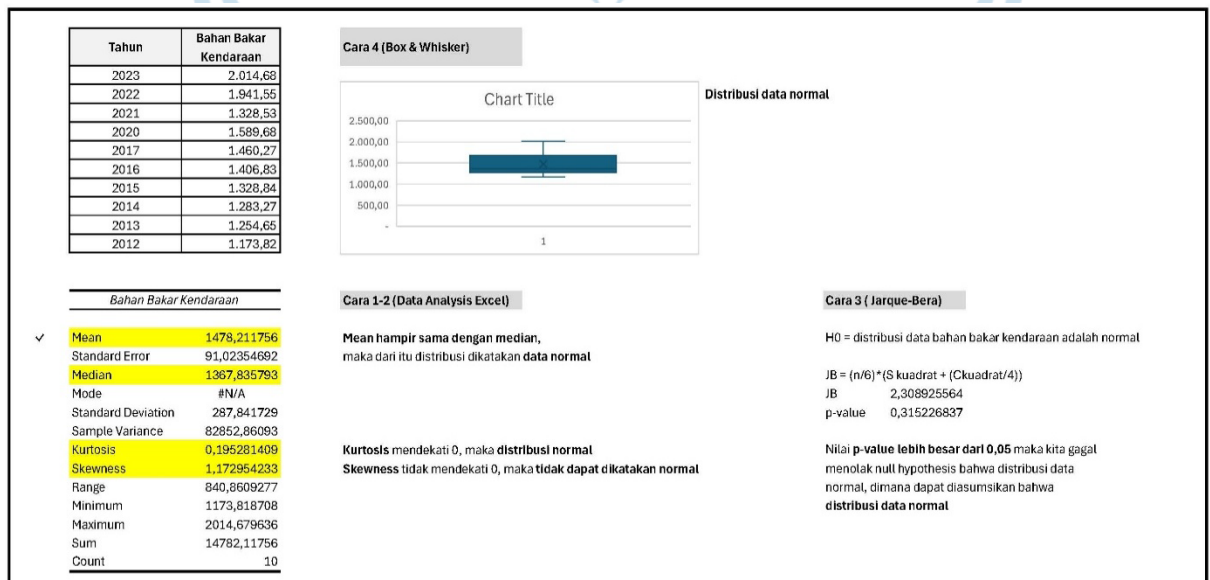
Data Imputation

Pertanian



Sumber: Analisis Penulis, 2025

Transportasi



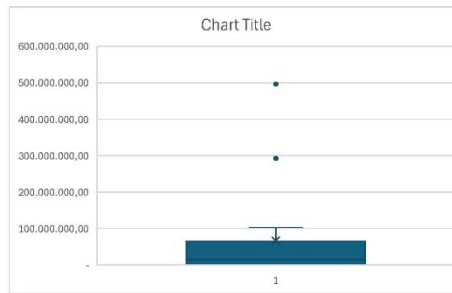
Sumber: Analisis Penulis, 2025

Industri

Tahun	Industri
2022	3.917.338,99
2015	87.604.049,99
2014	30.073.524,86
2013	102.770.991,52
2012	293.227.452,41
2011	495.936.665,16
2010	41.895.008,95
2009	22.437.800,00
2008	22.763.488,74
2007	15.294.172,82
2006	5.614.028,16
2005	1.719.027,59
2004	3.372.389,78
2003	1.924.324,48
2002	89.639,96
2001	5.876.013,31
2000	5.875.175,49

Industri	
Mean	67081828,95
Standard Error	31953633,67
Median	15294172,82
Mode	#N/A
Standard Deviation	131748206,7
Sample Variance	1,73576E+16
Kurtosis	7,40343255
Skewness	2,727409292
Range	495847025,2
Minimum	89639,96181
Maximum	495936665,2
Sum	1140391092
Count	17

Cara 4 (Box & Whisker)



Distribusi data tidak normal (buruk)

Cara 1-2 (Data Analysis Excel)

Nilai mean jauh dengan median,
maka dari itu distribusi dikatakan data **tidak normal**

Kurtosis jauh dari angka 0, maka distribusi **tidak normal**
Skewness tidak mendekati 0, maka **tidak dapat dikatakan normal**

Cara 3 (Jarque-Bera)

HA = distribusi data Industri tidak normal

JB = $(n/6) * (S^2_{kuadrat} + (C_{kuadrat}/4))$
JB 59,80081701
p-value 9,83338E-14

Nilai p-value lebih besar dari 0,05 maka kita gagal menolak null hypothesis bahwa distribusi data normal, dimana dapat diasumsikan bahwa **distribusi data normal**

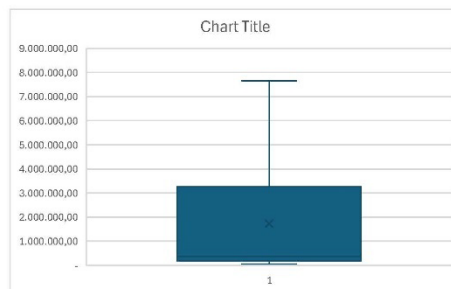
Sumber: Analisis Penulis, 2025

IPPU

Tahun	Pelumas
2022	60.282,10
2015	1.568.603,42
2014	373.636,32
2013	7.661.738,63
2012	4.797.847,17
2011	5.888.559,38
2010	3.982.759,18
2009	2.554.681,20
2008	181.058,51
2007	173.494,23
2006	160.401,35
2005	184.584,67
2004	895.280,35
2003	487.473,45
2002	184.099,85
2001	173.847,18
2000	185.504,98

Pelumas	
Mean	1736108,939
Standard Error	579713,2106
Median	373636,3159
Mode	#N/A
Standard Deviation	2390218,8
Sample Variance	5,71315E+12
Kurtosis	1,085095146
Skewness	1,472966154
Range	7601456,529
Minimum	60282,09928
Maximum	7661738,628
Sum	29513851,95
Count	17

Cara 4 (Box & Whisker)



Distribusi data tidak normal

Cara 1-2 (Data Analysis Excel)

Nilai mean jauh dengan median,
maka dari itu distribusi dikatakan data **tidak normal**

Kurtosis jauh dari angka 0, maka distribusi **tidak normal**
Skewness tidak mendekati 0, maka **tidak dapat dikatakan normal**

Cara 3 (Jarque-Bera)

HA = distribusi data pelumas tidak normal

JB = $(n/6) * (S^2_{kuadrat} + (C_{kuadrat}/4))$
JB 6,98154736
p-value 0,030477283

Nilai p-value kurang dari 0,05 maka dapat diasumsikan data tidak normal normal, dimana dapat diasumsikan bahwa **distribusi data normal**

Sumber: Analisis Penulis, 2025