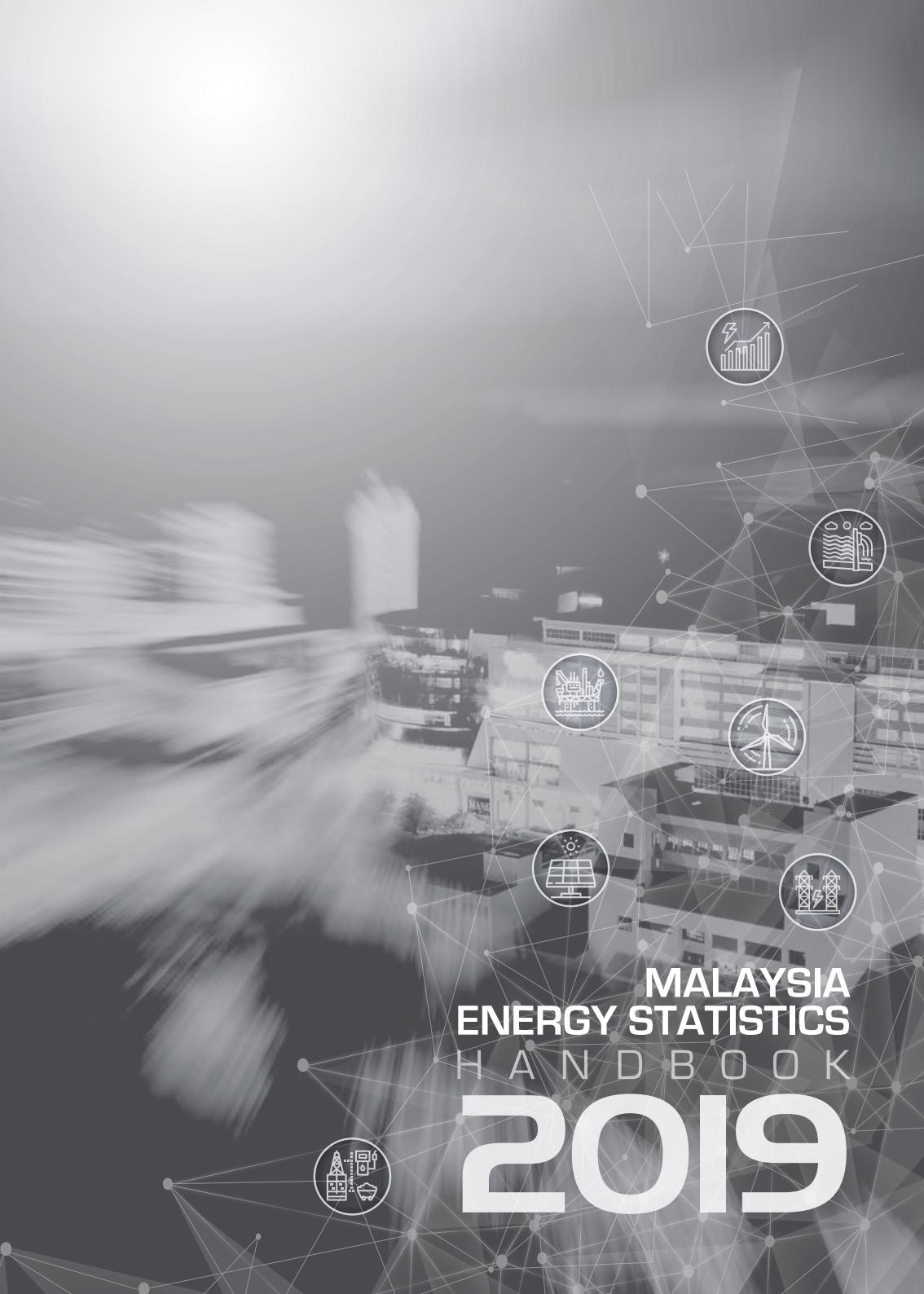


MALAYSIA ENERGY STATISTICS H A N D B O O K **2019**



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PREFACE

Energy Commission was established on the 1st of May 2001, under the Energy Commission Act 2001 and it became fully operational in January 2002. Energy Commission's core function is to regulate electricity and piped gas supply in Peninsular Malaysia and Sabah, delicately balancing the priorities of energy providers and the needs of consumers. We are committed in ensuring reliable, safe and cost effective supply of electricity and piped gas to all of its consumers. On top of that, we are also responsible as being the hub for energy data and the focal point for matters related to energy data in Malaysia.

The Malaysia Energy Statistics Handbook is a pocket sized guide that displays the national key energy data. Our database is updated annually and this handbook is published and distributed annually. The information in this handbook is also available in the MEIH (Malaysia Energy Information Hub) website (<https://meih.st.gov.my>) as well as in the 'MyEnergyStats' mobile application.

This handbook comprises of 10 main sections, whereby each section contains graphs and charts for users to visualize the energy trend and provides an overview of national energy supply and demand. This handbook displays data on Energy Supply, Energy Transformation, Energy Consumption, Energy Prices, Energy Indicators and Electricity and Piped Gas Performance.

The information presented in this handbook is a supplement to the National Energy Balance 2017, Performance and Statistical Information on Electricity Supply Industry in Malaysia 2018 and Piped Gas Distribution Industry Statistics Malaysia 2018.

Inquiries about figures and graphs in this handbook could be addressed to:

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Reserves of Crude Oil and Condensates

Unit: Billion Barrels

Year	Reserves of Crude Oil and Condensates			
	PENINSULAR MALAYSIA	SARAWAK	SABAH	TOTAL
1990	2.943	-	-	2.943
1991	3.045	-	-	3.045
1992	3.743	1.267	0.604	5.614
1993	4.279	1.205	0.631	6.115
1994	2.500	1.200	0.600	4.300
1995	2.455	1.067	0.590	4.112
1996	2.500	0.900	0.600	4.000
1997	2.700	0.680	0.470	3.850
1998	2.440	0.860	0.580	3.880
1999	2.080	0.830	0.510	3.420
2000	1.920	0.850	0.620	3.390
2001	1.920	0.850	0.620	3.390
2002	2.110	1.340	0.780	4.230
2003	2.040	1.300	1.210	4.550
2004	1.980	1.420	1.430	4.830
2005	1.770	1.560	1.970	5.300
2006	1.791	1.334	2.129	5.254
2007	1.452	0.889	1.975	4.316
2008	1.719	1.315	2.424	5.458
2009	1.781	1.388	2.348	5.517
2010	2.061	1.362	2.376	5.799
2011	2.374	1.492	1.992	5.858
2012	2.413	1.600	1.941	5.954
2013	2.335	1.592	1.923	5.850
2014	2.341	1.566	1.885	5.792
2015	2.205	1.693	2.009	5.907
2016	1.735	1.370	1.925	5.030
2017	1.669	1.290	1.767	4.727

Source: PETRONAS

Reserves of Natural Gas

Unit: Trillion Standard Cubic Feet (TSCF)

Reserves of Natural Gas											
Year	PENINSULAR MALAYSIA			SABAH			SARAWAK				Grand Total
	Non Associated	Associated	Total	Non Associated	Associated	Total	Non Associated	Associated	Total		
1990	21.350	6.080	27.430	1.320	1.030	2.350	23.840	3.310	27.150	56.930	
1991	21.320	6.200	27.520	1.380	0.980	2.360	25.770	3.400	29.170	59.050	
1992	22.500	6.700	29.200	1.800	1.100	2.900	31.900	3.800	35.700	67.800	
1993	23.900	7.800	31.700	3.000	1.700	4.700	36.600	3.800	40.400	76.800	
1994	26.600	7.900	34.500	2.900	1.200	4.100	37.900	4.200	42.100	80.700	
1995	28.000	8.200	36.200	6.000	1.300	7.300	37.000	4.200	41.200	84.700	
1996	28.300	8.300	36.600	4.900	1.200	6.100	33.200	4.300	37.500	80.200	
1997	29.400	8.900	38.300	4.800	1.200	6.000	32.500	3.000	35.500	79.800	
1998	27.700	8.900	36.600	4.900	1.200	6.100	40.600	3.700	44.300	87.000	
1999	25.900	8.500	34.400	6.600	1.100	7.700	39.900	3.800	43.700	85.800	
2000	25.300	8.400	33.700	6.700	1.300	8.000	37.400	3.400	40.800	82.500	
2001	25.300	8.400	33.700	6.700	1.300	8.000	37.400	3.400	40.800	82.500	
2002	24.900	8.400	33.300	6.800	1.200	8.000	42.600	3.400	46.000	87.300	
2003	23.900	8.500	32.400	8.100	1.800	9.900	42.700	4.000	46.700	89.000	
2004	21.740	9.520	31.260	7.750	1.880	9.630	42.750	3.380	46.130	87.020	
2005	21.590	9.200	30.790	8.230	2.500	10.730	40.540	3.130	43.670	85.190	
2006	23.170	9.650	32.820	8.210	2.750	10.960	41.240	2.930	44.170	87.950	
2007	24.030	9.440	33.469	8.461	3.137	11.598	40.850	3.008	43.858	88.925	
2008	24.190	9.269	33.459	9.132	3.584	12.716	38.974	2.861	41.835	88.010	
2009	24.079	9.153	33.232	8.578	3.523	12.101	39.727	2.908	42.635	87.968	
2010	25.139	9.280	34.419	8.681	3.787	12.468	39.187	2.513	41.700	88.587	
2011	25.337	9.797	35.134	8.638	3.327	11.965	39.856	3.033	42.889	89.988	
2012	26.144	9.594	35.738	9.801	3.502	13.303	39.901	3.180	43.081	92.122	
2013	25.649	9.325	34.974	9.454	3.764	13.218	46.798	3.330	50.128	98.320	
2014	25.242	9.688	34.930	10.029	3.724	13.753	48.955	3.024	51.979	100.662	
2015	24.022	8.471	32.493	11.884	3.149	15.032	50.034	2.853	52.888	100.413	
2016	20.428	6.793	27.221	10.915	2.521	13.436	45.336	1.770	47.105	87.762	
2017	19.327	6.333	25.659	11.060	1.487	12.547	43.184	1.508	44.692	82.897	

Source: PETRONAS

Reserves of Coal as of 31st December 2017

Unit : Million Tonnes

Location	Reserves			Coal Type
	Measured	Indicated	Inferred	
SARAWAK				
1. Abok & Silantek, Sri Aman	7.25	10.60	32.40	Coking Coal, Semi-Anthracite and Anthracite
2. Merit-Pila, Kapit	170.26	107.02	107.84	Sub-Bituminous
3. Bintulu	6.00	0.00	14.00	Bituminous (partly coking coal)
4. Mukah - Balingian	86.95	170.73	646.53	Lignite, Hydrous Lignite and Sub-Bituminous
5. Tutoh Area	5.58	34.66	162.33	Sub-Bituminous
Subtotal	276.04	323.01	963.10	-
SABAH				
1. Silimpodon	4.80	14.09	7.70	Sub-Bituminous
2. Labuan			8.90	Sub-Bituminous
3. Maliau			215.00	Bituminous
4. Malibau		17.90	25.00	
5. SW Malibau		23.23		
6. Pinangan West Middle Block			42.60	Bituminous
Subtotal	4.80	55.22	299.20	
SELANGOR				
1. Batu Arang			17.00	Sub-Bituminous
Subtotal	0.00	0.00	17.00	
Grand Total	280.84	378.23	1,279.30	

Source: Department of Mineral and Geosciences Malaysia

Installed Capacity as of 31st December 2017

Unit: MW

	Hydro	Natural Gas	Coal	Diesel/ MFO	Biomass	Solar	Biogas	Others	Total	
PENINSULAR MALAYSIA	TNB	2,554.1	2,531.0	0.0	0.0	0.0	0.0	0.0	5,085.1	
	IPPs	0.0	9,225.8	10,066.0	0.0	0.0	0.0	0.0	19,291.8	
	Co-Generation	0.0	924.8	0.0	79.2	12.4	0.0	0.0	1,041.4	
	Self-Generation	2.1	0.0	0.0	399.0	351.8	1.0	4.9	758.8	
	FiT	23.8	0.0	0.0	0.0	39.0	317.1	46.2	0.0	
	Subtotal	2,580.0	12,681.6	10,066.0	478.2	403.2	318.1	51.1	25.0	26,603.2
SABAH	SESB	82.1	112.0	0.0	172.9	0.0	0.0	0.0	367.0	
	IPPs	0.0	1,012.6	0.0	101.9	0.0	0.0	0.0	1,114.5	
	Co-Generation	0.0	106.8	0.0	0.0	116.2	0.0	0.0	223.0	
	Self-Generation	0.0	0.0	0.0	526.8	130.4	0.1	8.8	0.0	
	FiT	6.5	0.0	0.0	0.0	48.9	36.9	9.6	0.0	
	LSS	0.0	0.0	0.0	0.0	0.0	2.0	0.0	2.0	
SARAWAK	Subtotal	88.6	1,231.4	0.0	801.6	295.5	39.0	18.4	0.0	2,474.5
	SEB	3,459.5	594.6	480.0	114.0	0.0	0.5	0.0	0.0	
	Co-Generation	0.0	389.0	0.0	0.0	0.0	0.0	0.0	389.0	
	Self-Generation	0.0	0.0	0.0	12.6	49.5	0.0	0.5	5.1	
	Subtotal	3,459.5	983.6	480.0	126.6	49.5	0.5	0.5	5.1	5,105.2
	Total	6,128.1	14,896.6	10,546.0	1,406.4	748.2	357.6	70.0	30.1	34,182.9
	Share (%)	17.9%	43.6%	30.9%	4.1%	2.2%	1.0%	0.2%	0.1%	100.00%

Source: Power utilities, IPPs, SEDA, Kementerian Utiliti Sarawak

Note: Data exclude plants that are not in operation

Available Capacity as of 31st December 2017

		Hydro	Natural Gas	Coal	Diesel/ MFO	Biomass	Total	Unit: MW
PENINSULAR MALAYSIA	TNB	2,514.8	2,527.0	0.0	0.0	0.0	5,041.8	
	IPPs	0.0	8,602.7	10,066.0	0.0	0.0	18,668.7	
	Subtotal	2,514.8	11,129.7	10,066.0	0.0	0.0	23,710.5	
SABAH	SESB	74.6	103.4	0.0	141.1	0.0	319.1	
	IPPs	0.0	865.0	0.0	36.0	0.0	901.0	
	FiT	6.5	0.0	0.0	0.0	48.9	55.4	
	Subtotal	81.1	968.4	0.0	177.1	48.9	1,275.5	
SARAWAK	SEB	3,202.0	566.0	378.0	86.5	0.0	4,232.5	
	Subtotal	3,202.0	566.0	378.0	86.5	0.0	4,232.5	
	Total	5,797.9	12,664.1	10,444.0	263.6	48.9	29,218.4	

Power utilities, IPPs and SEDA

Key Economic and Energy Data

	2017				
	Q1	Q2	Q3	Q4	Total
GDP at current prices (RM million)*	324,577	329,787	343,008	356,009	1,353,381
GDP at 2010 prices (RM million)*	280,248	287,300	298,702	308,078	1,174,329
GNI at current prices (RM million)*	314,430	321,619	333,377	347,601	1,317,027
Population ('000 people)**	31,925	32,023	32,113	32,204	32,023
Primary Energy Supply (ktoe)	23,506	24,309	24,622	25,861	98,298
Final Energy Consumption (ktoe)	14,980	15,616	16,093	15,800	62,489
Electricity Consumption (ktoe)	2,991	3,193	3,222	3,201	12,607
Electricity Consumption (GWh)	34,767	37,113	37,445	37,199	146,524
Per Capita					
GDP at Current Prices (RM)*	40,667	41,194	42,725	44,219	42,263
Primary Energy Supply (toe)	0.734	0.759	0.769	0.807	3.070
Final Energy Consumption (toe)	0.469	0.488	0.501	0.491	1.951
Electricity Consumption (kWh)	1,086	1,159	1,169	1,162	4,576
Energy Intensity					
Primary Energy Intensity (toe/GDP at 2010 prices (RM million))	83.88	84.61	82.43	83.94	83.71
Final Energy Intensity (toe/GDP at 2010 prices (RM million))	52.1	53.7	54.4	52.8	53.2
Electricity Intensity (toe/GDP at 2010 prices (RM million))	10.7	11.1	10.8	10.4	10.7
Electricity Intensity (GWh/GDP at 2010 prices (RM million))	0.124	0.129	0.125	0.121	0.125

Note (*) : Quarterly data is from the Department of Statistics Malaysia

(**) : Mid-year population data is from the Department of Statistics Malaysia

Key Economic and Energy Data by Region

PENINSULAR MALAYSIA	2010	2011	2012	2013	2014	2015	2016	2017
GDP at Current Prices (RM million)*	672,787	739,349	793,280	835,888	909,988	959,507	1,022,555	1,125,017
GDP at 2010 Prices (RM million)*	672,787	709,030	752,858	789,217	838,939	881,462	920,163	975,045
Population ('000 people)**	22,754	23,099	23,417	23,868	24,281	24,669	24,995	25,303
Final Energy Consumption (ktoe)	35,593	35,968	36,683	41,859	42,470	43,011	45,872	46,520
Electricity Consumption (ktoe)	8,145	8,427	8,791	9,108	9,315	9,531	10,026	10,004
Electricity Consumption (GWh)	94,666	97,939	102,174	105,861	108,259	110,770	116,529	116,273
Per Capita								
GDP at Current Prices (RM)*	29,569	32,008	33,876	35,021	37,674	39,221	40,910	44,462
Final Energy Consumption (toe)	1.564	1.557	1.567	1.754	1.758	1.760	1.835	1.839
Electricity Consumption (kWh)	4,161	4,240	4,363	4,435	4,482	4,540	4,662	4,595
Energy Intensity								
Final Energy Intensity (toe/GDP at 2010 prices (RM million))	52.9	50.7	48.7	53.0	50.6	48.8	49.9	47.7
Electricity Intensity (toe/GDP at 2010 prices (RM million))	12.1	11.9	11.7	11.5	11.1	10.8	10.9	10.3
Electricity Intensity (GWh/GDP at 2010 prices (RM million))	0.141	0.138	0.136	0.134	0.129	0.126	0.127	0.119

Note (*) : 1. GDP data by State is from the Department of Statistics Malaysia

2. GDP for Peninsular Malaysia includes Supra State (Supra State covers production activities that beyond the centre of predominant economic interest for any state)

3. GDP data by State from 2005 until 2009 and 2017 were estimated by the Energy Commission

(**) : Mid-year population data is from the Department of Statistics Malaysia

SABAH	2010	2011	2012	2013	2014	2015	2016	2017
GDP at Current Prices (RM million)*	61,516	69,672	71,347	72,361	77,594	79,098	86,151	94,784
GDP at 2010 Prices (RM million)*	61,516	63,191	65,390	67,775	71,150	75,586	79,285	83,964
Population ('000 people)**	3,348	3,435	3,523	3,703	3,764	3,816	3,900	3,954
Final Energy Consumption (ktoe)	2,758	3,466	4,671	4,097	4,128	3,845	5,015	9,512
Electricity Consumption (ktoe)	355	368	425	439	423	499	487	477
Electricity Consumption (GWh)	4,127	4,275	4,943	5,097	4,919	5,805	5,665	5,548
Per Capita								
GDP at Current Prices (RM)*	18,373	20,284	20,251	19,542	20,616	20,730	22,092	23,975
Final Energy Consumption (toe)	0.824	1.009	1.326	1.106	1.097	1.008	1.286	2.406
Electricity Consumption (kWh)	1,233	1,245	1,403	1,377	1,307	1,521	1,453	1,403
Energy Intensity								
Final Energy Intensity (toe/GDP at 2010 prices (RM million))	44.8	54.8	71.4	60.4	58.0	50.9	63.3	113.3
Electricity Intensity (toe/GDP at 2010 prices (RM million))	5.8	5.8	6.5	6.5	5.9	6.6	6.1	5.7
Electricity Intensity (GWh/GDP at 2010 prices (RM million))	0.067	0.068	0.076	0.075	0.069	0.077	0.071	0.066

Note (*) : 1. GDP data by State is from the Department of Statistics Malaysia

2. GDP for Sabah includes WP Labuan

3. GDP data by State from 2005- 2009 and 2017 were estimated by the Energy Commission

(**) : Mid-year population data is from the Department of Statistics Malaysia

SARAWAK	2010	2011	2012	2013	2014	2015	2016	2017
GDP at Current Prices (RM million)*	87,131	102,713	106,625	110,365	118,862	119,119	121,414	133,580
GDP at 2010 Prices (RM million)*	87,131	92,700	94,013	98,089	102,359	106,307	108,778	115,260
Population ('000 people)**	2,487	2,528	2,570	2,643	2,664	2,702	2,739	2,766
Final Energy Consumption (ktoe)	3,125	4,086	5,358	5,628	5,612	4,951	6,331	6,458
Electricity Consumption (ktoe)	493	445	795	1,043	1,304	1,344	1,878	2,126
Electricity Consumption (GWh)	5,730	5,172	9,237	12,118	15,152	15,624	21,831	24,703
Per Capita								
GDP at Current Prices (RM)*	35,033	36,671	36,585	37,120	38,423	39,351	39,719	41,641
Final Energy Consumption (toe)	1.256	1.616	2.085	2.130	2.106	1.833	2.312	2.335
Electricity Consumption (kWh)	2,304	2,046	3,594	4,586	5,688	5,784	7,971	8,930
Energy Intensity								
Final Energy Intensity (toe/GDP at 2010 prices (RM million))	35.9	44.1	57.0	57.4	54.8	46.6	58.2	56.1
Electricity Intensity (toe/GDP at 2010 prices (RM million))	5.7	4.8	8.5	10.6	12.7	12.6	17.3	18.5
Electricity Intensity (GWh/GDP at 2010 prices (RM million))	0.066	0.056	0.098	0.124	0.148	0.147	0.201	0.214

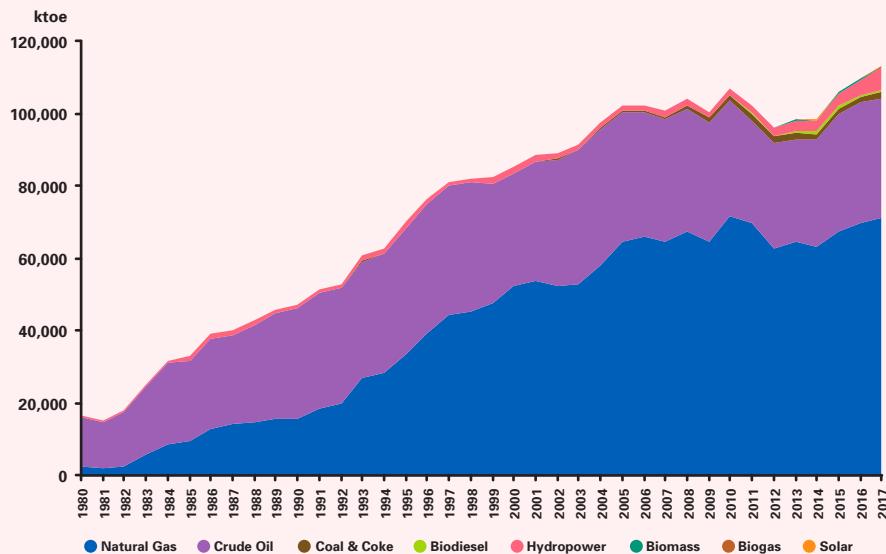
Note (*) : 1. GDP data by State is from the Department of Statistics Malaysia

2. GDP data by State from 2005 until 2009 and 2017 were estimated by the Energy Commission

(**) : Mid-year population data is from the Department of Statistics Malaysia

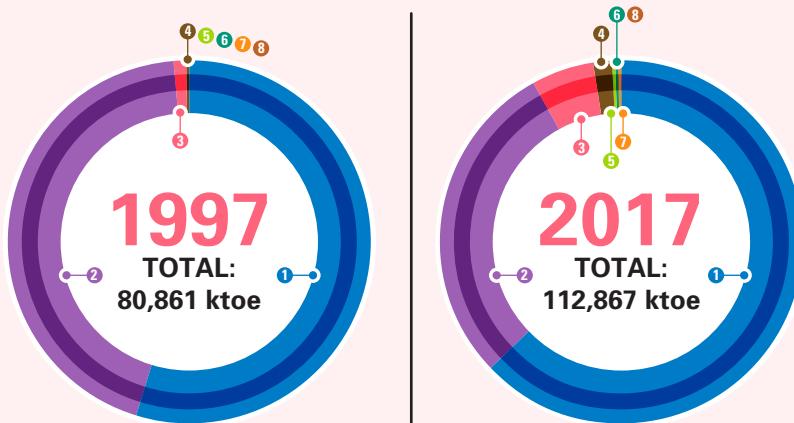
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Primary Production by Fuel Type



18

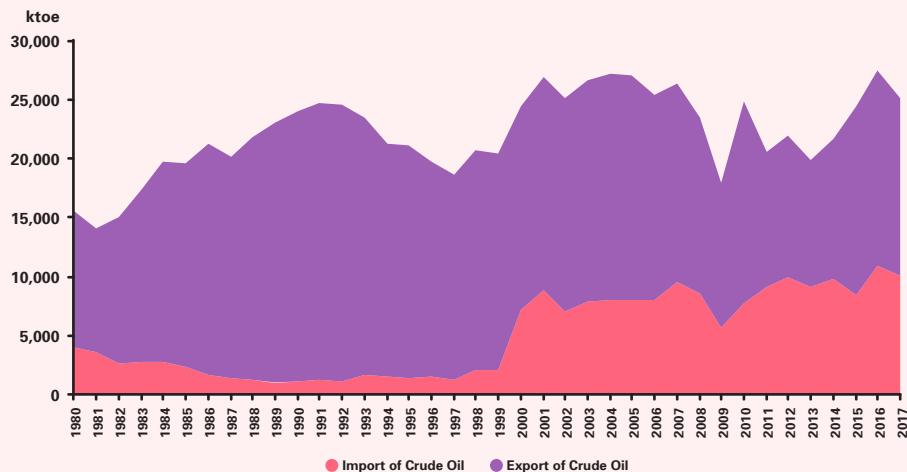
ENERGY SUPPLY



Source: National Energy Balance 2017

Year	Primary Production by Fuel Type									Total
	Natural Gas	Crude Oil	Coal & Coke	Biodiesel	Hydropower	Biomass	Biogas	Solar		
1980	2,245	13,707	0	0	383	0	0	0	0	16,335
1981	1,891	12,815	0	0	403	0	0	0	0	15,109
1982	2,379	15,048	0	0	394	0	0	0	0	17,821
1983	5,737	19,045	0	0	454	0	0	0	0	25,236
1984	8,715	22,207	0	0	913	0	0	0	0	31,835
1985	9,629	22,187	0	0	1,019	0	0	0	0	32,835
1986	12,950	24,979	0	0	1,070	0	0	0	0	38,999
1987	14,002	24,742	0	0	1,212	0	0	0	0	39,956
1988	14,455	26,923	15	0	1,288	0	0	0	0	42,681
1989	15,645	28,967	76	0	1,203	0	0	0	0	45,891
1990	15,487	30,629	70	0	915	0	0	0	0	47,101
1991	18,390	31,843	126	0	1,053	0	0	0	0	51,412
1992	19,644	32,264	53	0	997	0	0	0	0	52,958
1993	26,898	32,218	264	0	1,262	0	0	0	0	60,642
1994	28,335	32,798	89	0	1,652	0	0	0	0	62,874
1995	33,268	35,090	85	0	1,540	0	0	0	0	69,983
1996	39,031	35,744	153	0	1,243	0	0	0	0	76,171
1997	44,318	35,600	153	0	790	0	0	0	0	80,861
1998	45,054	35,784	221	0	1,113	0	0	0	0	82,172
1999	47,746	32,835	174	0	1,668	0	0	0	0	82,423
2000	52,432	30,839	242	0	1,612	0	0	0	0	85,125
2001	53,659	32,851	344	0	1,687	0	0	0	0	88,541
2002	52,465	34,838	223	0	1,329	0	0	0	0	88,855
2003	53,010	37,026	107	0	1,056	0	0	0	0	91,199
2004	57,768	38,041	241	0	1,329	0	0	0	0	97,379
2005	64,337	36,127	430	0	1,313	0	0	0	0	102,207
2006	65,752	34,386	569	0	1,568	0	0	0	0	102,275
2007	64,559	33,967	576	0	1,517	0	0	0	0	100,619
2008	67,191	34,195	791	0	1,964	0	0	0	0	104,141
2009	64,661	32,747	1,348	0	1,627	0	0	0	0	100,383
2010	71,543	32,163	1,511	0	1,577	0	0	0	0	106,794
2011	69,849	28,325	1,838	176	1,850	0	0	0	0	102,038
2012	62,580	29,115	1,860	253	2,150	183	4	11	0	96,156
2013	64,406	28,576	1,824	480	2,688	297	6	38	0	98,315
2014	63,091	29,545	1,694	612	3,038	181	12	63	0	98,236
2015	67,209	32,440	1,614	684	3,582	189	18	75	0	105,811
2016	69,673	33,234	1,522	509	4,501	198	21	90	0	109,747
2017	71,140	32,807	1,884	467	6,240	194	41	93	0	112,867

Import and Export of Crude Oil



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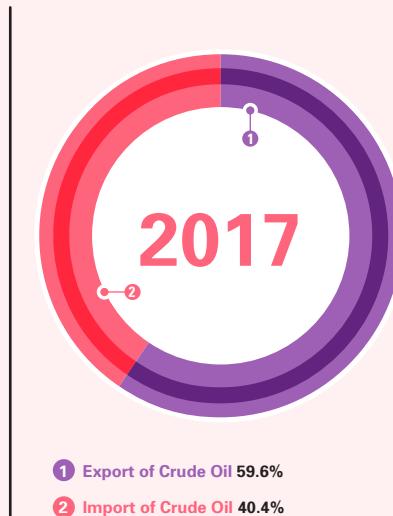
ENERGY SUPPLY



① Import of Crude Oil 7.0%

② Export of Crude Oil 93.0%

Source: National Energy Balance 2017



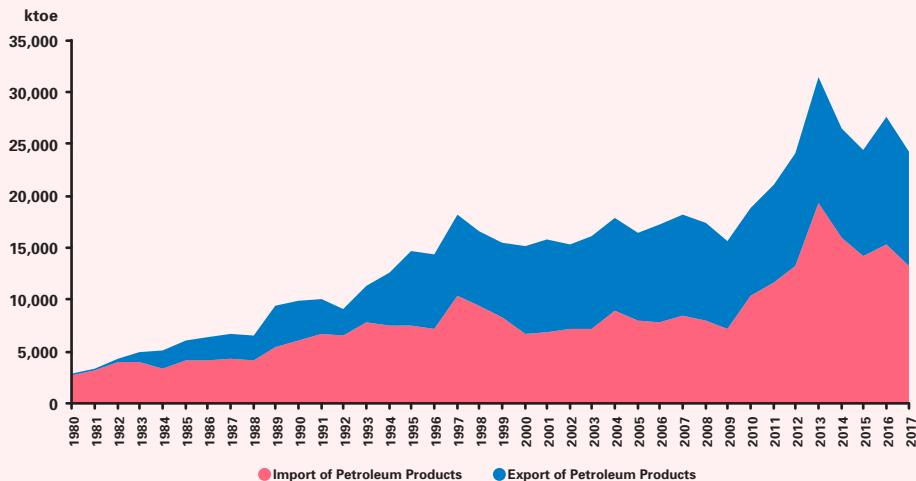
① Export of Crude Oil 59.6%

② Import of Crude Oil 40.4%

Unit: ktoe

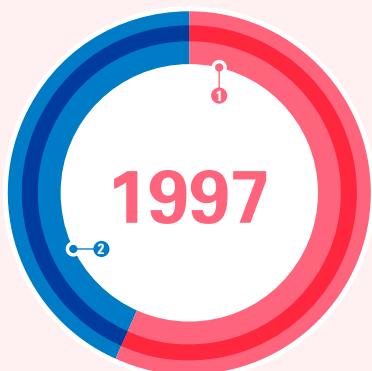
Year	Import and Export of Crude Oil	
	Import of Crude Oil	Export of Crude Oil
1980	4,034	11,619
1981	3,622	10,497
1982	2,587	12,392
1983	2,709	14,720
1984	2,690	17,073
1985	2,302	17,338
1986	1,625	19,683
1987	1,360	18,784
1988	1,198	20,593
1989	1,012	22,090
1990	1,047	22,949
1991	1,244	23,444
1992	1,159	23,374
1993	1,703	21,766
1994	1,566	19,726
1995	1,315	19,833
1996	1,446	18,315
1997	1,300	17,322
1998	2,014	18,640
1999	2,081	18,355
2000	7,218	17,254
2001	8,890	18,018
2002	7,083	18,100
2003	7,921	18,747
2004	7,953	19,245
2005	8,031	18,994
2006	8,048	17,389
2007	9,453	16,962
2008	8,519	15,001
2009	5,718	12,235
2010	7,760	17,125
2011	9,104	11,404
2012	9,995	11,988
2013	9,101	10,785
2014	9,780	11,831
2015	8,379	16,075
2016	10,854	16,605
2017	10,135	14,958

Import and Export of Petroleum Products



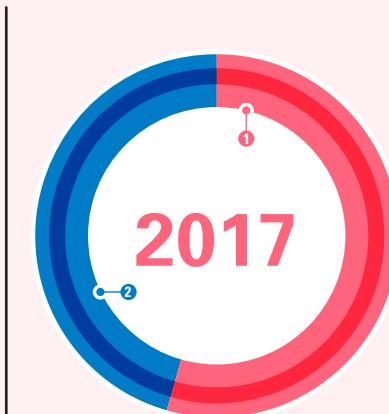
22

ENERGY SUPPLY



① Import of Petroleum Products 56.9%

② Export of Petroleum Products 43.1%



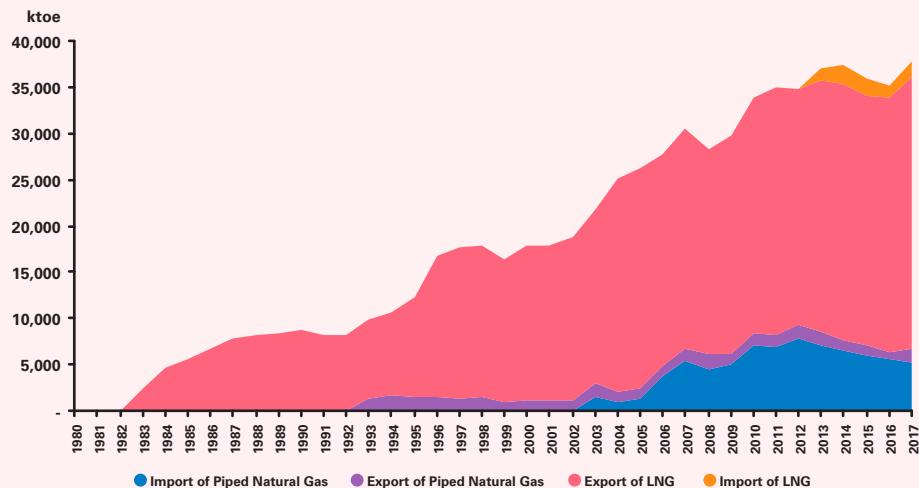
① Import of Petroleum Products 54.5%

② Export of Petroleum Products 45.5%

Source: National Energy Balance 2017

Year	Import and Export of Petroleum Products	
	Import of Petroleum Products	Export of Petroleum Products
1980	2,658	132
1981	3,160	123
1982	4,011	291
1983	3,981	976
1984	3,418	1,676
1985	4,062	1,949
1986	4,162	2,257
1987	4,259	2,425
1988	4,211	2,388
1989	5,490	3,960
1990	6,031	3,913
1991	6,728	3,272
1992	6,499	2,513
1993	7,835	3,507
1994	7,492	5,094
1995	7,411	7,261
1996	7,095	7,317
1997	10,331	7,840
1998	9,360	7,194
1999	8,357	7,161
2000	6,619	8,533
2001	6,881	8,900
2002	7,220	8,158
2003	7,116	8,972
2004	8,980	8,912
2005	7,961	8,435
2006	7,734	9,535
2007	8,452	9,780
2008	7,918	9,527
2009	7,243	8,419
2010	10,359	8,431
2011	11,579	9,421
2012	13,243	10,785
2013	19,383	11,983
2014	16,009	10,399
2015	14,219	10,219
2016	15,342	12,214
2017	13,252	11,063

Import and Export of Piped Natural Gas and Liquefied Natural Gas (LNG)



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ENERGY SUPPLY



① Export of LNG 78.0%

② Import of Piped Natural Gas 17.8%

③ Export of Piped Natural Gas 4.2%

④ Import of LNG 0.0%



① Export of LNG 77.7%

② Import of Piped Natural Gas 13.7%

③ Export of Piped Natural Gas 3.8%

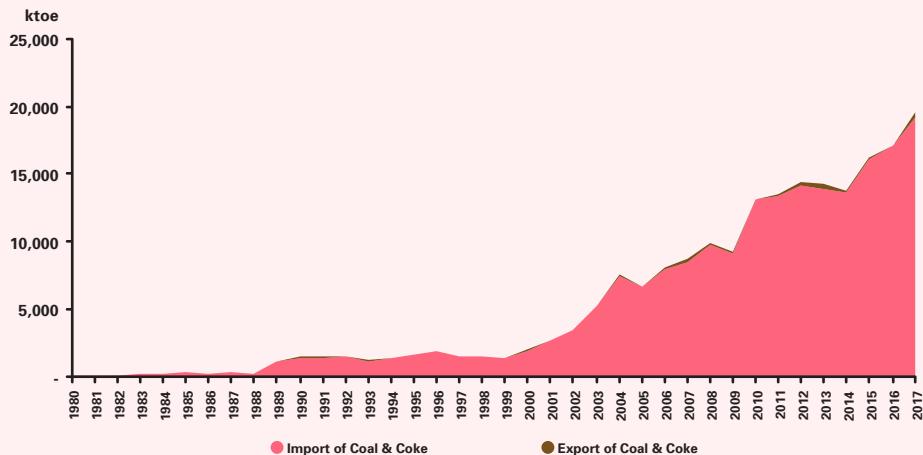
④ Import of LNG 4.8%

Source: National Energy Balance 2017

Unit: ktoe

Year	Import and Export of Piped Natural Gas and Liquefied Natural Gas (LNG)			
	Import of Piped Natural Gas	Export of Piped Natural Gas	Export of LNG	Import of LNG
1980	-	8	-	-
1981	-	10	-	-
1982	-	11	-	-
1983	-	2	2,416	-
1984	-	-	4,603	-
1985	-	-	5,658	-
1986	-	-	6,788	-
1987	-	-	7,855	-
1988	-	-	8,184	-
1989	-	-	8,464	-
1990	-	-	8,686	-
1991	-	-	8,278	-
1992	-	1	8,262	-
1993	-	1,258	8,654	-
1994	-	1,589	8,938	-
1995	-	1,474	10,790	-
1996	-	1,474	15,251	-
1997	-	1,340	16,396	-
1998	-	1,444	16,429	-
1999	-	860	15,445	-
2000	-	1,198	16,633	-
2001	-	1,178	16,636	-
2002	-	1,098	17,803	-
2003	1,501	1,402	18,965	-
2004	999	1,143	22,944	-
2005	1,340	1,134	23,707	-
2006	3,676	1,257	22,874	-
2007	5,435	1,295	23,777	-
2008	4,565	1,524	22,277	-
2009	5,055	1,166	23,606	-
2010	7,013	1,340	25,487	-
2011	6,979	1,147	26,856	-
2012	7,866	1,368	25,547	-
2013	7,098	1,497	27,089	1,450
2014	6,472	1,129	27,835	2,019
2015	5,941	1,062	27,018	1,873
2016	5,557	841	27,457	1,275
2017	5,183	1,452	29,428	1,815

Import and Export of Coal and Coke



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ENERGY SUPPLY



① Import of Coal & Coke 99.4%

② Export of Coal & Coke 0.6%

Source: National Energy Balance 2017

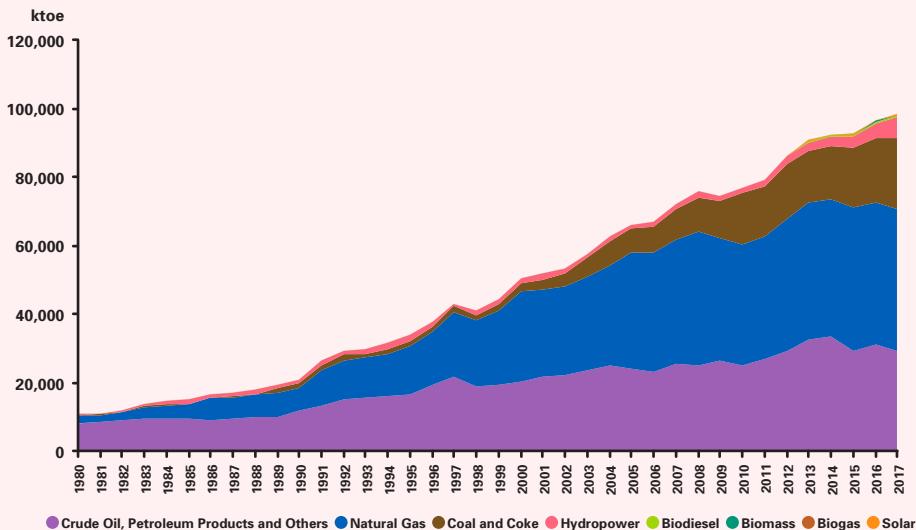


① Import of Coal & Coke 98.0%

② Export of Coal & Coke 2.0%

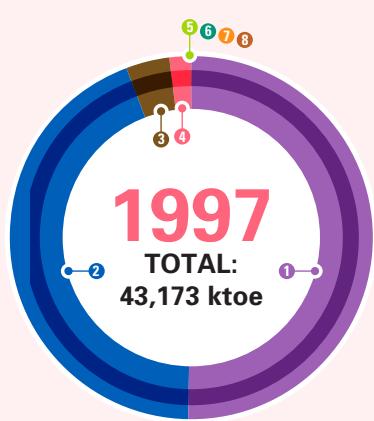
Year	Import and Export of Coal and Coke	
	Import of Coal and Coke	Export of Coal and Coke
1980	53	-
1981	99	-
1982	93	-
1983	249	-
1984	270	-
1985	362	-
1986	268	-
1987	327	-
1988	260	15
1989	1,093	11
1990	1,424	28
1991	1,407	66
1992	1,485	60
1993	1,158	70
1994	1,351	40
1995	1,588	50
1996	1,938	15
1997	1,446	9
1998	1,529	7
1999	1,321	8
2000	1,943	19
2001	2,665	34
2002	3,442	37
2003	5,268	36
2004	7,498	85
2005	6,612	44
2006	7,988	71
2007	8,425	273
2008	9,725	206
2009	9,126	119
2010	13,073	62
2011	13,330	141
2012	14,221	233
2013	13,909	326
2014	13,704	114
2015	16,051	156
2016	17,171	15
2017	19,181	382

Total Primary Energy Supply by Fuel Type

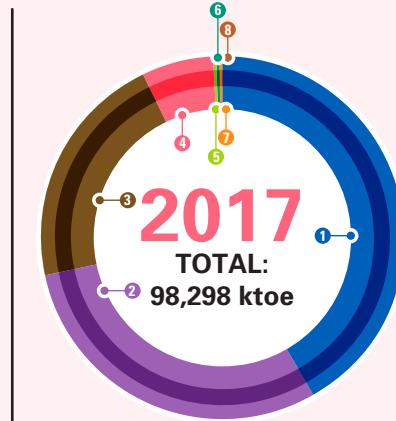


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ENERGY SUPPLY



- ① Crude Oil, Petroleum Products and Others 50.3%
- ② Natural Gas 44.1%
- ③ Coal and Coke 3.8%
- ④ Hydropower 1.8%
- ⑤ Biodiesel 0.0%
- ⑥ Biomass 0.0%
- ⑦ Solar 0.0%
- ⑧ Biogas 0.0%

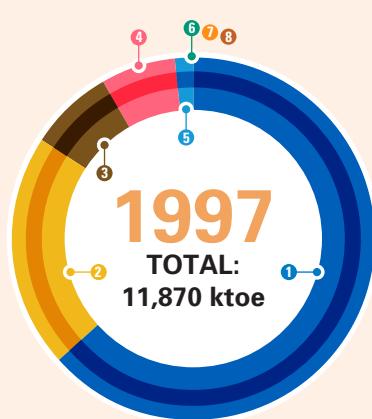
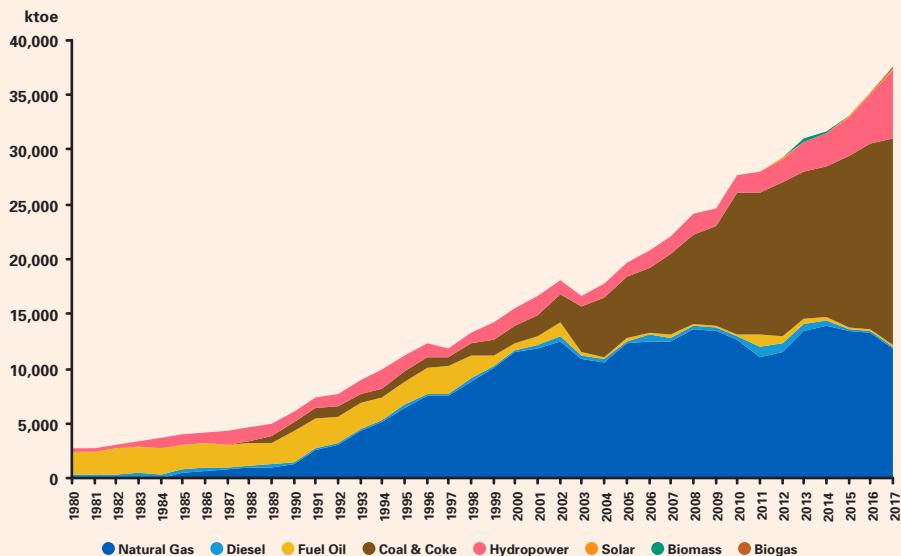


- ① Natural Gas 41.9%
- ② Crude Oil, Petroleum Products and Others 30.0%
- ③ Coal and Coke 21.1%
- ④ Hydropower 6.3%
- ⑤ Biodiesel 0.4%
- ⑥ Biomass 0.2%
- ⑦ Solar 0.1%
- ⑧ Biogas 0.0%

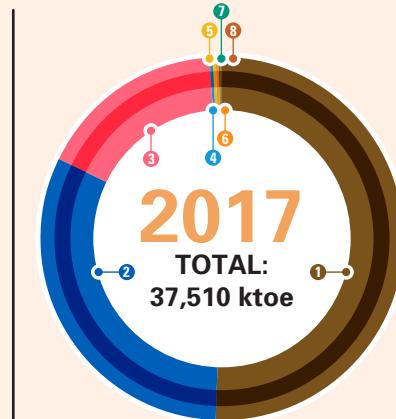
Source: National Energy Balance 2017

Year	Total Primary Energy Supply by Fuel Type								
	Crude Oil, Petroleum Products and Others	Natural Gas	Coal & Coke	Hydropower	Biodiesel	Biomass	Biogas	Solar	Total
1980	8,261	2,237	53	383	0	0	0	0	10,934
1981	8,873	1,881	99	403	0	0	0	0	11,256
1982	9,171	2,368	93	394	0	0	0	0	12,026
1983	9,718	3,319	249	454	0	0	0	0	13,740
1984	9,412	4,112	270	913	0	0	0	0	14,707
1985	9,715	3,971	362	1,019	0	0	0	0	15,067
1986	9,346	6,162	268	1,070	0	0	0	0	16,846
1987	9,543	6,147	327	1,212	0	0	0	0	17,229
1988	10,232	6,271	260	1,288	0	0	0	0	18,051
1989	10,177	7,181	1,158	1,203	0	0	0	0	19,719
1990	11,928	6,801	1,326	915	0	0	0	0	20,970
1991	13,606	10,112	1,564	1,053	0	0	0	0	26,335
1992	15,273	11,381	1,640	997	0	0	0	0	29,291
1993	15,951	11,360	1,352	1,262	0	0	0	0	29,925
1994	16,055	12,392	1,563	1,652	0	0	0	0	31,662
1995	16,767	13,960	1,612	1,540	0	0	0	0	33,879
1996	19,353	15,567	1,677	1,243	0	0	0	0	37,840
1997	21,720	19,041	1,622	790	0	0	0	0	43,173
1998	19,051	19,101	1,731	1,113	0	0	0	0	40,996
1999	19,450	21,476	1,940	1,668	0	0	0	0	44,534
2000	20,242	26,370	2,486	1,612	0	0	0	0	50,710
2001	21,673	25,649	2,970	1,687	0	0	0	0	51,979
2002	22,124	26,101	3,642	1,329	0	0	0	0	53,196
2003	23,936	27,257	5,316	1,056	0	0	0	0	57,565
2004	25,253	29,145	7,109	1,329	0	0	0	0	62,836
2005	24,096	33,913	6,889	1,313	0	0	0	0	66,211
2006	23,240	34,917	7,299	1,567	0	0	0	0	67,023
2007	25,381	36,639	8,848	1,522	0	0	0	0	72,390
2008	24,996	39,289	9,782	1,964	0	0	0	0	76,031
2009	26,482	35,851	10,623	1,627	0	0	0	0	74,583
2010	25,008	35,447	14,777	1,577	0	0	0	0	76,809
2011	26,903	35,740	14,772	1,850	24	0	0	0	79,289
2012	29,502	38,647	15,882	2,150	115	183	4	11	86,494
2013	32,474	39,973	15,067	2,688	188	297	6	38	90,731
2014	33,422	40,113	15,357	3,038	300	181	12	63	92,486
2015	29,165	41,853	17,406	3,582	389	189	18	75	92,677
2016	31,327	41,257	18,744	4,501	389	198	21	90	96,525
2017	29,379	41,201	20,771	6,240	379	194	41	93	98,298

Fuel Input to Power Stations



- ① Natural Gas 63.4% ⑤ Diesel 1.6%
- ② Fuel Oil 20.9% ⑥ Biomass 0.0%
- ③ Coal & Coke 7.4% ⑦ Solar 0.0%
- ④ Hydropower 6.7% ⑧ Biogas 0.0%



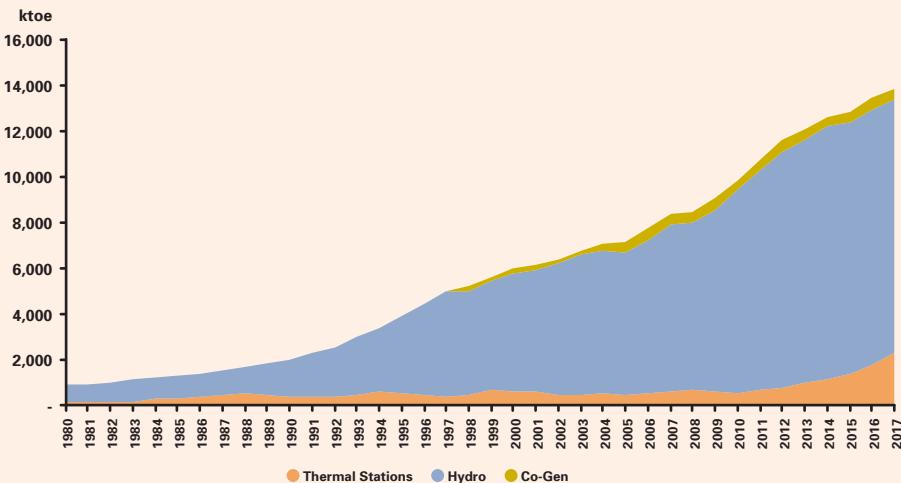
- ① Coal & Coke 50.6% ⑤ Fuel Oil 0.3%
- ② Natural Gas 31.7% ⑥ Solar 0.2%
- ③ Hydropower 16.6% ⑦ Biomass 0.1%
- ④ Diesel 0.4% ⑧ Biogas 0.1%

Source: National Energy Balance 2017

Unit: ktoe

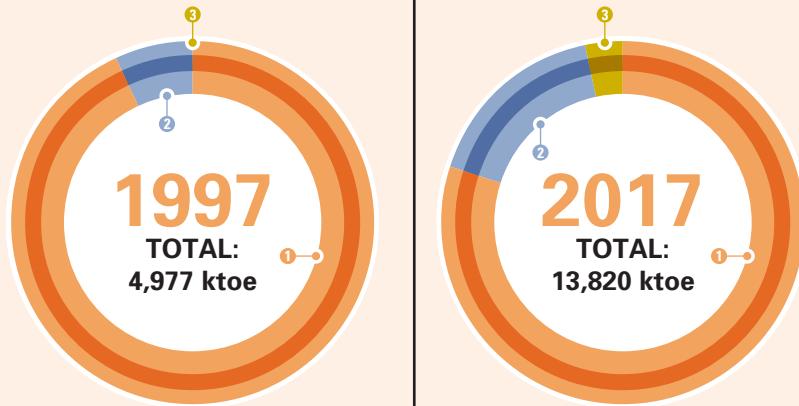
Year	Fuel Input to Power Stations								
	Natural Gas	Diesel	Fuel Oil	Coal & Coke	Hydropower	Solar	Biomass	Biogas	Total
1980	33	287	2,059	0	383	0	0	0	2,762
1981	36	273	2,097	0	403	0	0	0	2,809
1982	35	333	2,358	0	394	0	0	0	3,120
1983	59	461	2,370	0	454	0	0	0	3,344
1984	81	321	2,351	0	913	0	0	0	3,666
1985	539	345	2,174	0	1,019	0	0	0	4,077
1986	703	239	2,213	0	1,070	0	0	0	4,225
1987	818	183	2,086	0	1,212	0	0	0	4,299
1988	990	233	2,051	71	1,288	0	0	0	4,633
1989	1,004	319	1,888	602	1,203	0	0	0	5,016
1990	1,361	116	2,873	813	915	0	0	0	6,078
1991	2,533	164	2,687	963	1,053	0	0	0	7,400
1992	3,144	160	2,352	968	997	0	0	0	7,621
1993	4,374	87	2,388	884	1,262	0	0	0	8,995
1994	5,119	249	1,957	925	1,652	0	0	0	9,902
1995	6,414	265	2,073	957	1,540	0	0	0	11,249
1996	7,489	284	2,354	950	1,243	0	0	0	12,320
1997	7,531	185	2,482	882	790	0	0	0	11,870
1998	8,886	275	2,130	964	1,113	0	0	0	13,368
1999	10,162	172	950	1,332	1,668	0	0	0	14,284
2000	11,580	191	592	1,495	1,612	0	0	0	15,470
2001	11,922	278	730	1,994	1,687	0	0	0	16,611
2002	12,424	476	1,363	2,556	1,329	0	0	0	18,148
2003	10,893	340	289	4,104	1,056	0	0	0	16,682
2004	10,545	272	274	5,327	1,329	0	0	0	17,747
2005	12,271	298	275	5,541	1,313	0	0	0	19,698
2006	12,524	617	171	5,964	1,567	0	0	0	20,843
2007	12,549	314	199	7,486	1,522	0	0	0	22,070
2008	13,651	299	181	8,069	1,964	0	0	0	24,164
2009	13,390	384	205	9,010	1,627	0	0	0	24,616
2010	12,628	415	125	12,951	1,577	0	0	0	27,696
2011	10,977	981	1,103	13,013	1,850	0	0	0	27,924
2012	11,533	811	550	14,138	2,150	11	65	4	29,262
2013	13,520	623	392	13,527	2,688	38	164	6	30,958
2014	13,860	622	269	13,648	3,038	63	96	12	31,608
2015	13,378	279	101	15,627	3,582	75	74	17	33,133
2016	13,260	167	157	16,959	4,501	90	57	18	35,209
2017	11,872	147	99	18,967	6,240	93	52	40	37,510

Electricity Generation by Plant Type



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ENERGY TRANSFORMATION

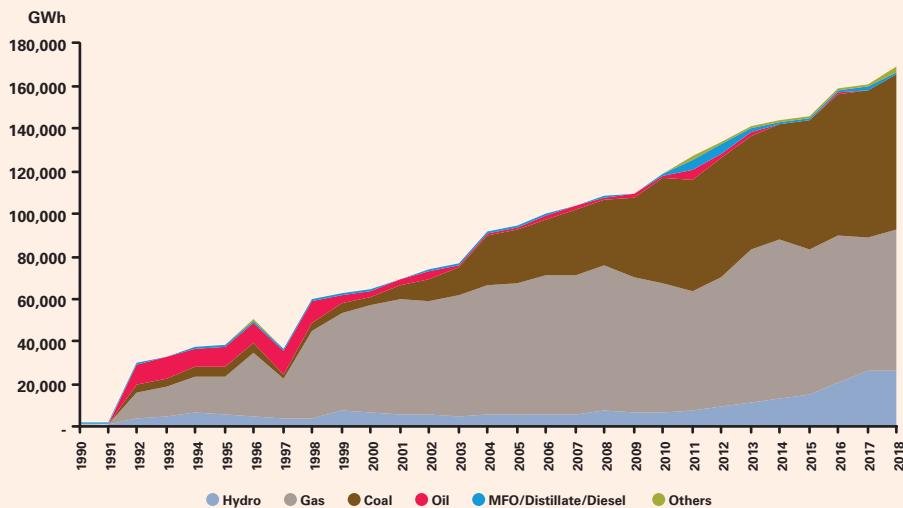


Source: National Energy Balance 2017

Unit: ktoe

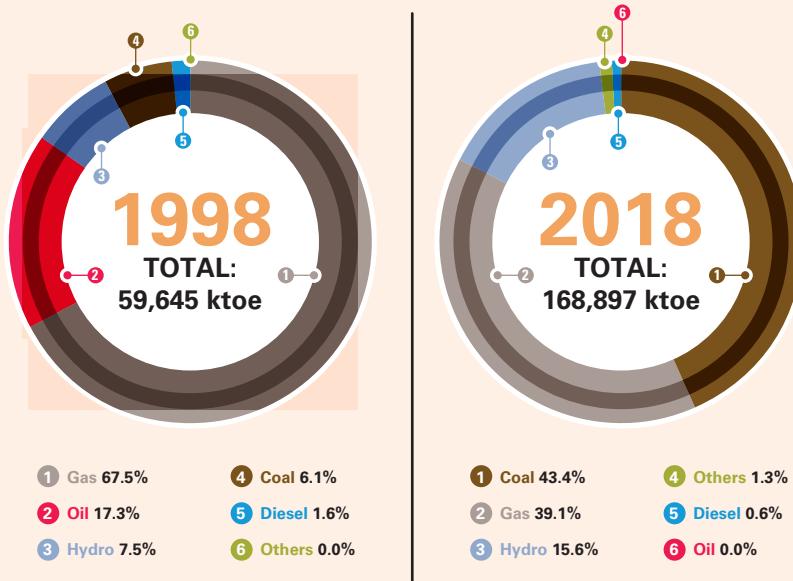
Year	Electricity Generation by Plant Type			
	Hydro	Thermal Stations	Co-Gen	Total
1980	120	744	-	864
1981	133	795	-	928
1982	128	885	-	1,013
1983	149	948	-	1,097
1984	294	888	-	1,182
1985	321	964	-	1,285
1986	351	1,036	-	1,387
1987	423	1,075	-	1,498
1988	488	1,176	-	1,664
1989	451	1,399	-	1,850
1990	343	1,636	-	1,979
1991	379	1,904	-	2,283
1992	375	2,146	-	2,521
1993	419	2,568	-	2,987
1994	561	2,801	-	3,362
1995	535	3,374	-	3,909
1996	446	3,975	-	4,421
1997	333	4,644	-	4,977
1998	417	4,596	207	5,220
1999	647	4,762	200	5,609
2000	599	5,132	224	5,955
2001	607	5,333	172	6,112
2002	456	5,771	157	6,384
2003	435	6,134	179	6,748
2004	501	6,215	359	7,075
2005	446	6,259	403	7,108
2006	554	6,687	499	7,740
2007	558	7,366	461	8,385
2008	642	7,321	460	8,423
2009	574	7,957	560	9,091
2010	540	8,864	387	9,791
2011	656	9,648	442	10,746
2012	779	10,253	530	11,562
2013	1,003	10,627	424	12,054
2014	1,152	11,075	402	12,629
2015	1,346	11,047	430	12,823
2016	1,723	11,170	535	13,428
2017	2,309	11,066	445	13,820

Electricity Generation Mix



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ENERGY TRANSFORMATION

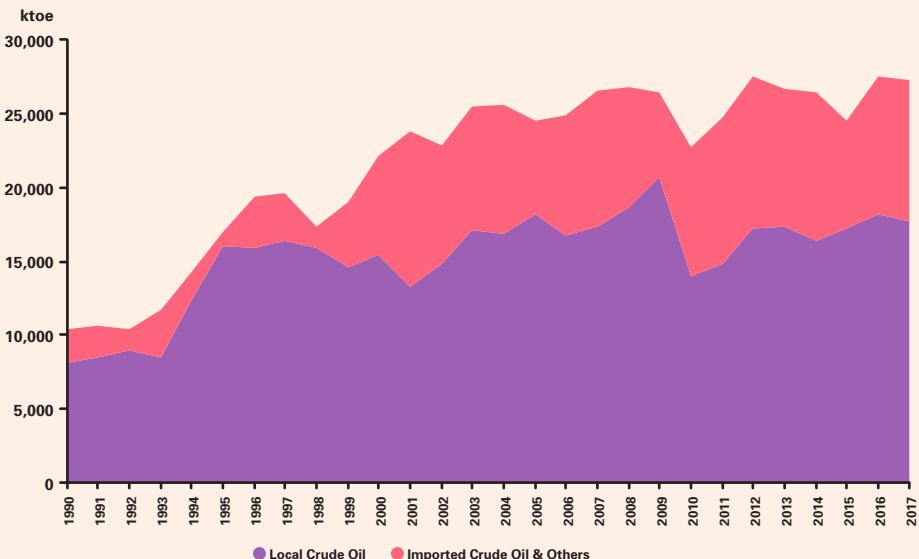


Source: Energy Commission

Unit: GWh

Year	Electricity Generation Mix						Total
	Hydro	Gas	Coal	Oil	Distillate/Diesel	Others	
1990	518	623	-	367	585	-	2,093
1991	762	525	-	379	612	-	2,278
1992	4,286	11,398	3,837	9,724	862	-	30,107
1993	4,853	13,905	3,880	9,820	865	-	33,323
1994	6,483	17,491	4,081	8,756	988	-	37,799
1995	6,184	17,726	3,974	9,687	1,249	-	38,820
1996	5,184	29,641	4,177	9,510	1,584	189	50,285
1997	4,134	18,387	2,460	10,784	1,300	-	37,065
1998	4,457	40,223	3,655	10,339	971	-	59,645
1999	7,552	45,988	4,522	4,220	747	-	63,029
2000	6,994	50,314	4,038	2,383	552	-	64,281
2001	6,066	54,066	6,238	2,531	831	-	69,732
2002	5,415	53,979	9,559	4,465	746	-	74,164
2003	5,090	56,478	13,435	1,221	976	-	77,200
2004	5,573	61,363	22,627	1,130	729	-	91,422
2005	6,007	61,396	25,231	1,048	348	-	94,030
2006	6,323	64,768	26,626	1,265	643	50	99,675
2007	5,957	65,568	30,856	1,091	677	63	104,212
2008	7,807	67,779	31,029	1,048	601	66	108,330
2009	6,890	63,370	37,644	1,041	685	132	109,762
2010	6,361	61,342	49,401	933	726	170	118,933
2011	8,056	55,732	52,302	4,295	5,108	1,576	127,069
2012	9,251	60,992	55,615	2,279	4,344	1,596	134,077
2013	11,799	71,174	53,663	1,571	1,741	1,318	141,266
2014	13,540	74,466	53,693	376	756	995	143,826
2015	15,524	67,900	60,129	595	877	1,196	146,221
2016	20,357	69,871	66,246	423	719	1,056	158,672
2017	26,716	62,131	68,866	-	1,695	1,316	160,724
2018	26,295	65,990	73,362	-	1,062	2,187	168,897

Input of Crude Oil in Refineries



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ENERGY TRANSFORMATION



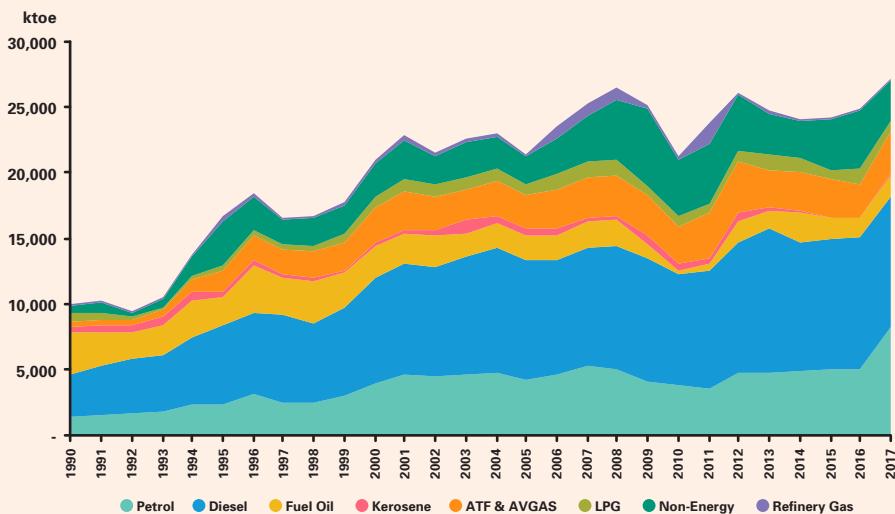
Source: National Energy Balance 2017



Unit: ktoe

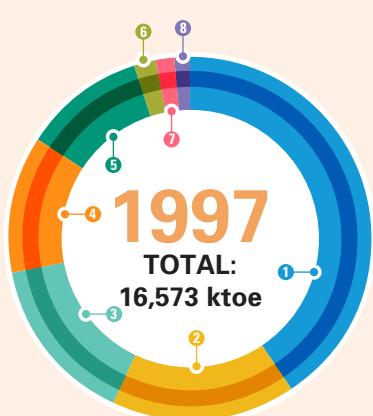
Year	Input of Crude Oil in Refineries		
	Local Crude Oil	Imported Crude Oil & Others	Total
1990	8,072	2,342	10,414
1991	8,476	2,113	10,589
1992	9,016	1,409	10,425
1993	8,502	3,195	11,697
1994	12,326	1,853	14,179
1995	15,991	969	16,960
1996	15,879	3,501	19,380
1997	16,382	3,224	19,606
1998	15,942	1,347	17,289
1999	14,595	4,437	19,032
2000	15,421	6,743	22,164
2001	13,299	10,546	23,845
2002	14,838	8,032	22,870
2003	17,127	8,322	25,449
2004	16,810	8,764	25,574
2005	18,216	6,271	24,487
2006	16,797	8,113	24,910
2007	17,320	9,251	26,571
2008	18,638	8,138	26,776
2009	20,685	5,812	26,497
2010	14,003	8,706	22,709
2011	14,874	9,904	24,778
2012	17,213	10,347	27,560
2013	17,365	9,289	26,654
2014	16,351	10,066	26,417
2015	17,249	7,327	24,576
2016	18,170	9,353	27,523
2017	17,647	9,605	27,252

Production of Petroleum Products from Refineries



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ENERGY TRANSFORMATION

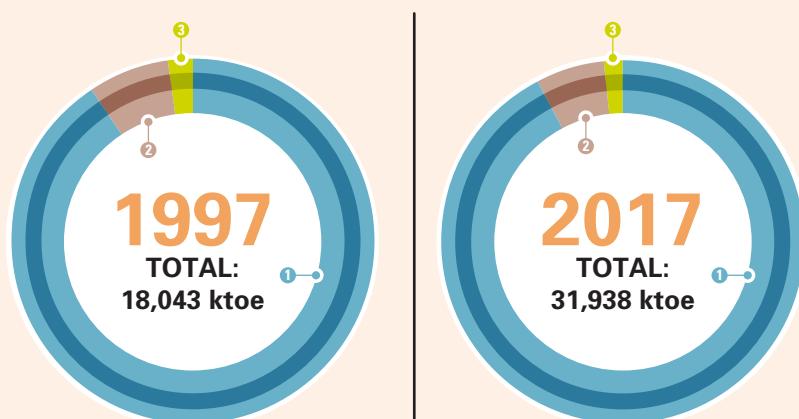
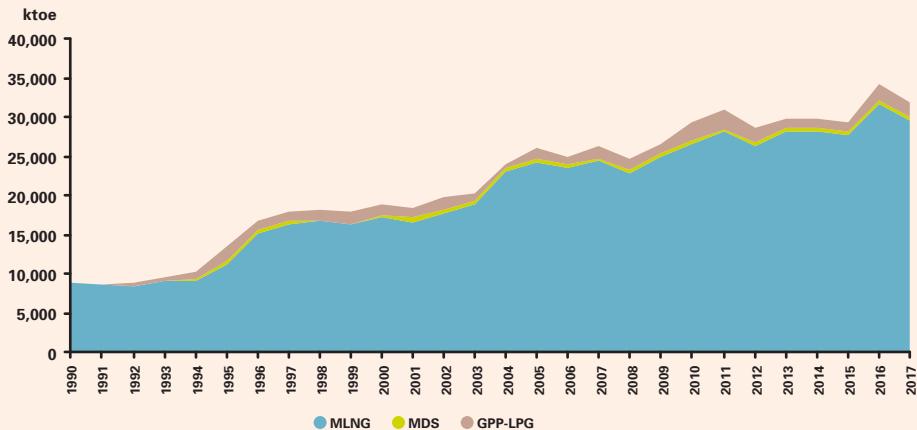


Source: National Energy Balance 2017

Unit: ktoe

Year	Production of Petroleum Products from Refineries								
	Petrol	Diesel	Fuel Oil	Kerosene	ATF & AVGAS	LPG	Non-Energy	Refinery Gas	Total
1990	1,347	3,350	3,106	491	360	613	561	151	9,979
1991	1,611	3,681	2,547	526	390	548	772	168	10,243
1992	1,724	4,048	2,110	541	412	200	324	143	9,502
1993	1,816	4,249	2,375	576	517	244	600	106	10,483
1994	2,316	5,108	2,887	563	980	319	1,468	162	13,803
1995	2,320	6,011	2,212	360	1,587	431	3,380	385	16,686
1996	3,134	6,174	3,696	292	1,899	371	2,554	331	18,451
1997	2,491	6,744	2,716	265	2,000	371	1,783	203	16,573
1998	2,545	5,926	3,233	285	1,985	449	2,117	192	16,732
1999	3,056	6,712	2,603	210	2,140	617	2,159	230	17,727
2000	3,893	8,059	2,532	239	2,660	838	2,492	241	20,954
2001	4,623	8,462	2,269	283	2,954	875	3,020	331	22,817
2002	4,460	8,401	2,332	414	2,570	897	2,127	294	21,495
2003	4,584	9,062	1,763	983	2,367	932	2,623	262	22,576
2004	4,724	9,611	1,813	591	2,693	897	2,455	215	22,999
2005	4,245	9,161	1,777	521	2,553	822	2,157	202	21,438
2006	4,607	8,752	1,933	537	2,938	1,118	2,750	849	23,484
2007	5,285	9,033	1,990	234	3,138	1,228	3,461	938	25,307
2008	5,066	9,364	1,994	245	3,139	1,208	4,475	991	26,482
2009	4,052	9,415	1,144	565	3,085	732	5,905	195	25,093
2010	3,873	8,369	327	483	2,891	697	4,357	209	21,206
2011	3,599	8,925	571	419	3,457	665	4,572	1,659	23,867
2012	4,708	10,033	1,608	654	3,918	702	4,318	197	26,138
2013	4,702	11,063	1,286	387	2,750	1,252	3,089	195	24,724
2014	4,918	9,725	2,340	100	2,916	1,102	2,826	192	24,119
2015	5,031	9,890	1,692	6	2,841	780	3,869	172	24,281
2016	5,044	9,988	1,479	4	2,548	1,285	4,339	201	24,888
2017	8,253	9,877	1,725	10	3,255	832	3,100	174	27,226

Conversion in Gas Plants



Source: National Energy Balance 2017

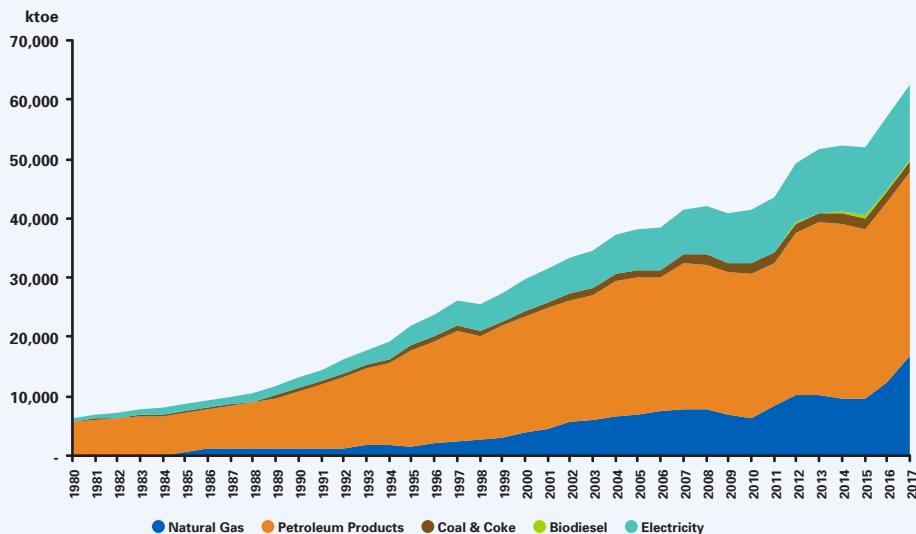
Unit: ktoe

Year	Input:	Conversion in Gas Plants				Total
		Natural Gas	MLNG	MDS	GPP-LPG	
1990	9,797	8,761	-	-	-	8,761
1991	11,715	8,749	-	-	-	8,749
1992	11,681	8,425	-	392	392	8,817
1993	13,005	9,019	39	529	529	9,587
1994	14,634	9,087	238	948	948	10,273
1995	17,088	11,244	421	1,900	1,900	13,565
1996	20,822	15,251	344	1,212	1,212	16,807
1997	24,945	16,396	389	1,258	1,258	18,043
1998	23,138	16,688	-	1,526	1,526	18,214
1999	24,116	16,417	-	1,472	1,472	17,889
2000	26,093	17,231	164	1,482	1,482	18,877
2001	25,703	16,636	513	1,310	1,310	18,459
2002	25,571	17,803	445	1,504	1,504	19,752
2003	27,940	18,965	443	790	790	20,198
2004	33,176	22,944	513	520	520	23,977
2005	36,447	24,254	460	1,319	1,319	26,033
2006	35,378	23,450	464	1,036	1,036	24,950
2007	38,141	24,355	417	1,483	1,483	26,255
2008	38,193	22,793	481	1,362	1,362	24,636
2009	37,098	25,004	426	1,012	1,012	26,442
2010	40,246	26,601	454	2,299	2,299	29,354
2011	40,737	28,130	359	2,434	2,434	30,923
2012	40,042	26,231	486	2,035	2,035	28,752
2013	39,678	28,209	478	1,174	1,174	29,861
2014	39,193	28,213	420	1,250	1,250	29,883
2015	40,773	27,722	423	1,155	1,155	29,300
2016	39,665	31,658	573	1,997	1,997	34,228
2017	38,296	29,468	509	1,961	1,961	31,938

Notes:

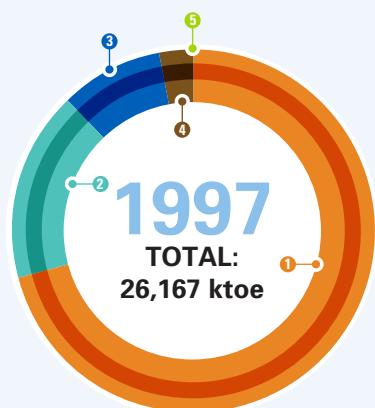
1. na : not applicable
2. Middle Distillate Synthesis (MDS) commenced pre-commercialization operation in year 2000
3. MLNG plant produced LPG in 2003

Final Energy Consumption by Fuel Type



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ENERGY CONSUMPTION



- ① Petroleum Products 71.0%
- ② Electricity 16.8%
- ③ Natural Gas 9.4%
- ④ Coal & Coke 2.8%
- ⑤ Biodiesel 0.0%

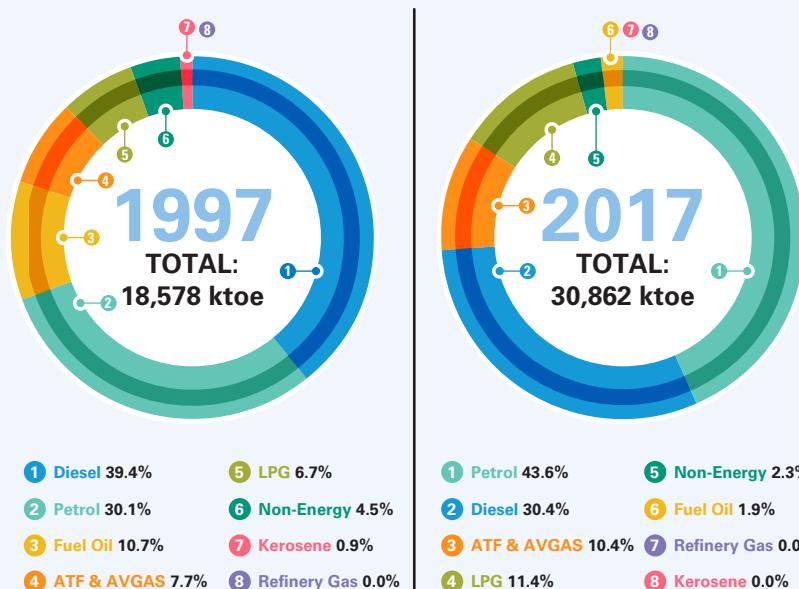
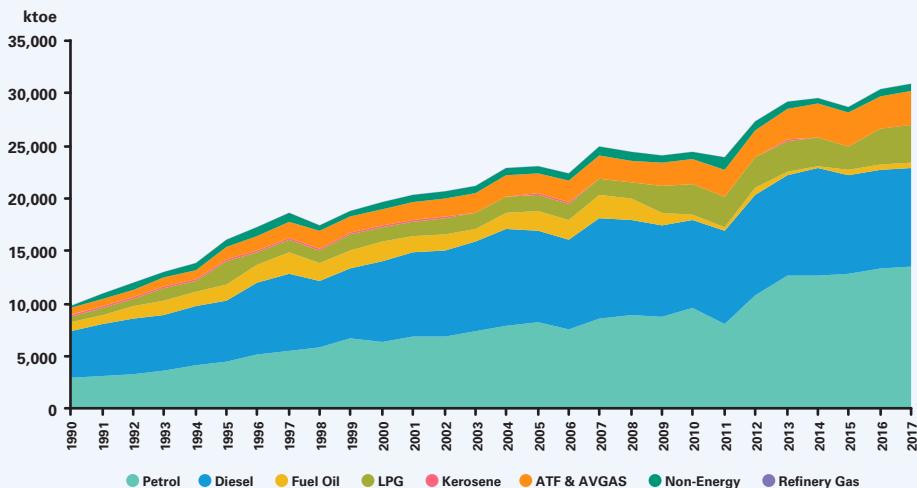
Source: Energy Commission



- ① Petroleum Products 49.4%
- ② Natural Gas 26.9%
- ③ Electricity 20.2%
- ④ Coal & Coke 2.9%
- ⑤ Biodiesel 0.6%

Year	Final Energy Consumption by Fuel Type						Total
	Natural Gas	Petroleum Products	Coal & Coke	Biodiesel	Electricity		
1980	35	5,550	53	-	747		6,385
1981	39	6,041	99	-	800		6,979
1982	46	6,228	93	-	866		7,233
1983	45	6,621	249	-	935		7,850
1984	134	6,622	270	-	1,019		8,045
1985	515	6,656	362	-	1,079		8,612
1986	1,056	6,880	268	-	1,164		9,368
1987	1,132	7,271	327	-	1,253		9,983
1988	1,058	7,816	189	-	1,393		10,456
1989	1,070	8,635	595	-	1,548		11,848
1990	1,069	9,825	513	-	1,715		13,122
1991	1,099	10,914	599	-	1,925		14,537
1992	1,344	11,927	672	-	2,218		16,161
1993	1,701	13,076	487	-	2,450		17,714
1994	1,660	13,894	598	-	2,932		19,084
1995	1,654	16,142	712	-	3,375		21,883
1996	2,079	17,203	727	-	3,777		23,786
1997	2,465	18,578	740	-	4,384		26,167
1998	2,726	17,488	767	-	4,577		25,558
1999	3,023	18,782	608	-	4,815		27,228
2000	3,863	19,582	991	-	5,263		29,699
2001	4,620	20,323	977	-	5,594		31,514
2002	5,643	20,638	1,086	-	5,922		33,289
2003	5,886	21,175	1,212	-	6,313		34,586
2004	6,490	22,886	1,305	-	6,642		37,323
2005	6,981	23,012	1,348	-	6,944		38,285
2006	7,562	22,398	1,335	-	7,272		38,567
2007	7,709	24,852	1,362	-	7,683		41,606
2008	7,818	24,451	1,713	-	7,986		41,968
2009	6,802	24,145	1,613	-	8,286		40,846
2010	6,254	24,403	1,826	-	8,993		41,476
2011	8,515	23,922	1,759	24	9,236		43,456
2012	10,206	27,215	1,744	115	10,011		49,291
2013	10,076	29,190	1,539	188	10,590		51,583
2014	9,641	29,517	1,709	300	11,042		52,209
2015	9,566	28,699	1,778	389	11,397		51,829
2016	12,304	30,348	1,785	389	12,394		57,219
2017	16,838	30,862	1,804	379	12,607		62,489

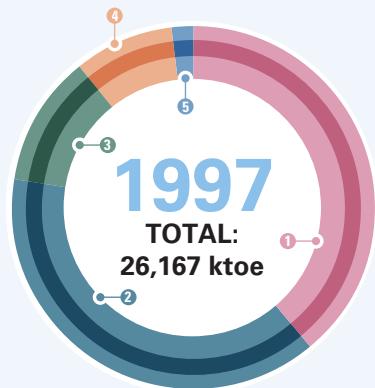
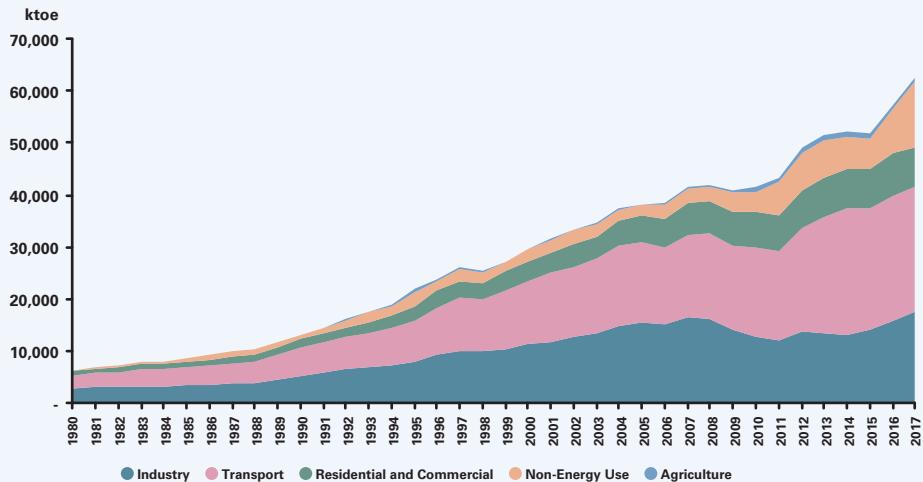
Final Energy Consumption for Petroleum Products



Source: National Energy Balance 2017

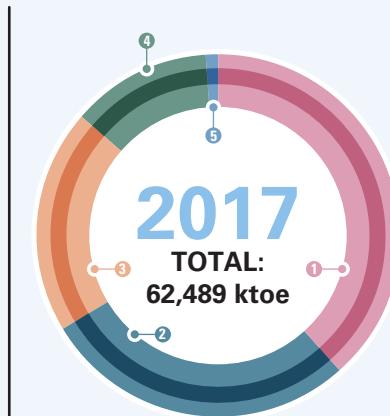
Year	Final Energy Consumption for Petroleum Products								
	Petrol	Diesel	Fuel Oil	LPG	Kerosene	ATF & AVGAS	Non-Energy	Refinery Gas	Total
1990	2,901	4,421	883	548	203	628	229	10	9,823
1991	3,135	4,873	945	612	180	690	467	12	10,914
1992	3,326	5,291	1,088	733	160	764	565	0	11,927
1993	3,666	5,339	1,293	1,119	149	875	625	10	13,076
1994	4,139	5,643	1,392	926	152	978	654	10	13,894
1995	4,548	5,810	1,506	2,215	177	1,160	718	8	16,142
1996	5,205	6,735	1,770	1,215	197	1,335	742	4	17,203
1997	5,586	7,314	1,978	1,245	169	1,439	843	4	18,578
1998	5,854	6,252	1,678	1,301	165	1,619	615	4	17,488
1999	6,793	6,506	1,792	1,523	162	1,424	579	3	18,782
2000	6,387	7,627	1,875	1,362	131	1,574	622	3	19,581
2001	6,827	8,116	1,497	1,392	99	1,762	626	4	20,323
2002	6,948	8,042	1,589	1,542	92	1,785	633	6	20,637
2003	7,360	8,539	1,256	1,437	93	1,852	632	7	21,176
2004	7,839	9,262	1,463	1,542	86	2,056	626	11	22,885
2005	8,211	8,672	1,953	1,510	81	2,010	564	10	23,011
2006	7,517	8,540	1,901	1,520	79	2,152	672	12	22,393
2007	8,600	9,512	2,202	1,474	76	2,155	823	9	24,851
2008	8,842	9,167	1,963	1,475	75	2,112	818	0	24,452
2009	8,766	8,634	1,291	2,506	30	2,120	799	0	24,146
2010	9,560	8,388	478	2,920	19	2,380	657	0	24,402
2011	8,155	8,712	414	2,892	19	2,553	1,178	0	23,923
2012	10,843	9,410	768	2,892	38	2,521	743	0	27,215
2013	12,656	9,568	329	2,946	31	2,998	662	0	29,190
2014	12,705	10,161	246	2,632	23	3,158	592	0	29,517
2015	12,804	9,377	498	2,261	4	3,134	621	0	28,699
2016	13,411	9,254	513	3,497	5	3,019	650	0	30,349
2017	13,437	9,388	579	3,514	5	3,220	719	0	30,862

Final Energy Consumption by Sector



- ① Transport 39.0% ④ Non-Energy Use 8.8%
- ② Industry 38.6% ⑤ Agriculture 1.9%
- ③ Residential and Commercial 11.7%

Source: National Energy Balance 2017



- ① Transport 38.5% ④ Residential and Commercial 12.5%
- ② Industry 28.0% ⑤ Agriculture 1.0%
- ③ Non-Energy Use 20.0%

Year	Final Energy Consumption by Sector					
	Industry	Transport	Residential and Commercial	Non-Energy Use	Agriculture	Total
1980	2,870	2,398	826	291	-	6,385
1981	3,221	2,587	884	287	-	6,979
1982	3,165	2,794	942	332	-	7,233
1983	3,301	3,170	1,040	339	-	7,850
1984	3,304	3,300	1,099	342	-	8,045
1985	3,489	3,377	1,123	623	-	8,612
1986	3,430	3,726	1,233	979	-	9,368
1987	3,709	3,929	1,297	1,048	-	9,983
1988	3,722	4,278	1,435	1,021	-	10,456
1989	4,704	4,684	1,495	965	-	11,848
1990	5,300	5,386	1,622	838	-	13,146
1991	5,809	5,806	1,721	1,071	130	14,537
1992	6,455	6,226	1,867	1,222	391	16,161
1993	7,012	6,558	2,055	2,027	62	17,714
1994	7,283	7,262	2,300	1,817	422	19,084
1995	8,060	7,827	2,556	2,994	446	21,883
1996	9,443	8,951	3,162	1,744	486	23,786
1997	10,106	10,201	3,072	2,298	490	26,167
1998	10,121	9,793	3,313	2,023	307	25,557
1999	10,277	11,393	3,653	1,799	106	27,228
2000	11,406	12,071	3,868	2,250	104	29,699
2001	11,852	13,137	4,048	2,378	98	31,513
2002	12,854	13,442	4,387	2,511	96	33,290
2003	13,472	14,271	4,399	2,345	98	34,585
2004	14,914	15,385	4,754	2,183	87	37,323
2005	15,492	15,384	5,134	2,173	101	38,284
2006	15,248	14,819	5,424	2,819	258	38,567
2007	16,454	15,717	6,197	2,957	281	41,606
2008	16,205	16,395	6,205	2,876	287	41,968
2009	14,312	16,119	6,336	3,868	211	40,846
2010	12,928	16,828	6,951	3,696	1,074	41,477
2011	12,100	17,070	6,993	6,377	916	43,456
2012	13,919	19,757	7,065	7,497	1,053	49,291
2013	13,496	22,357	7,403	7,277	1,051	51,584
2014	13,162	24,327	7,458	6,217	1,045	52,209
2015	13,989	23,435	7,559	5,928	895	51,806
2016	16,019	24,004	8,049	8,729	415	57,218
2017	17,463	24,039	7,796	12,517	674	62,489

Energy Balance Table in 2017

Commercial Energy Balance for Malaysia 2017 (Thousand Tonnes of Oil Equivalent)									
ENERGY SOURCE	NATURAL GAS	LNG	CRUDE OIL (1/)	OTHERS (2/)	TOTAL PETROLEUM PRODUCTS	PETROLEUM			
						PETROL	DIESEL	FUEL OIL	LPG
PRIMARY SUPPLY									
1. Primary Production	71,140	0	32,807	0	0	0	0	0	0
2. Gas Flaring, Reinjection & Use	-6,058	0	0	0	0	0	0	0	0
3. Imports	5,183	1,815	10,135	76	13,252	5,149	5,167	226	441
4. Exports	-1,452	-29,428	-14,958	-13	-11,063	-282	-5,133	-617	-208
5. Bunkers	0	0	0	0	-390	0	-93	-297	0
6. Stock Change	0	0	-297	0	143	49	65	-11	21
7. Statistical Discrepancy	0	0	-216	0	0	0	0	0	0
8. Primary Supply	68,814	-27,613	27,471	63	1,941	4,917	6	-699	253
TRANSFORMATION									
9. Gas Plants									
9.1 LNG	-36,964	29,428	0	0	40	0	0	0	40
9.2 MDS	-1,140	0	0	0	509	0	138	0	0
9.3 GPP-LPG (3&4/)	-2,008	0	0	0	1,961	0	0	0	1,961
9.4 RGT	1,815	-1,815	0	0	0	0	0	0	0
Subtotal	-38,296	27,613	0	0	2,510	0	138	0	2,001
10. Refineries	0	0	-27,252	-63	27,226	8,253	9,877	1,725	832
11. Power Stations & Self-Generation									
11.1 Hydro Stations	0	0	0	0	0	0	0	0	0
11.2 Thermal Stations	-11,872	0	0	0	-246	0	-147	-99	0
11.3 Self-Generation (5/)	-1,038	0	0	0	-226	0	-226	0	0
Subtotal	-12,910	0	0	0	-472	0	-372	-99	0
12. Losses & Own Use	-770	0	-219	0	-521	0	0	-29	0
13. Statistical Discrepancy	0	0	0	-0	177	267	-261	-319	429
14. Secondary Supply	-51,976	27,613	-27,471	-63	28,921	8,520	9,382	1,278	3,261
FINAL USE									
15. Residential	1	0	0	0	608	0	0	0	606
16. Commercial	25	0	0	0	791	0	22	5	764
17. Industry	6,827	0	0	0	2,687	182	1,750	569	184
18. Transport	148	0	0	0	23,473	13,190	7,062	1	0
19. Agriculture	0	0	0	0	35	0	31	5	0
20. Fishery	0	0	0	0	588	66	523	0	0
21. Non-Energy Use	9,837	0	0	0	2,680	0	0	0	1,961
22. Total Final Use	16,838	0	0	0	30,862	13,437	9,388	579	3,514
ELECTRICITY OUTPUT									
Main Activity Producer									
Gross Electricity Generation - GWh	58,201	0	0	0	890	0	688	202	0
Autoproducer									
Gross Electricity Generation - GWh	3,930	0	0	0	805	0	805	0	0

1/ Crude production includes Condensates comprising Pentane and Heavier Hydrocarbons.

2/ Others Refer to Non-Crude Energy Forms (consist of Imported Light Diesel, Slop Petroleum, Crude Residuum & Middle East Residue) Which are Used as Refinery Intake.

3/ GPP-LPG Extracts Liquid Products i.e Condensates, Ethane, Butane, Propane from Natural Gas, Ethane is not included under LPG Production.

4/ Butane and Propane as MTBE Feedstocks are Presented as Non-Energy use under LPG column. Ethane is Presented under Natural Gas Column.

5/ Estimated figures based from the Energy Commission, Statistics of Electricity Supply Industry in Malaysia 2017.

Note : Total may not necessarily add up due to rounding

PRODUCTS											
KEROSENE	ATF & AV GAS	NON-ENERGY	REFINERY GAS	COAL & COKE	HYDRO POWER	SOLAR	BIOMASS	BIOGAS	BIODIESEL	ELECTRICITY	TOTAL
0	0	0	0	1,894	6,240	93	194	41	467	0	112,867
0	0	0	0	0	0	0	0	0	0	0	-6,058
0	1,205	1,064	0	19,181	0	0	0	0	0	1	49,642
-60	-1,330	-3,433	0	-382	0	0	0	0	-239	-97	-57,632
0	0	-0	0	0	0	0	0	0	0	0	-390
4	3	12	0	58	0	0	0	0	32	0	-64
0	0	0	0	30	0	0	0	0	119	0	-67
-56	-122	-2,358	0	20,771	6,240	93	194	41	379	-96	98,298
<hr/>											
0	0	0	0	0	0	0	0	0	0	0	-7,496
51	0	320	0	0	0	0	0	0	0	0	-631
0	0	0	0	0	0	0	0	0	0	0	-46
0	0	0	0	0	0	0	0	0	0	0	0
51	0	320	0	0	0	0	0	0	0	0	-8,173
10	3,255	3,100	174	0	0	0	0	0	0	0	-89
<hr/>											
0	0	0	0	0	-6,240	0	0	0	0	2,309	-3,931
0	0	0	0	-18,967	0	-93	-52	-40	0	11,066	-20,203
0	0	0	0	0	0	-0	-142	-1	0	445	-962
0	0	0	0	-18,967	-6,240	-93	-194	-41	0	13,821	-25,096
0	0	-317	-174	0	0	0	0	0	0	-1,057	-2,567
-0	87	-26	0	0	0	0	0	0	0	-61	116
61	3,342	3,076	0	-18,967	-6,240	-93	-194	-41	0	12,703	-35,808
<hr/>											
3	0	0	0	0	0	0	0	0	0	2,610	3,219
0	0	0	0	0	0	0	0	0	0	3,762	4,577
3	0	0	0	1,804	0	0	0	0	0	6,145	17,463
0	3,220	0	0	0	0	0	0	0	379	39	24,039
0	0	0	0	0	0	0	0	0	0	50	85
0	0	0	0	0	0	0	0	0	0	0	588
0	0	719	0	0	0	0	0	0	0	0	12,517
5	3,220	719	0	1,804	0	0	0	0	379	12,607	62,489
<hr/>											
0	0	0	0	68,866	26,841	330	185	142	0	0	155,456
0	0	0	0	0	5	0	426	12	0	0	5,178

PRIMARY SUPPLY**PRIMARY SUPPLY***

(98,298)

Crude Oil	27,471	28.0%
Petroleum Products & Others	1,909	2.0%
Natural Gas	41,201	41.9%
Coal and Coke	20,771	21.1%
Hydropower	6,240	6.3%
Renewables	707	0.7%
Total	98,298	100.0%

PRIMARY PRODUCTION

(112,867)

Crude Oil	32,807	29.1%
Natural Gas	71,140	63.0%
Coal and Coke	1,884	1.7%
Hydropower	6,240	5.5%
Renewables	795	0.7%
Total	112,867	100.0%

IMPORTS

(49,642)

Crude Oil & Others	10,211	20.6%
Natural Gas & LNG	6,998	14.1%
Petroleum Products	13,252	26.7%
Coal and Coke	19,181	38.6%
Total	49,642	100.0%

EXPORTS

(57,632)

Crude Oil & Others	15,067	26.1%
Natural Gas	1,452	2.5%
Petroleum Products	11,063	19.2%
Coal and Coke	382	0.7%
LNG	29,428	51.1%
Renewables	239	0.4%
Total	57,632	100.0%

TRANSFORMATION**GAS PLANT INPUT**

- 36,964 LNG
- 1,140 GPP-LPG
- 2,008 MDS

OIL REFINERIES INPUT

- 17,647 LOCAL
- 9,605 IMPORT

POWER STATIONS & SELF GENERATION INPUT

- 12,910 NATURAL GAS
- 372 DIESEL
- 99 FUEL OIL
- 18,967 COAL AND COKE
- 6,240 HYDRO
- 328 RENEWABLES

Note *: Primary Supply = Primary Production - Flaring + Imports - Exports - Bunkers (+) Stock Change (+-) Statistical Discrepancy

FINAL USE

GAS PLANT OUTPUT



- 29,428 LNG
- 40 LPG (FROM LNG)
- 138 DIESEL
- 51 KEROSENE
- 320 NON-ENERGY
- 1,961 LPG

FINAL USE BY SECTOR

(62,489)

Residential	3,219	5.2%
Commercial	4,577	7.3%
Industry	17,463	28.0%
Transport	24,039	38.5%
Agriculture	85	0.1%
Fishery	588	0.9%
Non-Energy Use	12,517	20.0%
Total	62,489	100.0%

OIL REFINERIES OUTPUT



- 8,253 PETROL
- 9,877 DIESEL
- 1,725 FUEL OIL
- 832 LPG
- 10 KEROSENE
- 3,255 ATF & AV GAS
- 3,100 NON-ENERGY
- 174 REFINERY GAS

FINAL USE BY FUEL

(62,489)

Natural Gas	16,838	26.9%
Petroleum Products	31,241	50.0%
Coal and Coke	1,804	2.9%
Electricity	12,607	20.2%
Total	62,489	100.0%

POWER STATIONS & SELF GENERATION OUTPUT



- 11,066 THERMAL
- 445 SELF-GENERATION
- 2,309 HYDRO

Year	Average Annual Growth Rate		
	Primary Energy Supply	Final Energy Consumption	Electricity Consumption
1990	8.90	8.70	9.70
1991	22.65	10.78	12.24
1992	11.22	11.14	15.22
1993	2.16	9.53	10.46
1994	5.80	8.79	19.67
1995	7.00	14.92	15.11
1996	11.69	9.10	11.91
1997	14.09	8.21	16.07
1998	(5.04)	(2.33)	4.40
1999	8.63	6.53	5.20
2000	13.87	9.08	9.30
2001	2.50	6.11	6.29
2002	2.34	5.63	5.86
2003	8.21	3.90	6.60
2004	9.16	7.91	5.21
2005	5.37	2.58	4.55
2006	1.22	0.74	4.72
2007	8.01	7.88	5.65
2008	5.03	0.87	3.94
2009	(1.91)	(2.68)	3.76
2010	2.98	1.54	8.53
2011	3.23	4.77	2.69
2012	9.09	13.43	8.40
2013	4.90	4.65	5.78
2014	1.94	1.21	4.27
2015	0.21	(0.77)	3.22
2016	4.15	10.45	8.74
2017	1.84	9.21	1.72

Average Annual Growth Rate (%)

Unit: %

25.00

20.00

15.00

10.00

5.00

0.00

(5.00)

(10.00)

— Average Annual Growth Rate (%) Primary Energy Supply

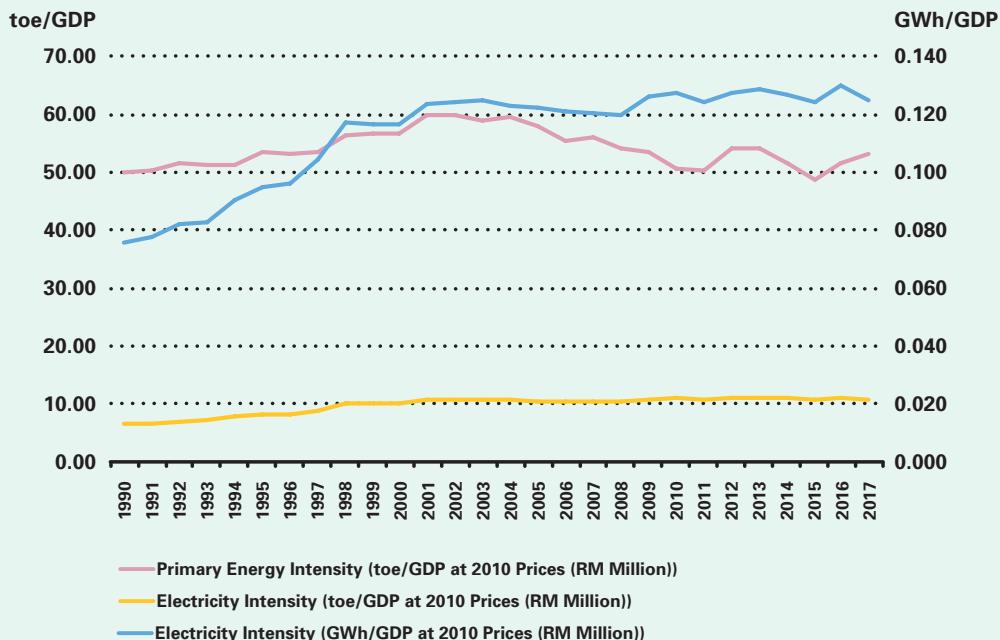
— Average Annual Growth Rate (%) Final Energy Consumption

— Average Annual Growth Rate (%) Electricity Consumption

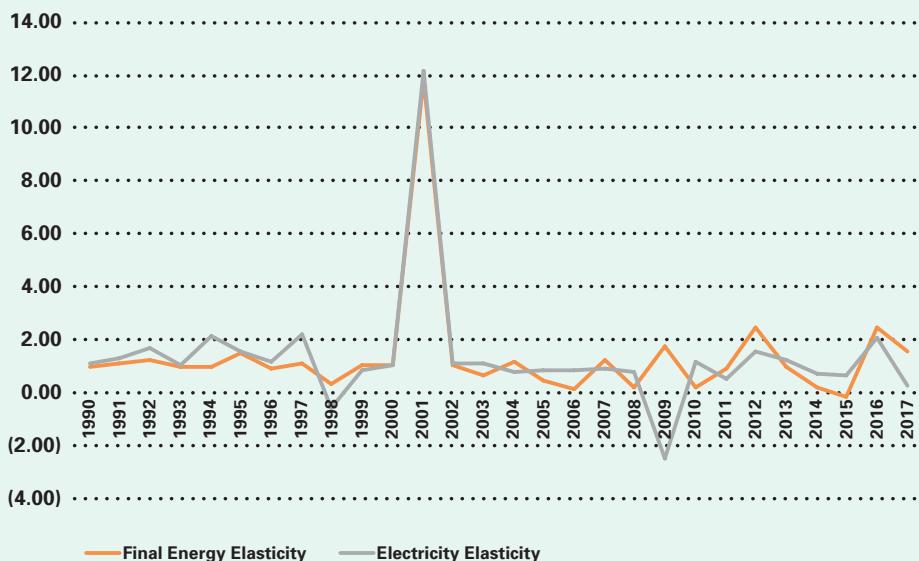
Year	Per Capita		
	Primary Energy Supply (toe)	Final Energy Consumption (toe)	Electricity Consumption (kWh)
1990	1.19	0.73	1,101
1991	1.42	0.79	1,206
1992	1.54	0.85	1,352
1993	1.53	0.90	1,453
1994	1.57	0.96	1,692
1995	1.64	1.07	1,897
1996	1.78	1.14	2,068
1997	1.98	1.20	2,341
1998	1.84	1.14	2,382
1999	1.94	1.19	2,443
2000	2.16	1.26	2,603
2001	2.16	1.31	2,706
2002	2.17	1.36	2,804
2003	2.30	1.38	2,930
2004	2.46	1.46	3,022
2005	2.54	1.47	3,099
2006	2.52	1.45	3,183
2007	2.68	1.54	3,300
2008	2.76	1.52	3,367
2009	2.66	1.45	3,429
2010	2.69	1.45	3,656
2011	2.73	1.50	3,693
2012	2.93	1.67	3,943
2013	3.00	1.71	4,074
2014	3.01	1.70	4,179
2015	2.97	1.66	4,248
2016	3.05	1.81	4,553
2017	3.07	1.95	4,576

Year	Energy Intensity		
	Final Energy Intensity (toe/GDP at 2010 Prices (RM Million))	Electricity Intensity (toe/GDP at 2010 Prices (RM Million))	Electricity Intensity (GWh/GDP at 2010 Prices (RM Million))
1990	49.89	6.51	0.076
1991	50.45	6.67	0.078
1992	51.50	7.06	0.082
1993	51.33	7.09	0.082
1994	51.13	7.77	0.090
1995	53.50	8.15	0.095
1996	53.06	8.29	0.096
1997	53.50	8.96	0.104
1998	56.41	10.10	0.117
1999	56.62	10.01	0.116
2000	56.73	10.05	0.117
2001	59.89	10.63	0.124
2002	60.03	10.68	0.124
2003	58.95	10.76	0.125
2004	59.58	10.60	0.123
2005	58.02	10.52	0.122
2006	55.35	10.44	0.121
2007	56.18	10.37	0.121
2008	54.05	10.29	0.120
2009	53.42	10.84	0.126
2010	50.49	10.95	0.127
2011	50.24	10.68	0.124
2012	54.03	10.97	0.128
2013	54.01	11.09	0.129
2014	51.57	10.91	0.127
2015	48.69	10.71	0.124
2016	51.60	11.18	0.130
2017	53.21	10.74	0.125

Energy Intensity



Energy Elasticity

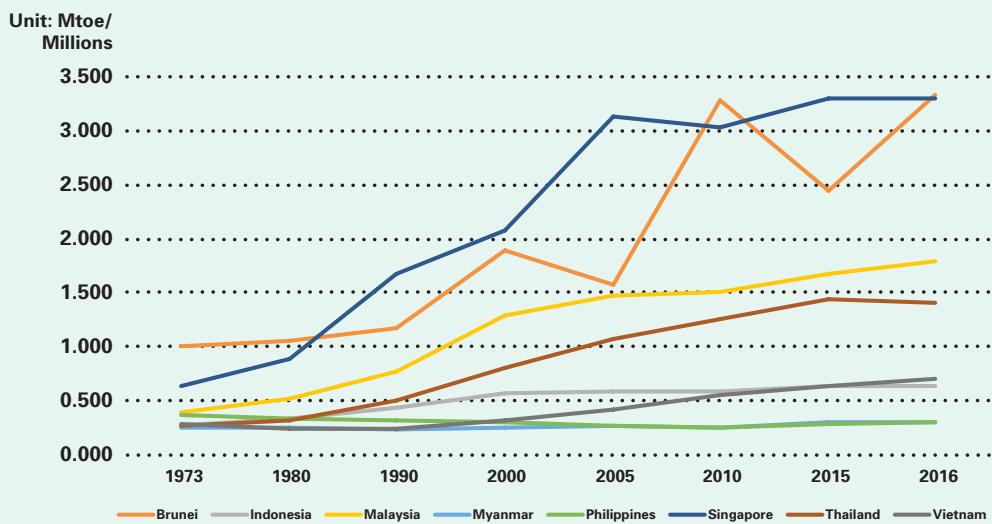


Year	Energy Elasticity	
	Final Energy	Electricity
1990	0.97	1.08
1991	1.13	1.28
1992	1.25	1.71
1993	0.96	1.06
1994	0.95	2.14
1995	1.52	1.54
1996	0.91	1.19
1997	1.12	2.19
1998	0.32	(0.60)
1999	1.06	0.85
2000	1.02	1.05
2001	11.81	12.15
2002	1.04	1.09
2003	0.67	1.14
2004	1.17	0.77
2005	0.48	0.85
2006	0.13	0.85
2007	1.25	0.90
2008	0.18	0.82
2009	1.77	(2.48)
2010	0.21	1.15
2011	0.90	0.51
2012	2.45	1.54
2013	0.99	1.23
2014	0.20	0.71
2015	(0.15)	0.63
2016	2.47	2.07
2017	1.56	0.29

Final Energy Consumption per Capita in ASEAN

Economy	1973	1980	1990	2000	2005	2010	2015	2016
	Unit: Mtoe/Millions							
Brunei	1.000	1.050	1.167	1.900	1.575	3.275	2.450	3.325
Indonesia	0.275	0.337	0.441	0.568	0.585	0.589	0.644	0.631
Malaysia	0.395	0.519	0.773	1.283	1.479	1.512	1.680	1.793
Myanmar	0.253	0.250	0.232	0.249	0.266	0.249	0.302	0.312
Philippines	0.368	0.344	0.317	0.307	0.264	0.253	0.285	0.306
Singapore	0.636	0.888	1.670	2.078	3.130	3.029	3.300	3.289
Thailand	0.271	0.320	0.510	0.803	1.069	1.263	1.440	1.415
Vietnam	0.286	0.243	0.243	0.323	0.427	0.555	0.636	0.700

Source: Energy Balances of Non-OECD Countries, 2018 Edition, International Energy Agency (IEA)



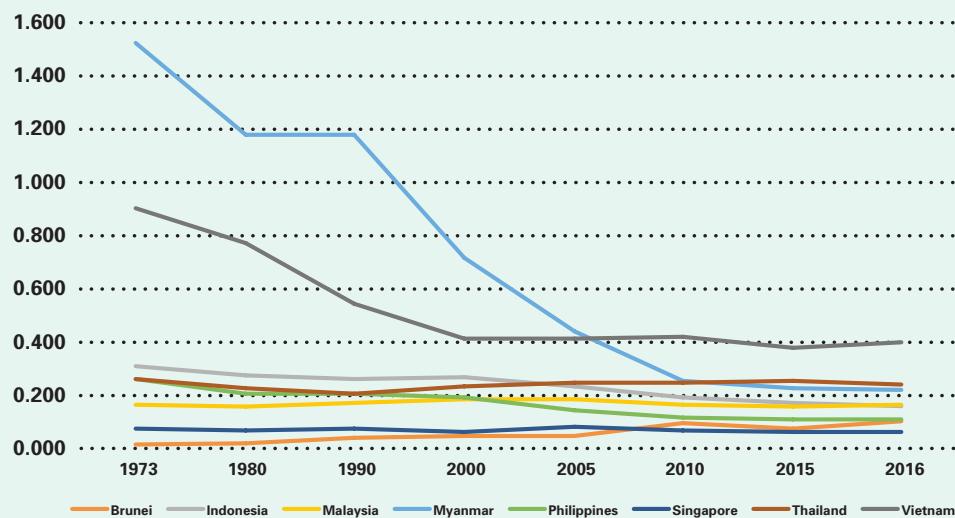
Final Energy Intensity in ASEAN

Unit: Mtoe/Billion USD 2010

Economy	1973	1980	1990	2000	2005	2010	2015	2016
Brunei	0.015	0.018	0.036	0.048	0.047	0.096	0.072	0.100
Indonesia	0.311	0.274	0.258	0.265	0.232	0.189	0.168	0.159
Malaysia	0.165	0.156	0.170	0.183	0.185	0.167	0.156	0.163
Myanmar	1.523	1.177	1.175	0.717	0.440	0.252	0.224	0.220
Philippines	0.263	0.204	0.208	0.191	0.145	0.119	0.109	0.111
Singapore	0.073	0.066	0.074	0.062	0.079	0.065	0.063	0.062
Thailand	0.263	0.228	0.204	0.232	0.246	0.249	0.251	0.240
Vietnam	0.905	0.773	0.544	0.411	0.412	0.416	0.378	0.396

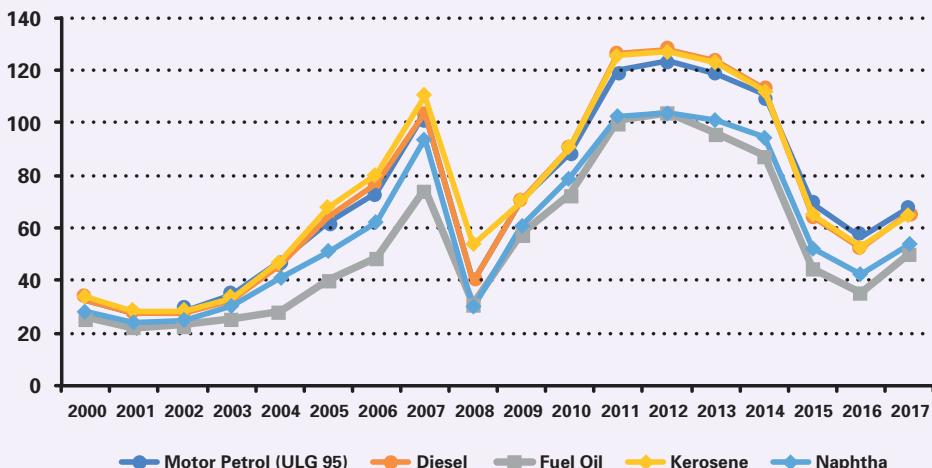
Source: Energy Balances of Non-OECD Countries, 2018 Edition, International Energy Agency (IEA)

Unit: Mtoe/
Billion USD
2010



Ex-Singapore Prices of Major Petroleum Products

USD/Barrels

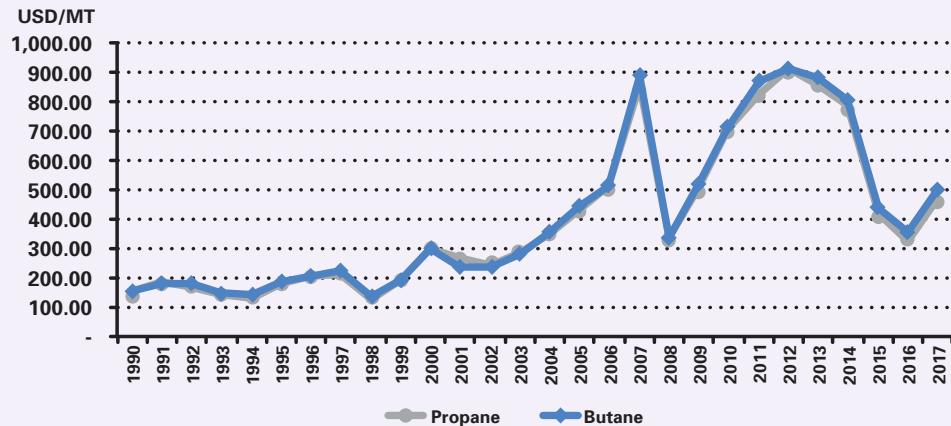


Unit: USD/Barrels

Year	Motor Petrol (ULG 95)	Diesel	Fuel Oil	Kerosene	Naphtha
2000	32.64	32.48	25.82	34.27	28.32
2001	27.43	27.32	21.78	28.32	23.75
2002	28.04	27.55	23.63	28.08	24.93
2003	34.69	32.46	25.72	33.25	30.14
2004	47.23	45.92	28.15	47.69	40.82
2005	62.38	64.35	40.32	67.99	51.04
2006	73.20	76.93	48.84	80.72	62.13
2007	104.05	103.74	74.60	110.50	93.98
2008	39.25	39.32	31.40	53.90	29.90
2009	70.38	70.42	58.12	70.14	60.96
2010	88.41	90.35	72.85	90.18	79.24
2011	119.79	126.28	100.68	125.71	102.49
2012	123.42	128.10	103.92	126.79	103.57
2013	119.00	123.27	96.35	122.85	100.99
2014	110.97	112.69	87.31	112.50	94.90
2015	69.17	64.47	44.52	64.69	52.62
2016	56.26	52.24	35.62	53.00	42.65
2017	67.99	65.65	49.99	65.27	53.79

Source: Platts

Annual Liquefied Petroleum Gas (LPG) Contract Prices – Arab Gulf

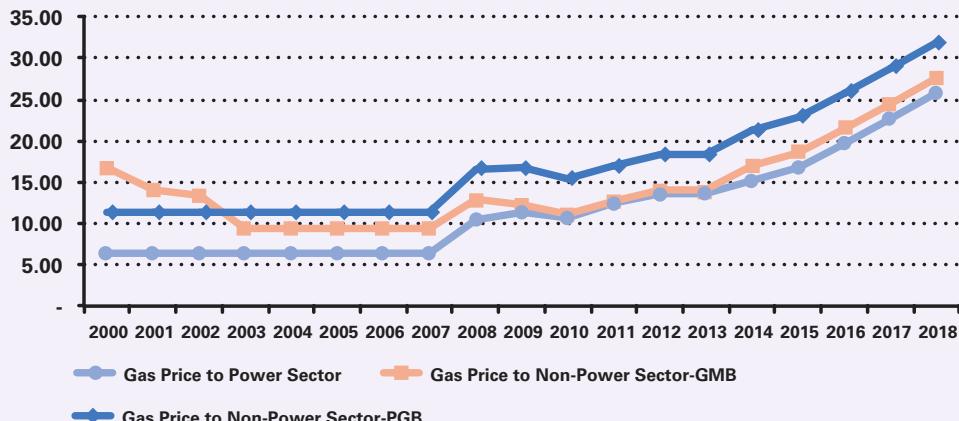


Year	Propane	Butane
1990	155.96	156.13
1991	186.89	182.19
1992	167.13	179.95
1993	140.02	147.67
1994	129.13	140.90
1995	178.62	183.82
1996	204.42	207.21
1997	210.35	222.21
1998	126.50	134.55
1999	191.07	190.84
2000	299.29	299.46
2001	269.29	239.43
2002	244.58	238.48
2003	288.84	278.46
2004	348.61	355.33
2005	430.79	442.89
2006	510.27	514.00
2007	858.00	887.50
2008	340.00	335.00
2009	504.37	521.43
2010	708.01	716.81
2011	828.03	871.12
2012	914.12	917.45
2013	856.79	884.14
2014	790.70	810.58
2015	416.75	436.57
2016	323.67	356.17
2017	467.56	502.06

Source: Platts

Natural Gas Prices in Malaysia

RM/MMBtu



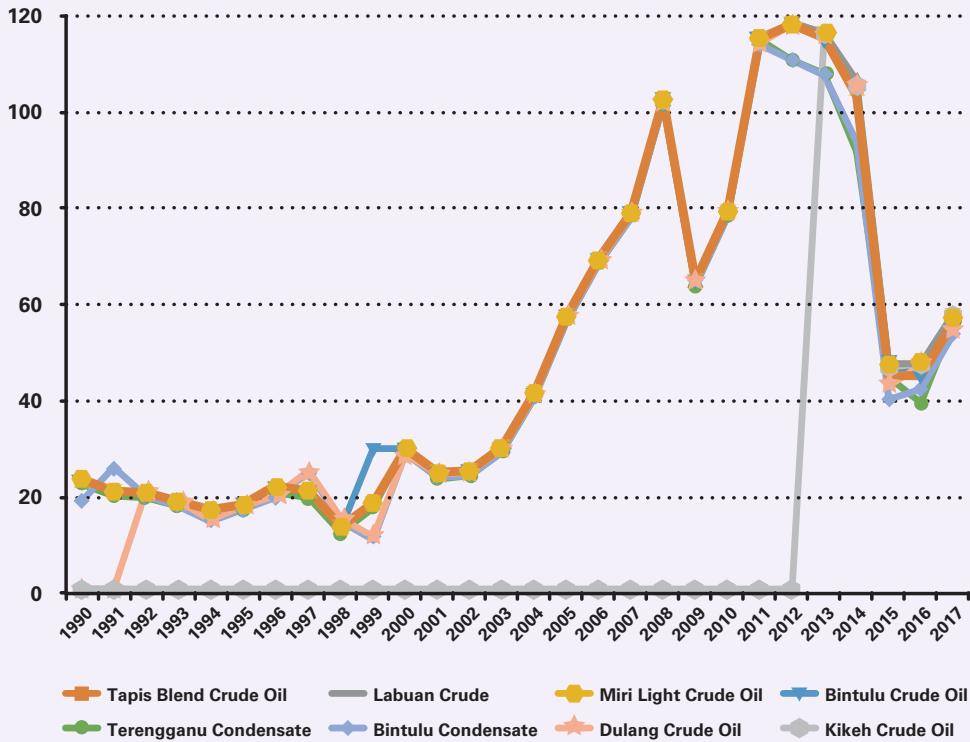
Unit: RM/MMBtu

Year	Gas Price to Power Sector	Gas Price to Non-Power Sector-GMB	Gas Price to Non Power Sector-PGB
2000	6.40	16.72	11.32
2001	6.40	14.10	11.32
2002	6.40	13.40	11.32
2003	6.40	9.40	11.32
2004	6.40	9.40	11.32
2005	6.40	9.40	11.32
2006	6.40	9.40	11.32
2007	6.40	9.40	11.32
2008	10.36	12.98	16.55
2009	11.30	12.21	16.77
2010	10.70	11.05	15.35
2011	12.45	12.80	17.10
2012	13.70	14.05	18.35
2013	13.70	14.05	18.35
2014	15.20	Jan-Apr: 14.05 May-Oct: 15.55 Nov-Dec: 17.05	Jan-Apr: 18.35 May-Oct: 19.85 Nov-Dec: 21.35
2015	Jan-Jun: 15.20 Jul-Dec: 16.70	Jan-Jun: 17.05 Jul-Dec: 18.55	Jan-Jun: 21.35 Jul-Dec: 22.85
2016	Jan-Jun: 18.20 Jul-Dec: 19.70	Jan-Jun: 20.55 Jul-Dec: 21.55	Jan-Jun: 24.35 Jul-Dec: 25.85
2017	Jan-Jun: 21.20 Jul-Dec: 22.70	Jan-Jun: 23.05 Jul-Dec: 24.55	Jan-Jun: 27.35 Jul-Dec: 28.85
2018	Jan-Jun: 24.20 Jul-Dec: 25.70	Jan-Jun: 26.05 Jul-Dec: 27.55	Jan-Jun: 30.35 Jul-Dec: 31.85

Source: Energy Commission

Official Selling Prices of Malaysian Crude Oil

USD/Barrels



Official Selling Prices of Malaysian Crude Oil

Unit: USD / Barrel

Year	Tapis Blend Crude Oil	Labuan Crude	Miri Light Crude Oil	Bintulu Crude Oil	Terengganu Condensate	Bintulu Condensate	Dulang Crude Oil	Kilkeh Crude Oil
1990	23.86	23.76	23.56	23.06	22.76	19.10	-	-
1991	21.47	21.37	21.17	20.67	20.37	26.35	-	-
1992	20.98	20.88	20.68	20.18	19.88	20.20	21.15	-
1993	19.11	19.11	18.91	18.46	18.26	18.25	19.20	-
1994	17.30	17.40	17.20	16.90	16.45	15.00	15.40	-
1995	18.53	18.63	18.43	18.06	17.33	17.36	18.16	-
1996	22.28	22.38	22.18	21.89	21.08	19.79	20.30	-
1997	21.18	21.33	21.28	20.78	19.98	25.13	25.66	-
1998	13.81	13.84	13.83	13.48	12.61	14.80	15.57	-
1999	18.95	18.95	18.95	29.95	17.76	11.14	11.84	-
2000	30.25	30.25	30.25	29.95	30.29	29.09	29.18	-
2001	25.06	25.06	25.06	24.78	23.86	23.96	24.68	-
2002	25.52	25.52	25.52	25.22	24.32	24.42	25.23	-
2003	30.60	30.60	30.60	30.33	29.40	29.50	29.99	-
2004	41.84	41.84	41.84	41.54	40.64	40.74	41.17	-
2005	57.71	57.71	57.71	57.43	56.51	56.61	57.41	-
2006	69.56	69.56	69.56	69.28	68.66	68.45	68.96	-
2007	78.96	78.96	78.96	78.66	77.91	77.92	78.59	-
2008	102.79	102.79	102.79	102.49	101.59	101.69	102.49	-
2009	64.97	64.97	64.97	64.67	63.77	63.87	64.67	-
2010	79.51	79.51	79.51	79.21	78.31	78.41	79.21	-
2011	115.33	115.33	115.33	115.03	115.03	114.13	114.23	-
2012	118.22	118.66	118.56	118.36	110.92	110.62	118.16	-
2013	115.30	116.60	116.30	115.40	108.00	107.70	115.70	116.60
2014	103.26	106.41	104.89	103.13	91.82	93.99	105.46	105.66
2015	45.12	47.73	47.63	47.35	44.94	40.28	42.98	46.96
2016	45.43	47.63	47.63	45.13	39.76	42.56	47.23	47.63
2017	56.30	57.90	57.90	57.50	56.30	53.57	54.97	57.90

Source: Petronas

Average Selling Prices of TNB

Unit: sen/kWh

Year	Domestic	Commercial	Industry	Mining	Public Lighting	Agriculture	Average
2011	27.97	39.10	29.77	20.21	20.87	38.48	32.48
2012	28.93	40.98	30.89	20.81	21.53	39.64	33.83
2013	29.15	40.76	31.00	20.55	21.55	39.35	33.87
2014	32.28	47.10	35.88	23.99	25.06	45.29	38.86
2015	32.67	47.68	36.56	25.00	25.49	45.86	39.45
2016	33.21	46.76	37.13	25.34	25.57	45.78	39.55
2017	32.87	47.16	36.97	25.07	25.53	45.54	39.53
2018	33.09	47.28	37.30	24.61	25.57	45.69	39.68

Average Selling Prices of SESB

Unit: sen/kWh

Year	Domestic	Commercial	Industry	Public Lighting	Average
2011	23.83	29.27	22.43	24.99	26.20
2012	25.10	31.41	24.68	18.66	29.10
2013	25.30	33.59	28.81	18.75	29.60
2014	29.32	39.25	32.90	23.31	34.31
2015	29.14	37.63	30.80	25.54	33.13
2016	28.86	38.21	31.36	23.09	33.41
2017	28.39	38.26	31.09	23.27	33.30
2018	29.11	39.19	31.36	24.61	34.00

Average Selling Prices of SEB

Unit: sen/kWh

Year	Domestic	Commercial	Industry	Public Lighting	Average
2011	31.20	31.20	24.70	47.10	29.40
2012	31.20	32.00	24.90	47.00	29.70
2013	31.30	32.00	25.10	47.10	29.90
2014	31.30	32.00	25.10	47.10	29.80
2015	28.25	31.72	24.48	n/a	28.50
2016	28.30	30.53	24.15	47.12	28.20
2017	28.21	30.54	23.86	47.18	28.04
2018	28.27	30.50	23.69	47.17	27.96

Number of Customers of TNB, SESB and SEB, 2012 – 2018

		Domestic	Commercial	Industry	Public Lighting	Mining	Others (Including Agriculture)	Free Units	TOTAL
2012	TNB	6,456,647	1,334,371	27,599	56,715	22	1,241	2,271	7,878,866
	SESB	403,387	75,375	2,903	4,820	-	-	-	486,485
	SEB	461,422	79,278	970	7,383	-	-	-	549,053
	TOTAL	7,321,456	1,489,024	31,472	68,918	22	1,241	2,271	8,914,404
2013	TNB	6,503,417	1,334,856	27,954	61,121	27	1,494	-	7,928,869
	SESB	422,964	79,188	2,937	5,128	-	-	-	510,217
	SEB	483,106	82,160	985	7,669	-	-	-	573,920
	TOTAL	7,409,487	1,496,204	31,876	73,918	27	1,494	0	9,013,006
2014	TNB	6,710,032	1,404,501	24,852	63,340	29	1,574	-	8,204,328
	SESB	442,516	82,472	2,906	5,349	-	-	-	533,243
	SEB	498,601	85,188	984	8,152	-	-	-	592,925
	TOTAL	7,651,149	1,572,161	28,742	76,841	29	1,574	0	9,330,496
2015	TNB	6,920,122	1,475,306	27,672	65,888	28	1,627	-	8,490,643
	SESB	460,321	85,581	2,756	5,596	-	-	-	554,254
	SEB	516,084	88,297	1,004	8,939	-	-	-	614,324
	TOTAL	7,896,527	1,649,184	31,432	80,423	28	1,627	0	9,659,221
2016	TNB	6,989,968	1,464,815	27,556	67,808	34	1,808	2,529	8,554,518
	SESB	478,049	90,510	1,545	5,906	-	-	-	576,010
	SEB	536,466	91,359	1,013	9,457	-	4	-	638,299
	TOTAL	8,004,483	1,646,684	30,114	83,171	34	1,812	2,529	9,768,827
2017	TNB	7,181,846	1,510,341	28,867	70,402	38	2,112	2,559	8,796,165
	SESB	491,809	93,738	1,550	6,061	-	-	-	593,158
	SEB	554,467	93,627	1,051	10,040	-	4	-	659,189
	TOTAL	8,228,122	1,697,706	31,468	86,503	38	2,116	2,559	10,048,512
2018	TNB	7,378,425	1,553,607	29,749	72,554	45	2,228	2,589	9,039,197
	SESB	505,239	96,167	1,589	6,129	-	-	-	609,124
	SEB	568,712	96,416	1,066	10,491	-	4	-	676,689
	TOTAL	8,452,376	1,746,190	32,404	89,174	45	2,232	2,589	10,325,010

Transmission System Capacity of TNB, SESB and SEB, 2015 – 2018

	TRANSMISSION SYSTEM LINES/CABLES (km)						TRANSMISSION SUBSTATIONS													
	2015		2016		2017		TNB		SESB		SEB		TNB		SESB		TNB		SESB	
	TNB	SESB	TNB	SESB	SEB	TNB	SESB	SEB	TNB	SESB	SEB	TNB	SESB	SEB	TNB	SESB	SEB	TNB	SESB	SEB
TRANSMISSION SYSTEM LINES/CABLES (km)																				
500kV	722	-	-	784	-	-	784	-	754	-	1,628	-	-	753	-	-	-	-	-	
275 kV	9,517	493	1,204	9,518	598	1,331	9,637	598	2,761	9,047	598	2,810	-	-	-	-	-	-	-	
132 kV	12,151	1,921	384	12,175	2,075	388	12,420	2,180	826	12,407	2,104	840	-	-	-	-	-	-	-	
66 kV	-	119	-	-	119	-	-	-	112	-	-	-	110	-	-	-	-	-	-	

Note : * Including 627.64 cct-km 500 kV lines energized at 275kV

Distribution System Capacity of TNB, SESB and SEB , 2015 – 2018

	2015	2016	2017	2018					
	TNB	SESB	TNB	SESB	TNB	SESB	TNB	SESB	SEB
DISTRIBUTION SYSTEM LINES/CABLES (km)									
Overhead Lines^{a,b,c}									
Overhead Lines ^{a,b,c}	532,403	9350	24,031	532,403	9,394	24,681	336,057	9,848	11,998
Underground Cables ^{a,b,c}	697,159	2,272	7,688	697,159	2,272	8,122	299,981	662	5,175
DISTRIBUTION SUBSTATIONS									
Number									
Number	74,417	6,762	11,435	74,417	7,382	12,522	79,450	7,382	13,076
Capacity (MVA)									
Capacity (MVA)	131,465	4,294	4,339	131,465 ^d	5,969	8,735	111,842	5,969	9,061

Note:

a. Only 11kV and 33 kV for SESB's overhead lines and underground cables

b. SESB data is financial year data

c. For TNB overhead lines and underground cable, 2014-2016: Route length, 2017: Circuit length

d. Data obtained from TNB Integrated Annual Report 2016

Performance Highlights of TNB, SESB and SEB, 2015 – 2018

	2015			2016			2017			2018		
	TNB	SESB	SEB	TNB	SESB	SEB	TNB	SESB	SEB	TNB	SESB	SEB
Peak Demand (MW)	16,822	914	2,288	17,788	945	3,005	17,790	938	3,302	18,338	955	3,504
Total Units Generated (GWh)	27,374	1,071	7,913	24,046	882	10,144	22,239	919	12,448	17,827	1,035	27,177
Total Units Sold (GWh)	105,562	5,109	14,038	110,199	5,284	20,627	110,567	5,169	23,675	113,469	5,345	25,825
Sales Revenue of Electricity (RM Million)	41,646	1,668	2,911	43,583	1,734	4,140	43,703	1,723	4,708	45,029	1,830	5,266
Installed Capacity (MW)*	6,299	328 ^a	2,241 ^b	6,107	331 ^a	2,262 ^b	5,067	319 ^a	2,241	5,067	317	4,640
Total Number of Employees	29,602 ^c	3,096	4,307	28,807 ^c	3,282	4,468	27,990	3,260	4,713	28,371	3,179	4,841
Revenue Per Employee (RM Million)	1.41	0.54	0.68	1.51	0.53	0.93	1.56	0.53	1.00	1.59	0.58	1.09
Unit Sold Per Employee (GWh)	3.57	1.65	3.26	3.83	1.58	4.77	3.95	1.59	5.02	4.00	1.68	5.33
Installed Capacity Per Employee (MW)	0.21	0.11	0.52	0.21	0.10	0.51	0.18	0.10	0.48	0.18	0.10	0.96
Total Purchased Units(GWh)	87,816	4,881	7,721	97,839	5,152	12,158	99,899	5,063	13,077	126,738	5,382	-
Total Units Exported (GWh)	3.00 ^d	-	-	0.74 ^d	-	693.00	4.81 ^d	-	1,119.00	0.08	-	1,509.00
Total Units Imported (GWh)	13,00 ^d	-	-	30.00 ^d	-	-	7,41 ^d	-	-	19.98	-	-

Notes: 1. GWh = Gigawatt Hours

2. MW – Megawatt

3. = Dependable capacity

^a = Installed Capacity for SEB excludes IPPs in Sarawak
^b = TNB employees excluding TNB wholly owned subsidiaries and TNB majority owned subsidiaries
^c = Data source : Single buyer

Revenue, Asset Size, Employment and Annual Investment of TNB and SESB, 2010 – 2018

		Revenue (RM Billion)	Asset Size (RM Billion)	Employment	Annual Investment (RM Billion)
TNB	2010	28.4	60.0	25,571	3.8
	2011	30.2	60.5	26,732	4.6
	2012	33.3	62.5	28,105	4.9
	2013	34.8	69.1	29,269	5.6
	2014	39.8	71.0	30,065	6.5
	2015	40.3	73.1	29,602	7.7
	2016	41.3	74.9	28,807	6.6
	2017	44.2	75.8	27,990	6.1
	2018	47.1	83.9	28,371	7.5
SESB	2010	1.1	2.6	2,617	0.3
	2011	1.1	4.0	2,614	0.3
	2012	1.4	4.0	2,675	0.3
	2013	1.5	3.9	2,759	0.3
	2014	1.7	5.7	2,975	0.2
	2015	1.9	6.3	3,092	0.3
	2016	2.1	6.4	3,282	0.4
	2017	2.2	6.9	3,264	0.4
	2018	2.1	7.1	3,179	0.3

Source: TNB, SESB

Number of Electricity Supply Interruptions, 2010 – 2018

	Peninsular Malaysia	Sabah	Sarawak
2010	101,126	24,173	8,003
2011	83,347	25,334	7,759
2012	75,271	26,841	7,881
2013	79,372	24,849	7,994
2014	70,629	22,739	9,496
2015	63,920	19,585	6,158
2016	58,175	20,105	7,550
2017	60,058	18,611	6,089
2018	64,198	17,017	5,772

Performance of Distribution System in Peninsular Malaysia, 2012 – 2018

Year	2012	2013	2014	2015	2016	2017	2018
Electricity Supply Interruptions per 1,000 Customers							
Scheduled Interruptions	0.11	0.09	0.17	0.17	0.16	0.06	0.05
SAIDI, SAIFI & CAIDI							
SAIDI (Minutes/Customer/Year) by Voltage Level	60.46	60.35	56.65	51.49	49.29	54.49	48.22
SAIFI (Number of Interruptions/Customer/Year) by Voltage Level	0.81	0.87	0.92	0.83	0.90	0.93	0.86
CAIDI (Minutes/Interrupted Customer/Year) by Voltage Level	74.64	69.37	61.58	62.04	54.77	58.59	56.07

System Average Interruption Duration Index (SAIDI) by State in Peninsular Malaysia, 2012 – 2018

State	2012	2013	2014	2015	2016	2017	2018
Johor	61.77	70.84	57.98	58.98	49.39	56.04	41.73
Kedah	81.36	74.38	84.34	57.42	60.82	82.51	73.30
Kelantan	72.35	69.61	56.23	56.18	67.90	59.34	49.91
Melaka	45.64	38.11	45.27	42.48	38.04	42.62	18.59
Negeri Sembilan	54.60	69.96	53.79	56.86	51.03	35.56	57.37
Pahang	62.15	63.70	68.94	62.61	57.22	51.30	46.01
Perak	83.61	78.95	69.04	51.64	46.23	52.83	43.89
Perlis	35.24	36.79	38.94	34.09	35.98	144.10	56.67
Pulau Pinang	73.29	68.89	50.40	54.49	51.05	58.12	78.66
Selangor	56.69	54.42	55.84	50.74	54.67	52.34	64.77
Terengganu	50.29	44.64	43.33	41.46	39.65	42.82	36.67
WP Kuala Lumpur	33.69	35.85	32.96	32.36	32.39	41.01	28.59
WP Putrajaya/Cyberjaya	8.48	0.99	0.17	0.63	0.13	0.55	0.73
Peninsular Malaysia	60.46	60.35	56.65	51.49	49.29	54.49	48.22

System Average Interruption Frequency Index (SAIFI) by State in Peninsular Malaysia, 2012 – 2018

Unit: Number of Interruptions/Customer/Year

State	2012	2013	2014	2015	2016	2017	2018
Johor	0.12	0.94	0.83	0.70	0.70	0.55	0.63
Kedah	0.29	1.11	1.65	1.20	1.40	1.19	1.26
Kelantan	0.24	1.26	1.21	1.25	1.45	1.53	1.47
Melaka	0.15	0.56	0.71	0.58	0.64	0.55	0.28
Negeri Sembilan	0.10	0.73	0.78	0.77	0.78	0.44	0.77
Pahang	0.19	1.42	1.49	1.44	1.56	1.39	0.65
Perak	0.21	1.10	1.08	0.80	0.94	0.71	1.41
Perlis	0.05	0.47	0.43	0.46	0.57	2.32	0.79
Pulau Pinang	0.16	1.00	0.81	0.83	0.82	0.69	1.68
Selangor	0.12	0.76	0.74	0.74	0.84	0.60	0.94
Terengganu	0.16	1.03	1.05	0.87	1.01	1.10	1.00
WP Kuala Lumpur	0.03	0.37	0.67	0.48	0.57	0.61	0.46
WP Putrajaya/Cyberjaya	0.00	0.01	0.08	0.01	0.15	0.00	0.09
Peninsular Malaysia	0.81	0.87	0.92	0.83	0.90	0.93	0.86

Customer Average Interruption Duration Index (CAIDI) by State in Peninsular Malaysia, 2012 – 2018

Unit: Minutes/Interrupted Customer/Year

State	2012	2013	2014	2015	2016	2017	2018
Johor	73.07	75.36	69.86	84.26	70.56	101.89	66.24
Kedah	47.45	67.01	51.12	47.85	43.44	69.33	58.17
Kelantan	54.80	55.25	46.47	44.94	46.83	38.78	33.95
Melaka	73.74	68.05	63.76	73.24	59.44	77.50	66.39
Negeri Sembilan	82.21	95.84	68.96	73.84	65.42	80.81	74.51
Pahang	57.46	44.86	46.27	43.48	36.68	36.91	31.13
Perak	66.52	71.77	63.93	64.55	49.18	74.41	71.73
Perlis	72.67	78.28	90.56	74.11	63.12	62.11	46.82
Pulau Pinang	67.06	68.89	62.22	65.65	62.26	84.23	70.78
Selangor	66.77	71.61	75.46	68.57	65.08	87.23	68.90
Terengganu	49.12	43.34	41.27	47.66	39.26	42.39	36.67
WP Kuala Lumpur	98.59	96.89	49.19	67.42	56.82	67.23	62.15
WP Putrajaya/Cyberjaya	35.78	99.00	2.13	63.00	0.87	0.00	8.11
Peninsular Malaysia	74.64	69.37	61.58	62.04	54.77	58.59	56.07

Performance of Distribution System in Sabah, 2012 – 2018

Year	2012	2013	2014	2015	2016	2017	2018
Electricity Supply Interruptions per 1,000 Customers							
Scheduled Interruptions	4.74	3.70	2.11	1.81	2.34	3.46	1.30
SAIDI, SAIFI & CAIDI							
SAIDI (Minutes/Customer/Year)	556.86	423.99	777.26	379.26	311.01	240.9	267.87
SAIFI (Number of Interruptions/Customer/Year)	14.69	12.25	13.44	9.63	8.60	6.61	8.61
CAIDI (Minutes/Interrupted Customer/Year)	37.91	34.61	57.83	39.38	36.16	36.44	31.11

Performance of Distribution System in Sarawak, 2012 – 2018

Year	2012	2013	2014	2015	2016	2017	2018
Electricity Supply Interruptions per 1,000 Customers							
Scheduled Interruptions	2.79	3.30	5.10	1.88	4.85	n/a	n/a
Unscheduled Interruptions	11.57	10.62	10.92	8.15	6.98	n/a	n/a
SAIDI, SAIFI & CAIDI							
SAIDI (Minutes/Customer/Year)	132	168	189	143	119	111	96
SAIFI (Number of Interruptions/Customer/Year)	1.80	2.08	2.00	1.69	1.46	1.28	1.20
CAIDI (Minutes/Interrupted Customer/Year)	73.33	80.77	94.50	84.62	81.51	86.72	79.63

Number of Natural Gas Customers of GMB and SEC by Sector, 2009 – 2018

		Domestic	Commercial	Industry	Total
	GMB	7,960	456	640	9,056
	SEC	-	-	11	11
2010	GMB	10,433	489	686	11,608
	SEC	-	-	11	11
2011	GMB	10,541	536	704	11,781
	SEC	-	-	12	12
2012	GMB	11,932	565	709	13,206
	SEC	-	-	12	12
2013	GMB	12,455	630	740	13,825
	SEC	-	-	18	18
2014	GMB	12,568	799	771	14,138
	SEC	-	-	20	20
2015	GMB	12,571	862	795	14,228
	SEC	-	-	22	22
2016	GMB	12,339	935	819	14,093
	SEC	-	-	23	23
2017	GMB	12,818	1,017	853	14,688
	SEC	-	2	21	23
2018	GMB	12,683	1,014	879	14,576
	SEC	-	-	24	24

Natural Gas Consumption by Sector of GMB and SEC, 2009 – 2018

		Domestic	Commercial	Industry	Total	Unit: mmBtu
	GMB	18,565	934,766	106,359,785	107,313,116	
	SEC	-	-	52,335	52,335	
2010	GMB	19,838	1,006,564	116,579,760	117,606,162	
	SEC	-	-	62,236	62,236	
2011	GMB	20,073	1,021,176	123,587,690	124,628,939	
	SEC	-	-	66,795	66,795	
2012	GMB	24,546	990,892	126,364,815	127,380,253	
	SEC	-	-	74,684	74,684	
2013	GMB	36,627	961,562	137,246,099	138,244,288	
	SEC	-	-	93,582	93,582	
2014	GMB	37,616	992,935	146,311,939	147,342,490	
	SEC	-	-	233,723	233,723	
2015	GMB	28,710	1,021,607	157,720,218	158,770,535	
	SEC	-	-	294,387	294,387	
2016	GMB	24,738	1,007,563	162,451,003	163,483,304	
	SEC	-	-	284,156	284,156	
2017	GMB	25,850	1,045,193	182,502,651	183,573,694	
	SEC	-	41,557	274,759	316,316	
2018	GMB	26,100	1,017,938	192,474,505	193,518,543	
	SEC	-	-	322,911	322,911	

Natural Gas Pipe Length, 2008 – 2018

Unit: km

	Peninsular Malaysia		Sabah	
	Polyethylene Pipe	Stainless Steel Pipe	Polyethylene Pipe	Stainless Steel Pipe
2008	428.35	1,014.44	6.50	1.30
2009	508.20	1,097.76	6.56	1.30
2010	534.16	1,174.28	6.56	1.30
2011	551.58	1,239.89	6.56	1.30
2012	556.36	1,261.69	6.72	1.30
2013	558.42	1,330.12	6.72	1.30
2014	563.60	1,429.64	6.72	1.30
2015	567.04	1,472.70	6.78	1.30
2016	571.00	1,543.00	6.78	1.30
2017	577.00	1,594.00	6.78	1.30
2018	426.00	1,680.00	6.78	1.30

Performance Highlights of GMB and SEC, 2012 – 2018

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		Demand (mmBtu)	Sales of Gas (RM'000)	Total Number of Employees	Revenue Per Employee (RM'000)	Unit Sold Per Employee (mmBtu)
2012	GMB	127,380,253	2,099,592	364	5,768	349,946
	SEC	74,684	2,003	62	32	1,205
2013	GMB	138,244,288	2,288,465	385	5,944	359,076
	SEC	93,582	2,702	63	43	1,485
2014	GMB	147,342,490	2,745,024	402	6,828	366,524
	SEC	233,723	7,316	74	99	3,158
2015	GMB	158,770,535	3,594,520	451	7,970	352,041
	SEC	294,387	9,789	74	132	3,978
2016	GMB	163,483,304	3,973,843	430	9,241	380,194
	SEC	284,124	9,872	80	123	3,552
2017	GMB	183,573,694	5,260,870	487	10,803	376,948
	SEC	274,759	11,424	83	138	3,310
2018	GMB	191,791,567	6,178,725	504	12,368	380,539
	SEC	322,911	1,437	79	32	4,077

Number of Supply Interruptions in Peninsular Malaysia and Sabah, 2008 – 2018

Year	GMB	SEC
2008	145	0
2009	150	0
2010	114	0
2011	124	0
2012	97	0
2013	79	0
2014	78	0
2015	22	0
2016	14	0
2017	16	0
2018	29	0

Gas Supply Interruptions per 1,000 Customers, 2008 – 2018

Year	Peninsular Malaysia	Sabah
2008	5.05	0.00
2009	3.75	0.00
2010	3.19	0.00
2011	3.14	0.00
2012	2.21	0.00
2013	1.95	0.00
2014	2.48	0.00
2015	1.55	0.00
2016	0.99	0.00
2017	3.64	0.00
2018	4.40	0.00

SAIDI, SAIFI, CAIDI, 2008 – 2018

	SAIDI (Minutes/Customer/Year)		SAIFI (Disruptions/Customer/ Year)		CAIDI (Minute/Disruption)	
	Peninsular Malaysia	Sabah	Peninsular Malaysia	Peninsular Malaysia	Peninsular Malaysia	Sabah
2008	0.0470	0.0000	0.0007	0.0000	64.1300	0.0000
2009	0.2489	0.0000	0.0046	0.0000	54.4100	0.0000
2010	0.6299	0.0000	0.0037	0.0000	169.2700	0.0000
2011	0.3630	0.0000	0.0039	0.0000	90.9600	0.0000
2012	0.7489	0.0000	0.0029	0.0000	260.9000	0.0000
2013	0.1480	0.0000	0.0022	0.0000	66.8300	0.0000
2014	0.1492	0.0000	0.0021	0.0000	70.7100	0.0000
2015	0.0874	0.0000	0.0016	0.0000	54.0500	0.0000
2016	0.5812	0.0000	0.0010	0.0000	575.2300	0.0000
2017	0.1067	0.0000	0.0025	0.0000	42.5100	0.0000
2018	0.3060	0.0000	0.0008	0.0000	404.8200	0.0000

Industrial Sales Volume by Industry Grouping of GMB, 2011 – 2018

	Unit: mmBtu							
	2011	2012	2013	2014	2015	2016	2017	2018
Non-Metallic Industry	12,151,278	12,322,733	12,643,979	13,494,149	12,479,020	12,270,125	12,832,894	12,078,564
Basic Metal Industry	11,695,310	11,318,185	11,119,585	10,874,986	10,765,579	10,730,111	11,000,633	11,204,076
Electrical & Electronic	2,083,166	200,274	1,984,425	2,027,958	1,873,005	14,325,025	1,599,008	1,549,292
Machinery & Equipment	298,548	243,448	259,167	246,215	251,223	10,856,212	221,487	202,071
Rubber products	29,308,071	32,875,665	37,581,300	41,489,234	50,052,506	31,258,184	58,843,709	62,873,516
Food, Beverages & Tobacco	33,315,737	34,421,384	37,763,632	40,743,034	42,438,744	32,817,174	45,147,561	46,222,536
Fabricated Metal Products	3,678,646	3,749,109	4,480,214	4,621,397	4,742,804	3,742,369	3,808,343	3,772,298
Chemical Products	9,823,832	9,467,377	10,410,346	11,333,511	11,858,331	10,845,667	16,350,120	19,757,457
Glass Products	9,033,533	7,793,642	8,299,467	8,119,994	6,821,966	18,996,952	13,656,240	16,285,351
Others	12,239,570	12,173,028	12,706,395	14,212,054	16,437,040	16,609,184	19,042,655	18,529,344
Total	123,587,691	124,564,845	137,248,510	147,162,532	157,720,218	162,451,003	169,669,756	192,474,505

NOTES ON ENERGY BALANCE

The net calorific value (NCV) was chosen as the basis of calculations rather than the gross calorific value (GCV). The Joule was used as the rigorous accounting unit, while the “tonne oil equivalent” (1 toe= 41.84 Gigajoules) was chosen as the final unit for presentation in the Energy Balance.

COMMERCIAL ENERGY BALANCE FORMAT

The rows of the Energy Balance tables contain the following items:

Primary supply	Refers to supply of energy that has not undergone the transformations/ conversions process within the country.
Primary Production (1)	Refers to the quantity of fuels extracted. Data for natural gas excludes the amount of reinjected and flared gas. Gross production of hydro is shown in conventional fuel equivalent input.
Gas Flaring, Reinjection & Use (2)	Refers to the quantity of gas flared, re-injected into the gas fields and use for production purpose.
Imports (3) and Exports (4)	Refer to the amount of primary and secondary energy obtained from, or supplied to other countries. In the energy balance format, imports always carry a positive and export a negative sign.
Bunkers (5)	Refer to the amount of fuels delivered to ocean-going ships of all flags engaged in international traffic.
Stock Change (6)	Refers to the difference between the amounts of fuel in stocks at the beginning and end of year and should ideally cover producers, importers and industrial consumers. At this stage, however, only oil companies' stocks are taken into account. A negative sign indicates net increases while a positive sign indicates net decreases in stocks.
Total	Under primary supply, ‘total’ is the addition of columns to obtain total availability. Under transformation, ‘total’ is the addition of columns to obtain transformation and conversion losses.
Gas Plants (9)	Shows the input of natural gas into the LNG, MDS and GPP-LPG plants and their respective outputs.
Refineries (10), Power stations and Co-generation & Private licensees (11)	Shows the input of any energy product (negative sign) for the purpose of converting it to one or more secondary products (positive sign).
Losses and own use (12)	Refers to losses of electrical energy and natural gas which occur outside the utilities and plants (i.e. distribution losses) and the consumption of energy by utilities and plants for operating their installation (i.e. electricity for operating auxiliary equipment and petroleum products used in the crude distillation process respectively). It does not, however, include conversion loss that is accounted for in the ‘total’ column.

Secondary supply (14)	Refers to the supply of energy from the transformation process and after deducting the energy sector's own use and losses, including power station use.
Residential and commercial (15 & 16)	Not only refers to energy used within households and commercial establishments but includes government buildings and institutions.
Industrial (17)	Is a very broad-based sector ranging from manufacturing to mining and construction. Diesel sales through distributors are assumed to be to industrial consumers.
Transport (18)	Basically refers to all sales of motor gasoline and diesel from service stations and sales of aviation fuel. It also includes diesel and motor gasoline sold directly to government and military.
Agriculture (19)	Covers agriculture, forestry and fishing.
Non-energy use (20)	Use of products resulting from the transformation process for non-energy purpose (i.e. bitumen/ lubricants, asphalt/ greases) and use of energy products (such as natural gas) as industrial feed stocks
Final use (21)	Refer to the quantity of energy of all kinds delivered to the final user.

Note:

- I) Non-commercial energy such as firewood and other biomass fuels have been excluded in the energy balance until more reliable data are made available.
- II) The output side of the final user's equipment of device i.e. useful energy will not be dealt with in the balance as it will involve assessing the efficiencies of end - use equipment operating under various different conditions.

NOTES OF ELECTRICITY

Reserve Margin	Total capacity margin is defined as the amount of installed generation available over and above system peak load Reserve Margin = <u>Installed Capacity – Peak Demand</u> Peak Demand
Peak Demand	The maximum power demand registered by a customer or a group of customers or a system in a stated period of time such as a month or a year. The value may be the maximum instantaneous load or more usually, the average load over a designated interval of time, such as half an hour and is normally stated in kilowatts or megawatts.
Installed Capacity	Installed capacity is defined as the maximum possible capacity (nameplate rating) that can be provided by the plant.
Dependable Capacity	The maximum capacity, modified for ambient limitations for a specified period of time, such as a month or a season.
Available Capacity	Available capacity refers to the Latest Tested Net Capacity. It is the dependable capacity, modified for equipment limitation at any time.
Unit Generated (Gross Generation)	The total amount of electric energy produced by generating units and measured at the generating terminal in kilowatt-hours (kWh) or megawatt hours (MWh)
Unit Sent Out From Station(s) (Net Generation)	The amount of gross generation less the electrical energy consumed at the generating station(s) for station service or auxiliaries.
Average Selling Price	Formula to calculate the Average Selling Price is as below; Average Selling Price = <u>Revenue by Customer Categories</u> Unit Sold by Customer Categories

NOTES OF COAL

Measured Resources	Refers to coal for which estimates of the rank and quantity have been computed to a high degree of geologic assurance, from sample analyses and measurements from closely spaced and geologically well known sample sites.
Indicated Resources	Refers to coal for which estimates of the rank, quality, and quantity have been computed to a moderate degree of geologic assurance, partly from sample analyses and measurements and partly from reasonable geologic projections.
Inferred Resources	Refers to coal of a low degree of geologic assurance in unexplored extensions of demonstrated resources for which estimates of the quality and size are based on geologic evidence and projection. Quantitative estimates are based on broad knowledge of the geologic character of the bed or region where few measurements or sampling points are available and on assumed continuation from demonstrated coal for which there is geologic evidence.

CONVERSION COEFFICIENTS AND EQUIVALENCE

TJ/1000 TONNES ¹			
Hard coal	29.3076	Lignite/brown coal	11.2834
Coke/oven coke	26.3768	Peat	9.5250
Gas coke	26.3768	Charcoal	28.8888
Brown coal coke	19.6361	Fuelwood ²	13.4734
Pattern fuel briquettes	29.3076	Lignite briquettes	19.6361

NATURAL GAS PRODUCTS (TJ/1000 TONNES)

Liquefied Natural Gas (LNG)	45.1923	Natural Gas	1TJ/ million scf 0.9479 mmbtu/GJ
Butane	50.393	Ethane	1,067.82 GJ/mscf
Propane	49.473	Methane	1,131.31 GJ/mscf

ELECTRICITY

Electricity	3.6 TJ/GWh
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PETROLEUM PRODUCTS (TJ/1000 TONNES)

Crude petroleum (imported)	42.6133	Gas oil/diesel oil	42.4960
Crude petroleum (domestic)	43.3000	Residual fuel oil	41.4996
Plant condensate	44.3131	Naphtha	44.1289
Aviation gasoline (AVGAS)	43.9614	White/industrial spirit	43.2078
Liquefied petroleum gas (LPG)	45.5440	Lubricants	42.1401
Motor gasoline	43.9614	Bitumen (asphalt)	41.8000
Natural gasoline	44.8992	Petroleum waxes	43.3334
Aviation turbine fuel (ATF)	43.1994	Petroleum coke	36.4000
Kerosene	43.1994	Other petroleum products	42.4960

1,000 Tonnes Oil Equivalent (toe) = 41.84 TJ

Note: ¹ Unless otherwise indicated ² Assuming 9.7 TJ/1000 cubic metre

DEFINITION

The sources of energy covered in the Energy Balances are as follows:-

Natural Gas	Is a mixture of gaseous hydrocarbons (mainly methane), which occurs in either gas fields or in association with crude oil in oil fields.
Liquefied Natural Gas (LNG)	Is a natural gas that is liquefied for ocean transportation and export.
Crude Oil	Is a natural product that is extracted from mineral deposits and consists essentially of many different non-aromatic hydrocarbons (paraffinic, cyclonic, etc.).
Aviation gasoline (AVGAS)	Is a special blended grade of gasoline for use in aircraft engines of the piston type. Distillation range normally falls within 30°C and 200°C.
Liquefied petroleum gas (LPG)	Commercial LPG consists essentially of a mixture of propane and butane gases which are held in the liquid state by pressure or refrigeration.
Motor gasoline (Mogas)	Petroleum distillate used as fuel in spark- ignition internal combustion engines. Distillation range is within 30°C and 250°C.
Aviation turbine Fuel (ATF)	Fuel for use in aviation gas turbines mainly refined from kerosene. Distillation range from 150°C and 250°C.
Kerosene	Is a straight-run fraction from crude oil, with boiling range from 150°C to 250°C. Its main uses are for domestic lighting and cooking.
Diesel oil (or gas oil)	Distillation falls within 200°C and 340°C. Diesel fuel for high-speed diesel engines (i.e. automotive) is more critical of fuel quality than diesel for stationary and marine diesel engines. Marine oil usually consists of a blend of diesel oil and some residual (asphaltic) material.
Fuel oil	Heavy distillates, residues or blends of these, used as fuel for production of heat and power. Fuel oil production at the refinery is essentially a matter of selective blending of available components rather than of special processing. Fuel oil viscosities vary widely depending on the blend of distillates and residues.
Non-energy products	Refer mainly to naphtha, bitumen and lubricants, which are obtained by the refinery process from petroleum but used for non-energy purposes. Naphtha is a refined or partly refined light distillate, which is further, blended into motor gasoline or used as feed-stock in the chemical industry. Bitumen is a viscous liquid or solid, non-volatile and possesses waterproofing and adhesive properties. Lubricating oil is used for lubricating purposes and has distillation range from 380°C to 500°C.
Refinery gas	The gas released during the distillation of crude oil and comprises methane, ethane, propane and butane. Most refinery gas is retained in the refinery and used as fuel in plant operations.
Coal and coke	Solid fuels consisting essentially of carbon, hydrogen, oxygen and sulphur. Coal in the energy balance is mainly bituminous coal (medium grade in terms of energy content) and some anthracite (high quality hard coal). Coke is obtained from coal by heating at high temperature in the absence of air.

Hydropower	Is the inferred primary energy available for electricity production and is shown in terms of conventional fossil fuel equivalent using the average thermal efficiency of conversion for the year, i.e. the hypothetical amount of fossil fuel, which would be needed to produce the same amount of electricity in existing thermal power plants.
Electricity Production	Production of electricity refers to production from public utilities as well as independent power producers (IPPs) and private installations & co-generation plants which obtain licenses from the Electricity and Gas Supply Department of Energy Commission. Figures for 'fuel input' into power stations & co-generation plants were only available for Tenaga Nasional Berhad, SEB, SESB, IPPs as well as GDC Sdn. Bhd. Estimates were made using average conversion efficiency to obtain the fuel input into private installations.

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