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Biofuels Annual

2018

Approved By:
William Verzani, Agricultural Attaché
Malaysia, Singapore, Brunei and Papua New Guinea

Prepared By:
Abdul Ghani Wahab, Agricultural Specialist

Report Highlights:
Biodiesel production in 2019 is expected to increase by roughly 28 percent (compared to the previous year) to 1.56 billion liters due to the expected Government of Malaysia (GOM) roll-out of a ten percent blend in early 2019. Malaysian exports of biodiesel in 2019 are projected to remain strong at 600 million liters as a result of steady demand from major customers. In early 2018, the European Parliament (EP) voted to ban the use of palm oil in biofuels by 2020. In June 2018, after objections from key palm oil producing countries, EP agreed to a phase-out of palm oil in transport fuels from 2020 to 2030.

Post:
Kuala Lumpur

Executive Summary:

Biodiesel production for calendar year 2019 is projected at 1.56 billion liters. This significantly higher level of production compared to the previous year is based on the Government of Malaysia's (GOM) intention to introduce a ten percent blend by early 2019 and growing biodiesel demand in foreign markets. Assuming GOM rolls out the higher biodiesel blend rate (from the current seven percent mandates) for commercial vehicles as expected, total consumption in 2019 is forecast to increase to 940 million liters.

Biodiesel exports for the first eight months of calendar year 2018 reached 332 million liters, roughly 50 percent higher than the 215 million liters recorded during the same period of 2017. Full calendar year 2018 exports are expected to reach 570 million liters. The 2018 increase in exports (especially to the EU; Malaysia's top customer) is due to antidumping duties the EU placed on Indonesia and Argentina during most of the year, which were subsequently removed. Malaysian exports of biodiesel in 2019 are projected to remain strong at 600 million liters as a result of steady demand from major customers such as the European Union, China and Peru.

In early 2018, the European Parliament (EP) voted to ban the use of palm oil in biofuels by 2020. In June 2018, after objections from palm oil producing countries, EP agreed to a less harsh phase-out of palm oil in transport fuels from 2020 to 2030. Under the revised resolution, the use of palm oil would be capped at the 2019 level until 2023 and then subsequently reduced to zero by 2030. Also under the new resolution, all palm oil products exported to the EU are required to be certified sustainable by a "single sustainability certification scheme". As the matter remains politically sensitive to both Malaysia and Indonesia, the details of the resolution are yet to be agreed to by member countries.

Policy and Programs:

The Government of Malaysia (GOM) released its National Biofuel Policy in 2006 with the stated objectives of utilizing environmentally friendly and sustainable energy sources to reduce dependency on fossil fuels and to help stabilize the palm oil (CPO) industry. In 2007, the Malaysian Parliament passed the Biofuel Industry Act, which included provisions from the National Biofuel Policy, to implement a biodiesel blend mandate.

Although the initial plan was to initiate a five percent blend by 2008, full national implementation covering both Peninsular and East Malaysia was not achieved until 2014. Market analysts report that with growing CPO stocks and declining CPO prices, GOM decided to increase the mandated CPO blend rate for the transportation sector from five percent to seven percent in 2015.

Later in the same year, to further promote domestic consumption of biodiesel in the transportation sector, GOM released a new five year strategy referred to as the "Eleventh Malaysia Plan (2016-2020)" to increase the blend rate in stages to 15 percent by 2020. Due to objections from the transportation industry related to the high cost of retrofitting vehicles to accommodate a blend rate higher than seven percent, progress on this plan has been very slow. Additionally, in order for this new plan to advance (which originally aspired to have a ten percent blend in place by 2016), major transportation associations in the country are reportedly petitioning the GOM to provide drivers with the option to choose between a seven percent blend or ten percent blend at all petrol stations in Malaysia. With the administrative change within GOM in 2018 combined with current historically low CPO prices, there is reportedly strong political interest in accommodating this flexibility request from industry in order to move forward with a higher blend mandate.

Planned and Actual Roll-Out of Blending Requirements

	Transportation Sector*		**Industrial Sector****	
Blend	**Planned Government Roll-out**	**Actual Roll-Out**	**Planned Government Roll-Out**	**Actual Roll-Out**
B5	2008	2014 (Nationwide)	None	None
B7	January 1, 2015	January 1, 2015	Early 2019	Pending
B10	Early 2019	Pending	N/A	N/A
B15	2020	Pending	N/A	N/A

*Cars, trucks, vans, pickups and small fishing vessels

**Diesel boilers

While the vast majority of domestically produced biodiesel is used by the transportation industry, GOM is also aiming to utilize it in the industrial sector (mainly to heat boilers and generate electricity). Currently, the planned GOM roll-out of a seven percent blend mandate in the industrial sector is

scheduled for early 2019.

Price Support Subsidies

To ensure the nation's biofuel program is financially viable, GOM uses an "Automatic Pricing Mechanism" (APM) to set biodiesel prices. Although GOM has not published how the APM is calculated, researchers at the University of Technology Malaysia (UTM) have estimated how the subsidy functions in order to support the seven percent blend mandate. Details on this widely accepted study can be found at: http://palmoilis.mpob.gov.my/publications/OPIEJ/opiejv11n1-hanafi.pdf. The following table depicts biodiesel subsidies based on the UTM research and GOM published prices for seven percent blend fuel.

Estimated Subsidy on Seven Percent Blend Biodiesel from January 2017 to August 2018

Time Period	RBD Olein US$/MT	Oil Price US$ per Barrel	Estimated Diesel Price in US$ per Liter *	Estimated B7 Biodiesel Price in US$ per Liter**	B7 Price in US$ per Liter Sold at Local Petrol Station	Subsidy (percent difference)
Jan-17	752.00	53.29	0.54	0.54	0.45	-20%
February	757.00	54.33	0.54	0.54	0.47	-15%
March	706.50	50.85	0.53	0.53	0.48	-10%
April	679.00	52.16	0.54	0.54	0.52	-4%
May	693.50	49.89	0.54	0.54	0.48	-12%
June	673.50	46.17	0.52	0.52	0.49	-6%
July	656.00	47.66	0.52	0.52	0.49	-6%
August	649.00	49.94	0.54	0.54	0.51	-6%
September	702.50	52.95	0.59	0.59	0.53	-11%
October	678.00	54.92	0.59	0.59	0.53	-11%
November	675.50	59.93	0.63	0.63	0.55	-14%
December	616.50	61.19	0.63	0.63	0.55	-14%

Jan - 18	649. 50	66.23	0.65	0.65	0.55	-18%
Febr uary	651. 50	63.46	0.66	0.66	0.62	-6%
Mar ch	651. 00	64.17	0.64	0.64	0.61	-5%
Apri l	647. 00	68.79	0.67	0.67	0.61	-10%
May ***	633. 00	73.43	0.71	0.71	0.53	-34%
June	606. 50	71.98	0.72	0.72	0.53	-36%
July	573. 50	72.67	0.71	0.71	0.53	-34%
Aug ust	555. 50	71.08	0.71	0.71	0.53	-34%

* based on diesel price (excluding tax) in the United States.
** Estimated price based on UTM APM calculation inclusive of operational cost, oil companies' margin and station dealers' margin.
***In May 2018, the new GOM administration set the price of seven percent blend biodiesel at US$0.53 (effective until December 2018).

Up until December 2014, all fuels dispensed at Malaysian commercial petrol stations were subsidized by GOM. Since then, fuel prices have been based on the rolling average price of crude oil during the previous week and adjusted on a weekly basis. However, with the new GOM administration in May 2018, the prices of diesel and RON95 (the most frequently used unleaded vehicle gasoline in Malaysia) were fixed (please see the table below), effective until December 31, 2018. GOM has yet to indicate whether or not the prices of diesel and RON95 gasoline will be market-based starting January 1, 2019.

Retail Price of Petroleum Products per Liter from June – September 2018

Period	**RON 95**	**RON 97**	**B7 (Biodiesel)**	**Euro 5 diesel**	**LPG**
Sept 1-31	RM 2.20	RM 2.65	RM 2.18	RM 2.28	RM1.16
Aug 30-31	RM 2.20	RM 2.69	RM 2.18	RM 2.28	RM1.16
Aug 16-22	RM 2.20	RM 2.65	RM 2.18	RM 2.28	RM1.16
Aug 9- 15	RM 2.20	RM 2.61	RM 2.18	RM 2.28	RM1.16
Aug 2- 8	RM 2.20	RM 2.64	RM 2.18	RM 2.28	RM1.16
July 26- Aug 1	RM 2.20	RM 2.54	RM 2.18	RM 2.28	RM1.16
July 12-18	RM 2.20	RM 2.59	RM 2.18	RM 2.28	RM1.16
July 5-11	RM 2.20	RM 2.58	RM 2.18	RM 2.28	RM1.16
June 29-July 5	RM 2.20	RM 2.50	RM 2.18	RM 2.28	RM1.16
June 28-July 4	RM 2.20	RM 2.56	RM 2.18	RM 2.28	RM1.16
June 21-27	RM 2.20	RM 2.59	RM 2.18	RM 2.28	RM1.16
June 14-20	RM 2.20	RM 2.60	RM 2.18	RM 2.28	RM1.16
June 7-13	RM 2.20	RM 2.66	RM 2.18	RM 2.28	RM1.16

Exchange rate August 31, 2018: RM4.12 = USD$1.00

In 2014, GOM allocated US$79 million to set up blending facilities and infrastructure to accommodate the country's biodiesel mandates. As of November 2018, there are six petroleum blending facilities serving 3,500 petrol stations throughout Malaysia. Along with building the facilities, the allocated funds are also used to help subsidize the seven percent blend mandate. GOM replenishes these biodiesel funds on a regular basis by utilizing CPO export taxes and proceeds from normal petroleum diesel sales.

Renewable Energy Policy and Environmental Sustainability

Based on research conducted by the Malaysian Palm Oil Board (MPOB), implementation of the seven percent blend mandate has reportedly reduced greenhouse gas emissions by as much as 1.05 million tons per year.

At the 23rd Conference of the Parties to the 1992 United Nations Framework Convention on Climate Change (COP23) in November 2017, the Malaysian Minister of Natural Resources and Environment highlighted Malaysia's commitment to reduce carbon emission by over 13 million tons (carbon dioxide equivalent) by 2030. One of the key mitigation actions in this "Energy Efficiency Action Plan" is the use of palm-based biodiesel in blended petroleum diesel. Details of this commitment can be found at: http://www.miti.gov.my/miti/resources/Article_on_Malaysia_UNFCCC-_Paris_Agreement.pdf?mid=572

Gasoline and Diesel Markets

Sales of new vehicles in 2017 dropped by one percent to 577,000 compared to 580,000 units in 2016. According to market analysts, for calendar year 2018, sales are forecast to increase marginally to 587,000 units. Gasoline powered vehicles are the most common, accounting for over 80 percent of new car sales. Diesel-powered vehicle sales are growing slowly. Most diesel vehicles are trucks, buses, and pick-ups.

There are two types of gasoline available in the Malaysian consumer fuel market, RON95 and the higher octane RON97. The price differential between the two ranges from 5 to 10 cents depending on the price of global crude oil. For diesel, in addition to seven percent blend (B7) biodiesel, many petrol retailers also offer "Euro5" diesel to consumers as an option. "Euro5" refers to the European exhaust emission standards which sets limits on emissions of unhealthy pollutants from the exhaust system of motor vehicles. Another fuel source available for on-road transport is liquid petroleum gas (LPG) for vehicles retro-fitted with a natural gas propulsion system, commonly used by taxis and inter-city buses.

Fuel Use History and Projections

Fuel Use History (Million Liters)										
Calendar Year	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018 *e**	**2019 *e**
Gasoline Total	11,103	9,470	10,358	14,699	14,766	14,870	15,576	15,621	15,791	15,974
Diesel Total	10,078	10,467	10,522	11,492	12,739	11,266	11,116	11,292	11,462	11,645
On-road	8,163	8,478	8,523	9,309	10,319	9,125	9,004	9,147	9,284	9,432

Agriculture	907	942	947	1,034	1,147	1,014	1,000	1,016	1,032	1,048
Construction & Mining	0	0	0	0	0	0	0	0	0	0
Shipping & Rail	202	209	210	230	255	225	222	226	229	233
Industry	806	837	842	919	1,019	901	889	903	917	932
Heating	0	0	0	0	0	0	0	0	0	0
Jet Fuel Total	562	238	596	708	746	740	713	1,644	1,775	1,917
Total Fuel Markets	21,743	20,175	21,476	26,899	28,251	26,876	27,405	28,557	29,028	29,536

Source: IEA.org- Oil Products Consumption for Malaysia

Ethanol

Although there are sugarcane plantations in Malaysia, a lack of economies of scale and high costs make ethanol production using cane or molasses untenable. A small amount of ethanol using palm oil mill effluent (POME) is produced in palm plantations throughout the country to generate electricity. However, this production is not on a commercial scale due to high transportation costs. Market analysts report there are initiatives to research commercially produced POME ethanol but a lack of capital investment and technological challenges make progress very slow.

Biodiesel

Biodiesel Supply and Demand

Biodiesel (Million Liters)										
Calendar Year	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018 *e**	**2019 *e**
Beginning Stocks	0	0	0	0	0	0	0	0	0	0
Production	130	204	271	507	611	660	724	907	1,220	1,560
Imports	0	0	0	0	0	0	0	0	0	0
Exports	97	54	31	192	95	204	94	267	570	600
Consumption	33	150	240	315	516	456	630	640	650	940
Ending Stocks	0	0	0	0	0	0	0	0	0	20
Balance Check	0	0	0	0	0	0	0	0	0	0
Production Capacity (Million Liters)										
Number of Bio-Refineries	13	13	14	15	16	18	17	16	16	16
Nameplate Capacity	2,050	1,363	2,101	3,010	2,726	2,647	2,350	2,340	2,340	2,340
Capacity Use (%)	6%	15%	13%	17%	22%	25%	31%	39%	52%	67%
Feedstock Use for Fuel (1,000 MT)										
Crude Palm Oil (CPO)	119	188	249	466	562	607	666	834	1,122	1,435
Market Penetration (Million Liters)										
Biodiesel, on-road use	33	150	240	315	516	456	630	640	650	940
Diesel, on-road	8,16	8,47	8,52	9,30	10,3	9,12	9,00	9,14	9,28	9,43

use	3	8	3	9	19	5	4	7	4	2
Blend Rate (%)	0.4 %	1.8 %	2.8 %	3.4 %	5.0 %	5.0 %	7.0 %	7.0 %	7.0%	10.0 %
Diesel, total use	10,078	10,467	10,522	11,492	12,739	11,266	11,116	11,292	11,462	11,645

Source: Malaysian Palm Oil Board (MPOB) for trade data, Post estimation

Production

With 16 processing plants online, production of biodiesel in Malaysia is significantly below full annual capacity of 2.34 billion liters. Due to this industry overcapacity, GOM is no longer issuing licenses for new processing plants and Post does not foresee further expansion for the next several years.

Production for calendar years 2018 and 2019 are projected at 1.22 billion liters and 1.56 billion liters, respectively. These higher levels of production are based off of GOM's intention to introduce a ten percent blend mandate (B10) by early 2019 and growing biodiesel demand in foreign markets.

Palm Methyl Ester 100% concentration (left). Palm oil fresh fruit bunch (right).

Consumption

With the blend rate remaining at seven percent, 2017 and 2018 total consumption of biodiesel is estimated at 640 million liters and 650 million liters respectively. Assuming GOM rolls out the proposed B10 biodiesel plan for commercial vehicles and the B7 biodiesel plan for the industrial sector as expected in early 2019, total consumption is expected to increase to 940 million liters.

Trade

Exports for the first eight months of calendar year 2018 reached 332 million liters, roughly 50 percent higher than the 215 million liters recorded during the same period of 2017. Full calendar year 2018

exports are expected to reach 570 million liters. The 2018 increase in exports is largely due to antidumping duties the EU (Malaysia's top biodiesel customer) placed on Indonesia and Argentina during most of the year, which were subsequently removed. Malaysian exports of biodiesel in 2019 are expected to remain relatively strong at 600 million liters due to steady demand from the EU and other countries such as China and Peru.

In early 2018, the European Parliament (EP) voted to ban the use of palm oil in biofuels by 2020. In June 2018, after objections from palm oil producing countries, EP agreed to a less harsh phase-out of palm oil in transport fuels from 2020 to 2030. Under the revised resolution, the use of palm oil would be capped at the 2019 level until 2023 and then subsequently reduced to zero by 2030. Also under the new resolution, all palm oil products exported to the EU are required to be certified sustainable by a "single sustainability certification scheme". As the matter remains politically sensitive to both Malaysia and Indonesia, the details of the resolution were left "yet to be agreed" by member countries.

Exports of Biodiesel by Destinations in 2016

COUNTRY	2016 (Tons)	2016 (Million Liters)
European Union	69,766	79.00
Albania	10,002	11.00
China	2,586	3.00
South Korea	604	0.60
Japan	426	0.48
Singapore	96	0.10
U.S.A	80	0.09
India	21	0.02
TOTAL	**83,581**	**94.29**

Source: MPOB

Exports of Biodiesel by Destinations in 2017

COUNTRY	2017 (Tons)	2017 (Millions Liters)
European Union	212,273	241
Switzerland	11,945	13
Peru	5,978	8
China	3,774	4
Japan	1,049	1
India	197	0.2
U.S.A	61	0.07
Vietnam	14	0.01
TOTAL	**235,291**	**267**

Source: MPOB

Advanced Biofuels

Although research of second generation renewable fuels from palm biomass and biogas has been ongoing since 2002, product development and commercialization have been hindered by a lack of

investment and a low oil price environment.

Appendix

Operating Biodiesel Plants in Malaysia		
	Name	**Location**
1	YPJ Palm International Sdn. Bhd.	Pasir Gudang, Johor
2	Malaysia Vegetable Oil Refinery Sdn. Bhd.	Pasir Gudang, Johor
3	Nexsol (Malaysia) Sdn. Bhd.	Pasir Gudang, Johor
4	PGEO BioproductsSdn. Bhd.	Pasir Gudang, Johor
5	Vance Bioenergy Sdn. Bhd.	Pasir Gudang, Johor
6	Felda Global Ventures Downstream Sdn Bhd	Kuantan, Pahang
7	CarotechBerhad (Chemor Plant)	Chemor, Perak
8	CarotechBerhad (Lumut Plant)	Setiawan, Perak
9	KL-Kepong OleomasSdn. Bhd.	Port Klang, Selangor
10	Sime Darby Biodiesel Sdn. Bhd.-Carey Island	Pulau Carey, Selangor
11	Sime Darby Biodiesel Sdn. Bhd.-Panglima Garang	Teluk Panglima Garang, Selangor
12	KLK Bioenergy Sdn. Bhd. (ZoopSdn. Bhd.)	Shah Alam, Selangor
13	Future Prelude Sdn. Bhd.	Port Klang, Selangor
14	Global Bio-Diesel Sdn. Bhd.	Lahad Datu, Sabah
15	SPC Bio-diesel Sdn. Bhd.	Lahad Datu, Sabah
16	Senari Biofuels Sdn. Bhd. (Global Bonanza)	Kuching, Sarawak

Source: MPOB