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Report Highlights:

The implementation of Malaysia's B20 mandate has been officially postponed until the end of 2022. However, it will be difficult for the Government of Malaysia (GoM) to implement the B20 within the current deadline and Post expects the delays to continue into 2023. Exports of biodiesel in 2022 are projected at 410 million liters, an increase of 8 percent from the previous year. With no domestic feedstock industry to support it, Malaysia has no fuel ethanol program, despite associated human health and climate benefits.

Section I. Executive Summary

It is the Government of Malaysia's (GoM) policy to manage inflationary pressure by subsidizing fuel prices (gasoline and diesel). In 2021, the GOM spent RM 4.30 billion (USD \$0.97 billion) and RM 2.9 billion (USD \$0.65 billion) respectively in gasoline and diesel subsidies. To reduce the impact of high petroleum prices and subsidy spending, the GOM introduced the biodiesel mandate.

The GoM intended to roll out a B20 mandate (i.e., a minimum 20 percent biodiesel blend rate for standard diesel fuel) by the first quarter of 2020. However, media reports emerged in February 2020 that the GoM had delayed its B20 implementation date to mid-2021. Due to the COVID-19 pandemic the program was postponed again, and in December 2021 the Ministry of Plantation Industries and Commodities (MPIC) announced the mandate would be fully implemented by the end of 2022. However, due to volatility in Crude Palm Oil (CPO) prices, political uncertainty, and local fiscal budget constraints Post expects the delays to continue into 2023.

Biodiesel production for calendar year (CY) 2022 is projected at 1.15 billion liters. This is a four percent lower level of production compared to the previous year, as refiners aim to manage their stock at acceptable levels. Although discretionary demand from China is expected to increase in line with the rise in price of petroleum for the rest of 2022, it is still not enough to entice biodiesel refiners to increase their production for CY2022. With price of CPO starting to drop and expected to drop further in 2023, the GoM will likely consider launching the B20 mandate in the first quarter of 2023.

Total 2022 consumption of biodiesel is forecast at 955 million liters (798 million liters for on-road use and 157 million liters for industrial use), an increase of eleven percent from the previous year. On-road use of B10 increased by eleven percent as the economy fully opened and businesses returned to operate as usual. Industrial usage increased by ten percent with the introduction of a B7 biodiesel mandate for industrial users from July 2019. With no expected change in blending levels, the 2022 increase in biodiesel use matches the increase in the diesel fuel pool.

Biodiesel exports for the first seven months of 2022 (Jan-July) reached 199 million liters, roughly twelve percent higher than the 178 million liters recorded during the same period of 2021. For CY2022, Post estimates biodiesel exports to increase to 410 million liters, eight percent higher than the 380 million liters recorded in CY2020. As the price of petroleum has trended upward and palm oil prices have been steadily dropping since June 2022, there has been an increase in discretionary demand from China and other markets such as Canada, India, and Vietnam. The European Union remains the largest importer of Malaysian biodiesel.

Malaysia does not have a fuel ethanol program because it does not have the domestic feedstock industry to support it. The country has been unwilling to create a program that would heavily or solely rely on imported feedstock or ethanol, despite the benefits of such a program for improved human health and lower GHG emissions to help mitigate climate change. The recent increase since 2019 in ethanol imports are for the pharmaceutical industry, where ethanol is used for disinfection and sanitization.

Section II. Policy and Programs



Mandates

The 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 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. The Malaysian Palm Oil Board (MPOB) under the Ministry of Plantation Industries and Commodities (MPIC) is the agency entrusted to implement the Palm Biodiesel program in Malaysia. Although the initial plan was to implement a five percent blend (B5) by 2008, full national implementation covering both Peninsular and East Malaysia was not achieved until 2014. With growing CPO stocks and declining CPO prices, the GoM decided to increase the mandated CPO blend rate for the transportation sector from five percent to seven percent in 2015 in selected states in Malaysia. Full implementation of B7 goal was achieved in 2016 where it was implemented nationwide.

To further promote domestic consumption of biodiesel in the transportation sector, the GoM released a five-year strategy in 2015 referred to as the Eleventh Malaysia Plan (2016-2020), to increase the blend rate in stages to 20 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 slow.

The move to a B10 mandate, originally scheduled for 2016, was not actually achieved until February 2019. A B20 rollout was originally scheduled for the first quarter of 2020. However, the MPIC revised its B20 implementation date to mid-2021 in stages by state throughout Malaysia with full enactment by July 2021. The state of Sarawak in Borneo, representing only a small portion of total Malaysian fuel consumption, implemented a B20 mandate in September 2020 and is the only state to have done so.

Due to COVID-19 and other factors, MPIC again pushed back the nationwide implementation of the B20 mandate until the end of 2022. One of the most important objectives of the B20 mandate is to stabilize the price of CPO and reduce surplus supply. The recent surge in CPO price reached its peak in May 2022 and is now in a downward trend, thus putting significant pressure on the GoM to finally execute the B20 mandate. Additional delays in the implementation could lead to an increase in end stocks and subsequently depress CPO prices, a situation that the mandate was intended to avoid. Realistically, Post expects the mandate to be in effect by the end of first quarter, 2023. However, political uncertainty and local fiscal budget constraints may impact implementation as well.

While the vast majority of domestically produced biodiesel is used by the transportation industry, the GoM also requires its use in the industrial sector (mainly to heat boilers and generate electricity). In July 2019, the GoM rolled out a seven percent blend mandate for the industrial sector.

Planned and Actual Roll-Out of Blending Requirements

Blend	Transportation Sector*		Industrial Sector**	
	Planned Government Roll-out	Actual Roll-Out***	Planned Government Roll-Out	Actual Roll-Out
B5	2008	2014 (Nationwide)	None	None
B7	January 1, 2015	2016 (Nationwide)	Early 2019	July 2019
B10	Early 2019	February 1, 2019	N/A	N/A
B20	2020	Pending (currently scheduled for end-2022)	N/A	N/A

Table 1.

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

**Diesel boilers

*** Nationwide roll-out where the Biodiesel blend available at all petrol stations

Price Support Subsidies

To ensure the nation's biofuel program is financially viable, the GoM uses an Automatic Pricing Mechanism (APM) to set biodiesel prices. Although the GoM has not published how the APM is calculated, researchers at the University of Technology Malaysia (UTM) estimated how the subsidy functioned when the mandate was at seven percent. 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 the current ten percent blend mandate. As noted in the table, the subsidy increased as a percentage of the actual cost due to rising petroleum and palm oil prices through June.

Estimated Subsidy on Ten Percent Blend Biodiesel from January to July 2022

Time Period	RBD Olein US\$/MT	Brent Oil Price US\$/Barrel	Estimated Diesel Price in US\$/Liter*	Estimated B10 Biodiesel price in US\$/Liter**	B10 Price in US\$/Liter Sold at Local Petrol Station ***	Subsidy % (Percent difference)
Jan	1,326.00	83.22	0.64	0.70	0.47	32.86
Feb	1,497.00	91.64	0.70	0.77	0.47	38.96
Mar	1,818.00	108.50	0.83	0.91	0.47	48.35
Apr	1,662.00	101.78	0.78	0.85	0.47	44.71
May	1,680.50	109.55	0.84	0.91	0.47	48.35
June	1,575.50	114.84	0.88	0.94	0.47	50.00
July	1,057.00	101.62	0.78	0.80	0.47	41.25

Table 2

*Diesel price based on brent crude oil (petroleum) monthly price – by EIA(<https://www.eia.gov>)

** Estimated price based on the UTM/APM calculation inclusive of operational cost, oil companies' margin and station dealers' margin.

***Exchange rate on August 16, 2022 @ RM 4.45 = USD\$1.00

Estimated levy* collected by MPOB to finance Biodiesel Mandate

	CPO produced in CY (ton)	Replanting and Biodiesel levy collected in USD
2022**	18,600,000	\$10.03 million
2021	18,116,354	\$9.77 million
2020	19,140,613	\$9.03 million
2019	19,858,367	\$9.37 million
2018	19,516,141	\$8.55 million
2017	19,919,331	\$8.73 million

Table 3

* The levy is known as “CESS” locally. 2022** indicates Estimated CY production.

Notes: Exchange rate on August 16, 2022 @ RM4.45 = USD\$1.00

To finance the development of the palm oil industry, GoM collects a levy from every ton of CPO produced by millers. The CESS Order, stipulated under the Malaysian Palm Oil Board Act 1998 (Act 582) is a fee levied by the Malaysian government to support and develop the palm oil industry in Malaysia. Since its introduction, the amount of levy paid by millers per ton of CPO produced has steadily increased (nominal value) from RM11 (\$2.47) in 2000 to RM16 (\$3.60) in 2021. Around 80 percent of the levy collected is allocated for research and development, regulatory, and promotional activities, 15 percent for replanting and biodiesel subsidies, and five percent for environmental protection initiatives. Details on the levy rate are available at: http://led.mpob.gov.my/?page_id=241.

Malaysia has a long history of subsidizing fuel prices. Before 2014, the price of fuels in Malaysia were fixed by the GOM and adjusted monthly. Starting in January 2015, the GOM began using the Mean of Platts Singapore (MOPS) as a basis to determine the rolling average price of crude oil during the previous week and adjusted on a weekly basis, with price caps built in. The price of RON95 (the most frequently used unleaded vehicle gasoline in Malaysia) and B10 biodiesel are currently capped at RM 2.05/liter and RM 2.15/liter, respectively. Fuel subsidies kick in if the price of these fuels surpasses these established ceiling rates. The price of RON97 (a higher-octane gasoline option) is floated based on the market price without any cap while the price of liquified petroleum gas (LPG) has been fixed at RM 1.16 since March 2015.

Retail Prices of Petroleum Products per Liter from June – August 2022

Period	RON95		RON97		Diesel B10		LPG	
	RM	USD	RM	USD	RM	USD	RM	USD
2-8 June	2.05	0.46	4.70	1.05	2.15	0.48	1.16	0.26
9-15 June	2.05	0.46	4.72	1.06	2.15	0.48	1.16	0.26
16-22 June	2.05	0.46	4.83	1.08	2.15	0.48	1.16	0.26
23-29 June	2.05	0.46	4.84	1.09	2.15	0.48	1.16	0.26
June 30 – July 6	2.05	0.46	4.84	1.09	2.15	0.48	1.16	0.26
7-13 July	2.05	0.46	4.55	1.02	2.15	0.48	1.16	0.26
14-20 July	2.05	0.46	4.65	1.04	2.15	0.48	1.16	0.26
21-27 July	2.05	0.46	4.75	1.06	2.15	0.48	1.16	0.26
July 28-Aug 3	2.05	0.46	4.80	1.07	2.15	0.48	1.16	0.26
4-10 Aug	2.05	0.46	4.50	1.01	2.15	0.48	1.16	0.26

11-17 Aug	2.05	0.46	4.40	0.98	2.15	0.48	1.16	0.26
18-24 Aug	2.05	0.46	4.35	0.98	2.15	0.48	1.16	0.26

Table 4.

Notes: Exchange rate on August 16, 2022 @ RM4.45 = USD\$1.00

In 2014, the GoM allocated 79 million USD to set up blending facilities and infrastructure to accommodate the country's biodiesel mandate ambitions. As of November 2020, there are nine petroleum blending facilities serving 4,000 petrol stations (100% of the retail market) throughout Malaysia. Along with helping build the facilities, the allocated funds are used to help subsidize the current ten percent blend mandate. The GoM replenishes the biodiesel funds on a regular basis from the CPO production levy and petroleum diesel sales.

To ensure the industry can cater the need of up to a B30 mandate in the future, five petroleum companies— Petronas, Shell, Petron Malaysia Refining, Chevron Malaysia, and Boustead Petroleum Marketing - agreed to upgrade 35 petroleum blending facilities across Malaysia from 2020. To date, nine facilities have been upgraded.

Renewable Energy Policy and Environmental Sustainability

The implementation of the Renewable Energy (RE) policy in Malaysia is under the purview of the Ministry of Science, Technology, and Innovation (MOSTI) through the Sustainable Energy Development Authority (SEDA). Further details on SEDA function, policy and programs are available at their website at www.seda.gov.my.

Total annual energy generated (in GWh) from RE projects from 2012 – 2020

Year	Resources				
	Solar PV	Biomass	Biogas	Small Hydro	Total
2012	6.93	104.54	7.56	28.68	147.71
2013	54.5	220.55	24.46	79.05	378.56
2014	194.25	200.16	50.27	69.58	514.26
2015	277.5	246.73	63.34	56.66	644.23
2016	359.54	248.48	107.11	50.28	765.41
2017	424.16	247.21	216.33	75.55	963.25
2018	467.89	226.09	251.78	89.67	1035.43
2019	47.19	225.22	314.29	220.6	1232.01
2020	420.43	149.32	384.91	257.27	1211.93
Total (GWh)	2677.1	1868.3	1420.05	927.34	6892.79
% of Total	39%	27%	21%	13%	100%

Table 5: total annual Energy Generation (GWh) from RE projects (2012-2020).

Source: SEDA (www.seda.gov.my)

Most of the biomass and biogas applicants are from the palm oil industries as they have abundant and consistent supply of empty fruit bunches (EFB) and Palm Oil Mill Effluent (POME) as the feedstocks.

The table below shows the annual CO₂ and CO₂e (CO₂ equivalent including methane and carbon monoxide released by organics matters) emissions reduction (in tons) from RE projects that have achieved commercial operations from 2012-2020 as the latest update from SEDA.

Year	Resources				
	Solar PV	Biomass	Biogas	Small Hydro	Total (tCO _{2e})
2012	5,135	57,852	5,605	19,843	88,434
2013	40,438	119,904	18,148	54,007	232,497
2014	134,775	109,413	34,885	45,654	324,726
2015	181,849	145,884	40,491	36,559	404,783
2016	225,428	137,636	66,025	31,533	460,621
2017	264,932	143,008	132,790	46,734	587,464
2018	292,345	131,313	154,973	56,154	634,786
2019	294,688	131,670	194,674	140,124	761,156
2020	262,724	86,848	241,882	163,529	754,983
Total (tCO _{2e})	1,702,313	1,063,528	889,473	594,137	4,249,451
% of Total	40%	25%	21%	14%	100%

Table 6: Annual CO_{2e} emissions reduction (in Tons) from RE projects that have achieved commercial operations from 2012-2020

Source: SEDA (www.seda.gov.my)

From the above table, the cumulative reduction of CO₂ and CO_{2e} emissions from the implementation of the RE policy in Malaysia shows a reduction of 4,249,451 tons of CO_{2e} over a 9-year period. Solar projects contributed the most with CO₂ reductions of 1,702,313 tons, followed by biogas and biomass (originating mostly from the palm oil sector), which contributed a total reduction of 1,953,001 tons of CO_{2e} during the corresponding period.

At the 23rd Conference of the Parties to the United Nations Framework Convention on Climate Change (COP23) in November 2017, the Malaysian Minister of Water, Land, and Natural Resources highlighted Malaysia's commitment to reduce carbon emissions by at least 13 million tons CO_{2e} by 2030. One of the key mitigation actions in this "Energy Efficiency Action Plan" is the use of CPO in blended petroleum diesel (3.3.1.6- Palm oil-based fatty acid methyl ester-Biodiesel). Details of this commitment can be found at: <https://unfccc.int/documents/267685>.

Though Malaysia was not one of the initial signatories of the Global Methane Pledge at COP26, the country subsequently signed on to the pledge. Separately, Malaysia has committed to maintain at least 50 percent of its area under forest and tree cover. Based on a 2010-2016 study, methane emissions contributed 17 percent of greenhouse emissions in Malaysia annually, mostly from the oil and gas industries. Malaysia focused on negotiations around the common timeframe for the Nationally Determined Contributions (NDC), discussing Article 6 of the Paris Agreement covering instruments for carbon markets, climate finance for developed countries to share of financing in combating climate change, and transparency in countries reporting on climate targets and emissions. On June 2, 2022, Malaysia submitted its first NDC and details of the updated submission can be found at: <https://unfccc.int/documents/497775>.

Life Cycle Assessment (LCA) on Sustainable Palm Oil

Life Cycle Assessment on sustainable palm oil is a study done to assess environmental impacts associated with all the life cycle stages of palm oil from cultivation to the gate of the refinery including all upstream emission such as from the production of fertilizers, fuels, and machinery. The impacts of

palm oil are presented as greenhouse gas (GHG) emissions such as carbon footprint, impact on biodiversity, respiratory effects, and toxicity.

As LCA studies are voluntary (certified by third-party consultants), not many plantation companies complete them. However, United Plantations Bhd., has been conducting the study annually since 2004 and details are available from the annual report of plantation companies' websites:

- 1- [United Plantations Bhd](#)
- 2- [Sime Darby Plantation Bhd](#)

POME Management

Palm Oil Mill Effluent (POME) is the waste from the milling process of oil palm fresh fruit bunch (FFB) to produce CPO. If untreated, POME causes water pollution and methane release to the atmosphere. Industry standard practice is to treat POME in open wastewater ponds, and once it reaches the minimum permitted level of Chemical Oxygen Demand (COD) and Biological Oxygen Demand (BOD) set by the local authority, it is released. The sludge from the pond then dried and used as fertilizer or mix as an aggregate in building materials. As this process releases GHG, especially methane gas, into the environment, some millers trap these gases to generate electricity. This electricity may either be used at the mill or connected to the grid for use by the community.

Based on Malaysia's biennial update report to the United Nations, in 2010 under the Economic Transformation program Entry Point Project initiative on Developing Biogas Facilities at Palm Oil Mills, GoM mandated that from January 1, 2014, all new mills and all existing mills applying for expansion must install methane capture facilities or methane avoidance facilities. Funding for the facilities come from private sources, with an estimated investment of USD\$650 million for all of the mills. As of 2022, 104 out of 454 palm oil mills were fully equipped with methane capture facilities. Unfortunately, the downside to this program is that existing mills not applying for expansion have no requirement or incentive to install methane capture or avoidance facilities. In the last five years, no mills have volunteered to take on this costly initiative.

In addition to methane capture, another initiative taken to reduce GHG is through filtering solid waste from POME by using filter belt press technology. The filter belt press is a device used to chemically enhance the separation of POME into a filtrate (wastewater) and a solid press cake (solid organic matter). With less or no solids from POME present in the water, the formation of methane gas is reduced, and the solid press cake produced can be used as organic fertilizer.

According to a study by CPO producer KLK, Neste, International Sustainability and Carbon Certification – ISCC, and IDH Sustainable Trade Initiative, this system can reduce the mill's daily emission of CO₂e by 20.6 tons, equivalent to 0.13kg of CO₂e per 1 kg of CPO produced. Compared to a methane capture facility, the filter belt press technology incurred low investment and running cost and is applicable to any size of mill currently in operation. However, this system is also voluntary, and since the study was published by RSPO in November 2018, no data has been made public to quantify GHG savings.

Gasoline and Diesel Markets

Sales of new vehicles in 2021 dropped by four percent to 508,911 units compared to 529,424 units in 2020. According to market analysts, for calendar year 2022, sales are forecast to increase to 630,000 units as GoM extended the sales tax allowance until June 30, 2022. Gasoline-powered vehicles are the most common in Malaysia, accounting for over 80 percent of new vehicle sales. Diesel-powered vehicle sales are growing slowly. Most diesel-run vehicles are trucks, buses, and pick-ups.

As stated in the “Price Support Subsidies” section above, there are two types of gasolines available in the Malaysian consumer fuel market, RON95 and the higher octane RON97. The price differential between the two has been roughly double in recent months. For diesel, in addition to the ten percent blend (B10) biodiesel, many petrol retailers also offer Euro5 diesel at 7 percent blend to consumers as an option. Euro5 refers to the European exhaust emission standards which set limits on emissions of unhealthy pollutants from the exhaust system of motor vehicles. The other 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.

While hybrid and electric vehicles gain popularity among car buyers, the lack of GoM incentives, infrastructure and unfavorable tax structures limit the number of such vehicles on the road. Most of the hybrid and electric vehicles are from well-known established premium brands such as BMW, Mini, Mercedes Benz, Volvo, and Audi which are out of reach of ordinary Malaysian consumers. As of August 2021, press reports indicated just 500 charging stations spread throughout the country. Based on research done on [Electric Vehicle adoption in Malaysia](#) there are around 1,550 registered Battery Electric Vehicles (BEV) on Malaysia roads as of the end 2021. However, limited government incentives and unfavorable taxes have hindered the adoption of BEVs in Malaysia. Unlike Indonesia, Thailand, and Singapore, Malaysia does not have clear direction and policy for the use of BEVs. The Ministry of Transport Malaysia does not publish the number of electric or hybrid vehicle ownership in Malaysia.

Malaysia Fuel Use History

Fuel Use History (Million Liters)										
Calendar Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022f
Gasoline Pool 1/2/	16,350	16,413	16,541	17,325	17,359	16,847	16,728	14,473	15,920	17,193
Diesel Pool 1/	10,703	11,367	10,489	10,352	10,502	10,913	10,639	9,482	10,240	10,864
On-road	7,492	7,957	7,342	7,246	7,351	7,639	7,447	6,637	7,168	7,605
Agriculture	428	455	420	414	420	437	426	379	410	435
Construction & Mining	0	0	0	0	0	0	0	0	0	0
Shipping & Rail	642	682	629	621	630	655	638	569	614	652
Industry	2,141	2,273	2,098	2,070	2,100	2,183	2,128	1,896	2,048	2,173
Jet Fuel Pool 1/3/	3,894	4,102	4,071	3,922	4,183	4,054	4,024	2,265	2,197	2,966
Fuel Pools Total 1/	30,947	31,882	31,101	31,599	32,044	31,814	31,391	26,220	28,357	31,023

Table 7.

Notes: 1/ Fuel pools are defined as fossil fuels plus all bio-components (biofuels) as well as MTBE if used in gasoline; 2/ Excludes 'aviation' gasoline; 3/ Interior flights + outbound international flights; f = forecast
Source: Malaysia Energy Statistics Handbook 2020 with updated figures of 2022 fuel consumption data and estimate from EIA on fuel projection. GoM subsidy program has offset recent and current higher finished fuels prices to support overall fuel demand.

Section III. Ethanol

Malaysia's Ethanol Supply and Demand

Ethanol Used as Fuel and Other Industrial Chemicals (Million Liters)										
Calendar Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022f
Beginning Stocks	0	0	0	4	4	4	4	0	2	2
Fuel Begin Stocks	0	0	0	0	0	0	0	0	0	0
Production	0	0	0	0	0	0	0	0	0	0
Fuel Production	0	0	0	0	0	0	0	0	0	0
Imports	10	11	14	11	11	11	20	20	18	14
Fuel Imports	0	0	0	0	0	0	0	0	0	0
Exports	0	1	0	0	0	0	11	0	0	0
Fuel Exports	0	0	0	0	0	0	0	0	0	0
Consumption	10	10	10	11	11	11	13	18	18	14
Fuel Consumption	0	0	0	0	0	0	0	0	0	0
Ending Stocks	0	0	4	4	4	4	0	2	2	2
Fuel Ending Stocks	0	0	0	0	0	0	0	0	0	0

Table 8.

Notes: f = forecast, beverage ethanol is excluded

Source: Trade Data Monitor, HSCODE: 220720 – ethyl alcohol and other spirits, denatured of any strength

Although there are sugarcane plantations in Malaysia, a lack of economies of scale and high costs make non-beverage ethanol production using cane or molasses untenable. Beyond these considerations, the supply of sugarcane is simply insufficient for any fuel ethanol program of scale given existing domestic demand in sugar milling, molasses for feed as well as potable and industrial uses for ethanol. A small amount of ethanol using POME is produced in palm plantations throughout the country to generate electricity. However, this production is not on a commercial scale. Malaysia has been unwilling to create a fuel ethanol program that would be heavily or solely reliant on imported feedstock or ethanol despite benefits of such a program that would improve air quality to provide health benefits and lower GHG emissions to help mitigate climate change.

Section IV. Biodiesel

Malaysia's Biodiesel Supply and Demand

Biodiesel (Million Liters)										
Calendar Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022f
Beginning Stocks	27	62	42	76	70	150	155	405	444	463
Production	510	475	743	595	854	1,100	1,778	1,249	1,197	1,150
Imports	0	0	0	0	0	0	0	0	0	0
Exports	190	95	194	91	256	560	663	412	315	410
Consumption	285	400	515	510	518	535	865	798	863	955

Ending Stocks	62	42	76	70	150	155	405	444	463	248
Production Capacity (Million Liters)										
Number of Biorefineries	13	18	18	17	16	15	19	19	18	18
Nameplate Capacity	2,120	3,109	2,527	2,248	2,239	2,174	2,321	2,426	2,535	2,535
Capacity Use (%)	24.1%	15.3%	29.4%	26.5%	38.1%	50.6%	76.6%	51.5%	47.2%	45.4%
Feedstock Use for Fuel (1,000 MT)										
Crude Palm Oil (CPO) *	469	437	684	535	786	1,012	1,635	1,149	1,101	1,059
Market Penetration (Million Liters)										
Biodiesel, on-road use	285	400	515	510	518	535	745	665	720	798
Biodiesel, industrial use	0	0	0	0	0	0	120	133	143	157
Diesel Pool, on-road use 1/	7,492	7,957	7,342	7,246	7,351	7,639	7,447	6,637	7,168	7,605
Blend Rate (%)	3.8%	5.0%	6.8%	7.0%	7.0%	7.0%	10.0%	10.0%	10.0%	10.5%
Diesel Pool, total 1/	10,703	11,367	10,489	10,352	10,502	10,913	9,482	10,240	10,240	10,864

Table 9.

Notes: 1/ Fuel pools are defined as fossil fuels plus all "bio-components" (biofuels) blended with fossil diesel; f = forecast

Source: MPOB – Biodiesel Export and Production Capacity data,

MPIC – Biodiesel Imports data

Malaysia Biodiesel Association – Biodiesel Production

Malaysia Energy Commission – Diesel Pool,

FAS Kuala Lumpur Analysis – Consumption, Ending Stocks and Feedstock Use

Blend Rate is calculated for on-road use only with exception from 2022 where GOM mandated B7 biodiesel for industrial use hence the slight increase in blend rate.

* conversion rate of 1 mt CPO = 1,087 liters

Production

With a reported 18 processing plants operating in 2022, production of biodiesel in Malaysia is significantly below full annual capacity of 2.6 billion liters. Due to industry overcapacity, the GoM is not issuing licenses for new processing plants and Post does not expect further expansion over the next multiple years.



Palm Methyl Ester (biodiesel)



Palm Oil Fresh Fruit Bunch (feedstock)

Total national production of biodiesel for calendar year 2022 is projected at roughly 1.15 billion liters. This is a significantly lower compared to the previous two years, reflecting processors’ attempts to manage excessive stocks and reduced sales to the European Union’s (EU) now implementing its RED II program which increasingly limits the use of palm biodiesel. Also impacting the incentive to produce B10 biodiesel is the current large price differential between CPO and fossil diesel since 2021. With the price of CPO on downward trend from June 2022 onwards and fossil hydrocarbons elevated, the significant price differential has increased discretionary demand especially from China this year.

Consumption

Total calendar year 2022 consumption of biodiesel is forecast at 955 million liters (798 million liters from on-road use and 157 million liters from industrial use), an increase of eleven percent from the previous year, due to some growth in the diesel pool and power demand with the opening of economic sectors by GoM.

Trade

According to MPOB data, exports for the first seven months of calendar year 2022 (Jan – July) reached 199 million liters, twelve percent higher than the 178 million liters recorded during the same period of 2021. Global supply-demand imbalances for diesel, the Russia-Ukraine conflict and strong discretionary demand from China for the remaining five months of the CY 2022 will amplify demand for palm oil-based biodiesel. Post forecasts total calendar year 2022 exports at 410 million liters. The EU remains the largest importer of Malaysian biodiesel, accounting more than 70 percent of total biodiesel exports.

Exports of biodiesel to major destinations: 2021/2020 (Million Liters)

Country	2021	2020	Difference (vol)
European Union	270.97	305.83	-34.84
China	75.28	32.48	42.81
United Kingdom	27.18	0	27.18
Japan	14.76	15.87	-1.11

Singapore*	7.06	6.23	0.83
Hong Kong	1.34	0.86	0.49
South Korea	0.45	0.11	0.38
Indonesia	0.44	0	0.44
USA	0.18	0.03	0.15
Vietnam	0.13	0	0.13
India	0.13	0.02	0.11
Peru	0	0.04	-45.35
Switzerland	0	0.04	-4.73
Others	0	0.002	-0.002
Total	397.92	411.44	-13.52

Table: 10 Source: MPOB *Mainly for re-export

Monthly export of biodiesel to European Union countries Jan-July 2022 (Liters)

Country	Jan	Feb	Mar	Apr	May	Jun	Jul	Total
Belgium	5,907,200	10,417,120	0	0	6,854,624	0	0	23,178,944
Germany	46,576	0	0	0	205,616	0	0	251,056
Netherlands	19,389,248	6,808,048	0	4,200,928	37,448,240	14,792,992	0	82,639,456
Spain	5,907,200	31,653,504	0	20,619,536	3,972,592	0	11,536,080	73,690,048
Total	31,250,224	48,879,808	0	24,820,464	48,481,072	14,792,992	11,536,080	179,759,504

Table: 11 Source: MPOB

Monthly export of biodiesel to European Union Countries Jan-July 2021 (Liters)

Country	Jan	Feb	Mar	Apr	May	Jun	Jul	Total
Belgium	0	0	0	0	0	5,280,128	0	5,280,128
Netherlands	2,893,392	3,295,536	9,938,864	13,700,160	5,895,840	7,747,520	8,541,584	52,012,896
Spain	6,861,440	26,310,896	3,642,016	5,885,616	14,703,248	17,539,840	11,179,376	86,122,432
Total	9,755,968	29,606,432	13,580,880	19,585,776	20,599,088	30,567,488	19,719,824	143,415,456

Table: 12 Source: MPOB

Monthly export of biodiesel by the European Union Countries Jan-July 2021 (Liters)

Country	Jan	Feb	Mar	Apr	May	Jun	Jul	Total
Belgium	0	0	0	0	0	5,280,128	0	5,280,128
Netherlands	2,893,392	3,295,536	9,938,864	13,700,160	5,895,840	7,747,520	8,541,584	52,012,896
Spain	6,861,440	26,310,896	3,642,016	5,885,616	14,703,248	17,539,840	11,179,376	86,122,432
Total	9,755,968	29,606,432	13,580,880	19,585,776	20,599,088	30,567,488	19,719,824	143,415,456

Table: 13 Source: MPOB

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 and weighing other considerations tied to EU internal market dynamics, the EP agreed to a plan that phases out the use of palm oil in biodiesel and renewable diesel in transport fuels. Under the revised resolution, the use of palm oil is

capped at the 2019 level until 2023 and then subsequently reduced to zero by 2030. Additionally, under the new resolution, all palm oil products for the biodiesel industry exported to the EU are required to be certified sustainable by a “single sustainability certification scheme.” In January 2021, Malaysia initiated a World Trade Organization (WTO) dispute against the EU’s renewable energy policies, which Malaysia claims discriminate against palm oil and palm oil-based biofuels. A panel was established in July 2021. This dispute is currently running in parallel to a similar WTO case initiated by Indonesia in December 2019.

Although most plantations in Malaysia are RSPO certified, smallholders, on the other hand are not. To comply with the EU’s “single sustainability certification scheme,” the GoM introduced the Malaysian Sustainable Palm Oil (MSPO) under the purview of the Malaysian Palm Oil Certification Council (MPOCC). Detailed information on MSPO’s seven principles of standards can be found at MPOCC website: <https://www.mpocc.org.my/>.

Section V. 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 following the oil price collapse of 2014.

Sustainable Aviation Fuel (SAF)

In December 2021, MPOB partnered with the Pengerang Maritime Industries Sdn Bhd, Shanxi Construction Investment Group Co. Ltd., and the Chinese Academy of Sciences’ Institute of Coal Chemistry to produce biodiesel and sustainable aviation fuel in Malaysia. The joint venture intends to develop a Hydrogenation- derived Renewable Diesel (HDRD) plant that produces hydrocarbon fuel. Working to achieve the Malaysian objective of reducing carbon intensity by 45 percent, the plant will use POME as the feedstock. However, since the announcement of the partnership there have been no updates on when the project or production may begin. Currently, Malaysia does not require aviation companies to use SAF. There is only one small company, Firefly, operating a fleet of ATR72-500 a twin engine turboprop plane, that is using SAF blended fuel (38 percent) for their domestic flights and to Singapore.

In August 2022, Malaysia launched a Sustainable Aviation Energy task force, headed by the Ministry of International Trade and Industry (MITI). The task force is expected to serve in advisory capacity to propose ways to increase use of sustainable fuels in the aviation sector.

Appendix

Operating Biodiesel Plants in Malaysia, 2021

- 1 Bremfield Sdn. Bhd. Pulau Indah, Selangor
- 2 Carotino Sdn Bhd Pasir Gudang, Johor
- 3 FGV Biotechnologies Sdn Bhd Kuala Lumpur
- 4 Fima Biodiesel Sdn Bhd Port Klang, Selangor
- 5 Future Prelude Sdn Bhd Port Klang, Selangor
- 6 Genting Biodiesel Sdn Bhd Kuala Lumpur
- 7 Green Edible Oil Sdn Bhd Sandakan, Sabah

- 8 Gulf Lubes Malaysia Sdn Bhd Pulau Indah, Selangor
- 9 KLK Bioenergy Sdn Bhd Shah Alam, Selangor
- 10 Nexsol (Malaysia) Sdn Bhd Pasir Gudang, Johor
- 11 PGEO BioProducts Sdn Bhd Pasir Gudang, Johor
- 12 Sime Darby Oils Biodiesel Sdn Bhd Carey Island, Selangor
- 13 SOP Green Energy Sdn Bhd Miri, Sarawak
- 14 SPC Biodiesel Sdn Bhd Kuala Lumpur
- 15 Vance Bioenergy Sdn Bhd Pasir Gudang, Johor
16. PGEO BioProducts Sdn Bhd – Pasir Gudang, Johor
17. Excelvite Sdn Bhd – Ipoh Perak
18. Supervitamins Sdn Bhd - Masai Johor

Source: MPOB

Attachments:

No Attachments