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Report Highlights:

The Malaysian Government looks towards 2025 and B30 implementation. Interest in sustainable aviation fuel (SAF) is gaining traction and a few projects by the national oil company, Petronas and the state government of Sarawak are in the works.

Section I. Executive Summary

It is the Government of Malaysia (GoM) policy to manage inflationary pressure by subsiding the fuel prices (Gasoline, Diesel, and Liquefied Petroleum Gas) at manageable and acceptable level. In 2022, total fuel subsidy (Gasoline, Diesel, and Liquefied Petroleum Gas) was at RM50.8 billion (USD\$10.81 billion) with diesel subsidy alone amounting at RM8.4 billion (USD\$1.8 billion). With subsidy expenditure on fuels increasing every year and a widening government deficit, the GoM is under pressure to cut down the deficit especially on subsidies. During the tabling of Malaysia's 2024 budget in October 2023, Malaysia's Prime Minister (PM) indicated his intention to restructure the diesel subsidy to only support the public transportation sectors. Currently the GoM spends around RM1.60 (USD0.34) on the subsidy to maintain the price of retail diesel at RM2.15 (USD\$0.46) per liter. Subsidies for gasoline and liquified petroleum gas are expected to continue.

The GoM's intention to roll-out B20 mandate by 2023, has not materialized. It is possible Malaysia will skip the B20 mandate and look forward to the B30 mandate in 2025. This is in line with Malaysian commitment to the Paris Agreement of the United Nations Climate Change Conference (UNFCCC). During the COP 21 in Paris, Malaysia committed to reduce 45 percent of Green-House Gases (GHG) emission intensity to gross domestic product by 2030. Currently, only the State of Sarawak and the islands of Labuan and Langkawi have implemented a B20 mandate. The impact is negligible on national level.

For the biodiesel mandate, the GoM uses palm oil as feedstock and is derived from processed palm oil (PPO), crude palm oil (CPO) and processed palm kernel oil (PPKO). The feedstocks were processed into palm methyl ester and blend with petroleum diesel at the ratio of 10% palm methyl ester with 90% petroleum diesel for the B10 biodiesel mandate.

To support the biodiesel mandate, the GoM maintained the effective financial support mechanism put in place since 2006. The funding is based on a percentage of tariffs received from CPO produced and managed by the Malaysian Palm Oil Board (MPOB). Currently the funding for the B10 biodiesel is estimated at USD\$9.7 million for calendar year 2023.

In related developments, Malaysia's national petroleum company, Petronas intends to expand the production of Sustainable Aviation Fuel (SAF) using waste-based feedstocks such as used cooking oil (UCO) and palm oil mill effluents (POME). The feedstocks will be processed at a 12,500 barrel/day biorefinery plant it plans to build with Japanese biotechnology company Euglena and Italian oil firm Eni in Pengerang Johore. It hopes to commence production in 2025. At full operations it is expected to process around 650,000 metric ton/year of feedstock to produce 185 million gallons per year of SAF, hydrotreated vegetable Oil (HVO) and bio-naphtha. To ensure sufficient demand for SAF, Petronas signed an offtake agreement with the Malaysia Aviation Group (MAG), the parent company of the Malaysia national airline company, for the supply of 230,000 tons of SAF to MAG's airlines with first delivery expected from 2027.

In addition, the state government of Sarawak with Mitsubishi from Japan, embarked on their own SAF program by using Micro Algae as feedstock. The commercial plant is expected to commence production in 2024 with the target of producing 100,000 barrels of SAF per day by 2030.

As part of a commitment to reduce greenhouse gas emissions (GHG), the GoM announced the implementation of a voluntary carbon market (VCM). The implementation of the VCM program is under the Ministry of Finance, Ministry of Natural Resources, Environment and Climate Change and Bursa Malaysia Berhad (Malaysia Stock Exchange). Under the VCM program, private companies can purchase carbon offsets/credits to compensate for their emissions from the Bursa Carbon Exchange (BCX). To kick-start the trading markets, BCX commenced the auction of carbon credits in March 2023 with participation of 15 buyers from various industries purchasing a total of 150,000 Verra-registered carbon credits. On September 25, 2023, BCX commenced trading and saw 16,500 Verra-registered carbon credits transacted by 10 companies. Subsequent trading saw low uptake of the carbon credits by Malaysian companies which indicated lack of interest and seriousness in their environment and sustainability commitments. To entice more companies volunteering in the carbon trading market, in tabling 2024, GoM will introduce tax exemption of up to RM300,000 for companies that have already spent on Measurement, Reporting and Verification (MRV) for carbon projects.

Section II. Policy and Programs

To promote the development and usage of palm biodiesel for commercial sector in Malaysia, GoM introduced the <u>National Biofuel Policy (NBP)</u> in 2006. The NBP aim to promote the use of palm methyl ester (palm oil) as the blending mix to petroleum diesel with the aim to reduce GHG emissions and at the same time to fulfill Malaysia's commitment to the UNFCCC. In enforcing the policy the <u>Malaysian</u> <u>Biofuel Industry Act 2007 (Act 666)</u> was enacted. Under the Act, GoM passed few regulations to strengthen it namely:

- Malaysian Biofuel Industry (Blending Percentage and Mandatory Use) Regulations 2019-PU(A) 27
- Malaysian Biofuel Industry (Licensing) regulations 2008 PU(A) 404
- <u>Malaysian Biofuels Industry (Blending Percentage and Mandatory Use) (Amendment of</u> <u>Schedule) Regulations 2019-PU(A) 129</u>
- Malaysian Biofuel Industry (Compounding of Offences) Regulations 2021-PU(A) 13

The act provides standards for biofuels as determined by the <u>Department of Standards Malaysia</u>. In addition, the act provides licensing procedure, distribution and exemption of usage and power to the Ministry of Plantation and Commodities to enforce the act.

Renewable Energy and GHG Emissions

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 CO2e 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.

In July 2021, Malaysia's latest update on the nationally determined contributions (<u>NDC</u>) registry submitted to the United Nations' Framework Convention on Climate Change (UNFCCC), shows an increase of 10 percent to 45 percent unconditional reduction of greenhouse gas (GHG) emissions by 2030. To ensure Malaysia achieves this target, the Ministry of Plantation and Commodities (MPC) intends to roll-out the B30 mandate for commercial transportation sector by the year 2025. To date, the

total palm biodiesel consumed by the national biodiesel program exceed above 5.5 million tons which translated to a saving of 10.5 million tons of carbon dioxide emissions compared to burning fossil diesel.

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 (<u>SEDA</u>). Further details on SEDA function, policy and programs are available at their website at www.seda.gov.my.

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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	1,035.43				
2019	47.19	225.22	314.29	220.6	1,232.01				
2020	420.43	149.32	384.91	257.27	1,211.93				
2021	449.9	160.39	454.87	289.03	1,354.19				
Total (GWh)	3,127	2,028.69	1,874.92	1,216.37	8,246.98				
% of Total	38%	24%	23%	15%	100%				

Total annual energy generated (in GWh) from RE projects from 2012 - 2021

Table 1: total annual Energy Generation (GWh) from RE projects (2012-2021). 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 2012-2021 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					
2021	450,111	149,481	453,188	289,033	1,341,813					

Total (tCO _{2e})	2,152,425	1,213,009	1,342,661	883,170	5,591,265
% of Total	38%	22%	24%	16%	100%

Table 2: Annual CO2e emissions reduction (in Tons) from RE projects that have achieved commercial operations from 2012-2021

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

From the above table, the cumulative reduction of CO2 and CO2e emissions from the implementation of the RE policy in Malaysia shows a reduction of 5,591,265 tons of CO2e over a 10-year period. Solar projects contributed the most with CO2 reductions of 2,152,425 tons, followed by biogas and biomass (originating mostly from the palm oil sector), which contributed a total reduction of 2,555,670 tons of CO_{2e} during the corresponding period.

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, 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, the 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. Currently, 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.

Biofuel Policy Framework and Mandates

The GoM released its National Biofuel Policy (NBP) 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. Three main objectives of the NBP were to reduce the greenhouse gas (GHG) emissions rate target of 45 percent of GDP by 2030, to expand the use of downstream palm oil products to increase the income of palm oil smallholders through price control mechanisms and to held Malaysia's dependency on fossil fuels. The MPOB under the MPC 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 November 2014 in selected states in Malaysia. Full implementation of B7 goal was achieved in 2015 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 MPC revised the schedule multiple times without it every being implemented. Given the inconsistency in GoM planning and roll-out, it is likely GoM may skip the B20 mandate and proceed with the B30 mandate in 2025.

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.

Table 3. Planned and Actual Roll-Out of Blending Requirements

Transportation Sector*	Industrial Sector**

Blend	Planned Government	Actual Roll-	Planned Government Roll-	Actual
	Roll-out	Out***	Out	Roll-Out
B5	2008	2014 (Nationwide)	None	None
B7	January 1, 2015	2016 (Nationwide)	Early 2019	July 2019
B10	Early 2019	February 1, 2019 (Nationwide)	N/A	N/A
B20	2020	Selected areas in Sarawak, Labuan, and Langkawi.	N/A	N/A
B30	2025			

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

**Diesel boilers

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

Financial Supports

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.

Time Period	RBD Olein US\$/MT	Average Crude 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	944.00	62.81	0.48	0.52	0.49	-6.36
Feb	955.50	60.58	0.47	0.51	0.49	-3.42
Mar	966.00	62.79	0.48	0.52	0.49	-6.74
Apr	1,004.50	68.95	0.53	0.57	0.49	-16.74
May	897.00	63.60	0.49	0.52	0.48	-9.01
June	826.50	63.34	0.49	0.51	0.47	-9.67
July	884.50	67.99	0.52	0.55	0.47	-17.70

Table 4 Estimated Subsidy on Ten Percent Blend Biodiesel from January to July 2023

*Average Crude Oil and Diesel price based on monthly price published 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 July 31, 2023 @ RM 4.6 = USD\$1.00

Table 5 Estimated levy* collected by MPOB to finance Biodiesel Mandate

	CPO produced in CY (ton)	Replanting and Biodiesel levy collected in USD
2023**	19,000,000	\$9.70 million
2022	18,453,420	\$9.95 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

* The levy is known as "CESS" locally. 2023** indicates Estimated CY production. Notes: Exchange rate on August 16, 2023 @ RM4.45 = USD\$1.00 and in October 23, 2023@RM4.70

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.

However, in July 2023, the MPC, put forward a proposal to GoM for a separate funding for replanting program under the Ministry of Finance (MOF), In the proposal MOF will provide soft loan to smallholders in ensuring those eligible smallholders can apply for it. Under the current system, the replanting program funds will be given on first come first served basis and not all eligible smallholders can apply for it. With this proposal, more funds will be available from levy collected for biodiesel program.

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, fifteen facilities have been upgraded from nine previous year.

Electric Vehicle Incentives

To promote the adoption of battery electric vehicles (BEV) in Malaysia, in 2022 budget tabling by the Ministry of Finance, tax incentives were given for the purchase of fully imported BEV until the end of 2024 and for locally assembled models till the end of <u>2025</u>. The incentives covered exemptions of import and excise duty on fully imported BEV along with road tax. In addition, those who purchase, lease, subscribe or install an EV charging port will be entitled to a one-time personal tax rebate up to RM2,500. Before the incentives, excise duty and taxes for fully imported BEV is roughly around 100 percent (%).

According to the Malaysia road transport department, currently there are around 17,000 BEVs and 1,200 public charging stations nationwide. Malaysia aimed to have 100,000 BEVs on the roads by 2030 of

which 50,000 are expected to be commercial BEVs, in addition to install 10,000 charging stations nationwide by 2025.

For Flex Fuel Vehicles such as Plug-In Hybrid Electric Vehicles (PHEV) and Hybrid vehicles, GoM do not provide the same exemption as BEVs. For locally assembled PHEV and Hybrid vehicles, incentives given to car manufacturers by GoM are specific to the car manufacturers. Currently there are roughly 80,000 petrol-electric hybrid vehicles of various types and 2,700 diesel-electric hybrids registered in Malaysia.

Import policy, import duties, and export taxes.

Palm oil production, supply and distribution in Malaysia is regulated by the Malaysia Palm Oil Board (MPOB). Although no import or export licenses required for the trade of palm oil products, companies involved in palm oil business need to be registered and licensed by MPOB. This is in accordance with the Malaysian Palm Oil Board Act 1998 (Act 582), the Malaysian Palm Oil Board (Licensing) Regulations 2005 and Malaysian Palm Oil Board (Licensing) (Amendment) Regulations 2011.

Below the import/export duties and sales taxed applicable for ethanol, gasoline, petroleum products containing palm biodiesel and Biodiesel palm methyl ester.

10010 01 11						
HS Code	Description	Duty Rate (%)		Sales Tax	Import	Export
		Import	Export		License	License
2207.10	Undenatured ethanol	RM60/100%	0%	10%	Yes	No
2207.20	Denatured ethanol	vol / liter	0%	10%		
2710.12	Unblended Gasoline	0%	0%	RM0.60/liter	No	Yes
2710.20	Petroleum containing	0%	0%	10%	No	No
	30% or less biodiesel					
3826.00	Biodiesel Palm Methyl	0%	0%	10%	No	No
	Ester					

Table 6: Import duties and export taxes

Source : The Malaysian trade classification and customs duties order

Section III. Ethanol

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

Biodiesel (Million Liters)										
Calendar Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023f
Beginning Stocks	62	42	76	70	150	155	405	444	362	207
Production	475	743	595	854	1,100	1,778	1,249	1,197	1,151	1,078
Imports	0	0	0	0	0	0	0	0	0	0
Exports	95	194	91	256	560	663	412	416	351	233
Consumption	400	515	510	518	535	865	798	863	955	1,015
Ending Stocks	42	76	70	150	155	405	444	362	207	37
Balance Check	0	0	0	0	0	0	0	0	0	0
Production Capacity (M	1illion Lite	ers)								
Number of Biorefineries	18	18	17	16	15	19	19	18	18	18
Nameplate Capacity	3,109	2,527	2,248	2,239	2,174	2,426	2,426	2,332	2,362	2,565
Capacity Use (%)	15.3%	29.4%	26.5%	38.1%	50.6%	73.3%	51.5%	51.3%	48.7%	42.0%
Feedstock Use (1,000	MT)									
Crude Pal m Oil (CPO)	437	683	535	786	1,012	1,636	1,149	1,101	1,059	991
Market Penetration (M	illion Lite	rs)								
Biodiesel, On-road use	400	515	510	518	535	745	665	720	760	860
Biodiesel, Industrial	0	0	0	0	0	120	133	143	195	155
Diesel/Biodiesel, On- road use 1/	7,957	7,342	7,246	7,351	7,639	7,447	6,637	7,168	7,605	8,576
Blend Rate (%)	5.0%	7.0%	7.0%	7.0%	7.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Diesel/Biodiesel Pool, Total 1/	13,616	11,938	11,647	12,517	12,571	14,143	13,430	13,995	14,226	14,850

Note 1/ Fuel pools are defined as fossil fuels plus all "bio-components" (biofuels) blended with fossil diesel.

f = forecast

Source : Production and export data are from the official data published by MPOB, Biodiesel on -road use are from Malaysia Energy Statistics Handbook 2021 and IEA

Consumption

Total consumption of biodiesel for calendar year 2023 is estimated at 1,015 million liters where 860 million liters for on road use and 155 million liters for industrial use on higher blending rate and expected rising diesel consumption. For CY 2023, the blend rate for on-road use, is at 10% and for industrial use is at 7%. Although the GoM planned to increase the blend rate for on-road use to 20% from 10% in 2023, it however postponed the 20% mandate blend by 2025 to achieve Malaysia's commitment to the Paris Agreement of the United Nations Climate Change Conference (UNFCCC).

Production

Based on MPOB data on Biodiesel production, there are 18 active biodiesel plants currently in operation with capacity of 2.5 billion liters. A total of 0.991 million tons of palm oil products were process to produce 1.078 billion liters of palm methyl ester. Before 2019, export was the main driver for biodiesel production, the introduction of European Union's (EU) Renewal Energy Directive (<u>REDII</u>) in 2019 saw

export to the EU, Malaysia's largest importer of biodiesel, started to decline. Realizing this, GOM introduced B10 mandate in 2019 and since then production of biodiesel is dominated by domestic consumption.

Feedstock for Malaysia's biodiesel production are from palm oil products namely crude palm oil (CPO), process palm oil (PPO) and process palm kernel oil (PPKO) as they are abundant, easily, and readily available to biodiesel processors. Used cooking oil (UCO) is also an option, however, collection can be difficult. Most UCO is collected by private companies and is intended for the export market where it fetches a higher price. Recently, Malaysia's national oil company, Petronas, embarking on pilot UCO collection program at their selected petrol stations. This is in anticipation for their upcoming SAF project plant scheduled to operate in 2025.

Trade

Malaysia's biodiesel exports in 2023 are forecast at 233 million liters down by 118 million liters. The European Union remains the largest export market for Malaysia's biodiesel accounting for 48 percent of market share, followed by China and the United States.

Table	Table 8. Malaysia : Export of biodiesel to China from October 2022 till September 2023 (1,000 liters)											
	Oct 22	Nov22	Dec 22	Jan 23	Feb23	Mar 23	Apr23	May 3	Jun 23	Jul 23	Aug23	Sept 3
China	296	23	10,936	11,658	224	11,360	67	223	0	0	27	568

COUNTRY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
CHINA	11,658	224	11,360	67	27	0	0	29	618	23,983
E.U	113	3,589	23,584	2,919	13,695	12,862	155	21,074	7,952	85,943
HONG KONG	47	138	140	45	0	90	90	161	132	843
JAPAN	949	1,388	1,413	38	1,436	77	2,769	1,450	0	9,520
PHILIPPINES	0	0	0	0	0	0	45	45	0	90
SINGAPORE	3,386	3,408	0	1,704	0	1,569	0	0	10,170	20,237
SOUTH KOREA	0	0	0	0	58	87	44	0	0	189
SWITZERLAND	0	0	0	0	0	0	0	0	5,869	5,869
U.S.A	0	0	0	46	0	0	15,983	0	8,019	24,002
U.K	23	7,952	0	0	0	0	0	0	0	7,975
Total										178,651

Table 9. Malaysia: Monthly exports of biodiesel by destination (1,000 liters) from January till September 2023

Source : Malaysia Palm Oil Board (MPOB)

Table 10. Malaysia: Annual exports of biodiesel by destination (1,000 liters)

Country	2021	2022	Percentage change (%)
Canada	0	87	0
China	78,677	41,822	-46.8%
EU	283,198	242,735	-14.3%
Hong Kong	1,403	1,613	14.9%
India	136	254	86.8%
Indonesia	466	0	-100%
Japan	15,429	17,368	12.5%

Singapore	7,376	7,586	2.8%
South Korea	516	393	-23.8%
USA	192	11,358	5,815.6%
U.K	28,408	28,233	-0.6%
Vietnam	137	0	-100%
Total	415,938	351,449	-15.5%

Source : Malaysian Palm Oil Board (MPOB)



Source : Trade Data Monitor UCO HS Code: 1518000, POME HS Code: 230690 and PFAD HS Code: 382319

UCO- used cooking oil, POME-palm oil mill effluent PFAD- palm fatty acid distillate

Section V. Advanced Biofuels

Sustainable Aviation Fuels

Production of sustainable aviation fuels (ASF) is still at the infancy level where there is no commercial production. According to industry players, there are three sources of feedstock for SAF project in Malaysia, used cooking oil (UCO), and micro-algae. For UCO, the challenge is in collection of feedstock as there are limited numbers of collection centers and is primarily for the private export market. In October 2023, Malaysia's national petroleum company, Petronas did a pilot collection center for UCO in thres of their gas stations in Klang Valley. This program is in preparation for their upcoming SAF plant that expected to be fully operational by 2027.

As for the micro-algae, the Sarawak state government, with technology provider Mitsubishi from Japan is embarking on a small pilot project to convert micro-algae into SAF. The project is currently at feasibility stage and commercial production is expected to start in 2026 onwards.

Section VI. Notes on Statistical Data

Fuel consumption figures are derived from IEA published data, the Malaysia energy statistics handbook 2021- publication by the Energy Commission Malaysia and Monthly Manufacturing Statistics – Department of Statistics Malaysia.

Biofuel production, export, nameplate capacity and consumption

Biofuel production, export and nameplate capacity based on data published by the Malaysian Palm Oil Board (MPOB E-books – 2022 Malaysian oil palm statistics and 2022 Review of the Malaysian oil palm industry.

Biodiesel consumption data based on published data from the Malaysia Energy Statistics Handbook 2021.

Trade data

All trade data on used cooking oil (UCO), Palm Oil Mill Effluent (POME) and Palm Fatty Acid Distillate (PFAD) sourced from Trade Data Monitor.

Price of palm oil products

Information on the palm oil products price is based on monthly published price by the Malaysian Palm Oil Board.

Conversion Rates: Palm Methyl Ester Biodiesel 1 metric tons (MT) Palm Methyl Ester = 1,136 liters Palm Methyl Ester 1 metric tons (MT) crude palm oil = 1,087 liters of Palm Methyl Ester

Attachments:

No Attachments