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## **Malaysia**

## **Biofuels Annual**

**2017**

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**Report Highlights:**

The planned rollout of 10 percent biodiesel blend (B10), initially scheduled on July 1, 2016 and deferred to January 1, 2017, has been postponed indefinitely. Post believes it could likely be implemented in 2019. Consumption of B7 in 2016 was at 279 million liters and forecast to increase to 300 million in 2017 and 400 million in 2018. A 15 percent blend is the goal for roll-out in 2020. Malaysia exports palm methyl ester biodiesel, but there are little to no imports. There is no significant production or use of fuel ethanol.

**Post:**

Kuala Lumpur

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## I. Executive Summary

The Government of Malaysia's (GOM) intention to phase out 7 percent biodiesel blend (B7), with a 10 percent biodiesel blend (B10) by January 1, 2017 was delayed so B7 blend levels remain in effect. Lack of subsidy support when extending the mandate and the high price of feedstock relative to low petroleum prices would raise the cost to consumers of B10 to unacceptable levels. Although GOM seems committed to implement a B10 mandate, it has not indicated when. Crude palm oil (CPO) is the feed stock (raw material) used for making biodiesel in Malaysia due to its abundance and low cost.

Although there are sugar cane plantations in Malaysia (in the Northern state of Perlis), producing raw sugar, lack of economies of scale and high cost makes it financially unviable to produce ethanol from sugar cane. Ethanol is produced in Malaysia derived from Palm Oil Mill Effluent (POME), but production is insignificant due to high cost of production.

## II. Policy and Programs



### National biofuel policy and the Eleventh Malaysia Plan

Under the *National Biofuel Policy* released on March, 21, 2006, GOM objectives were to use environmentally friendly and sustainable energy sources to reduce dependency on fossil fuels and stabilize and boost palm oil prices. Under this plan, biofuels were to be produced for transport, industry, and export while the GOM would develop home grown biofuel technology and second generation biofuels. In 2007, Parliament passed the *Biofuel Industry Act*, which included provisions for the Ministry of Plantation Industries and Commodities to implement a biodiesel blend mandate. However, this act excluded ethanol as the source of alternative fuels under the National Biofuel Policy.

Although the initial plan was to initiate B5 in 2008, it only began on June 1, 2011. Selected states in Peninsular Malaysia, Central region (Negeri Sembilan and Selangor) were first to be introduced followed by the Southern region (Malacca and Johore) on July 22, 2012; the northern region (Perak, Penang, Kedah and Perlis) on October 1, 2013 and finally the east coast states (Pahang and Kelantan) on February 1, 2014. Full nation online implementation covering both Peninsular and East Malaysia was achieved at the end of 2014. With growing CPO stocks and declining prices, GOM was pressured to further increase CPO quantity blended for biodiesel which led to the B7 mandate in 2015.

To promote domestic consumption of biodiesel, GOM released the Eleventh Malaysia Plan (2016-2020) to have a B15 transport mandate by year 2020 for the on-road sector with no details on implementation. Nevertheless, automotive manufacturers were skeptical about implementation as they believed usage of palm methyl ester beyond 7% blending rate could cause problems to the injection system of the diesel engine.

Needless to say, distribution, quality control, safety and user education issues need to be overcome so users have confidence in the product. The GOM needs programs to educate consumers on the benefits of biodiesel and dispel concerns about potential damage to the engine.

**Table 1 - Planned versus actual/expected roll-out of blending requirements**

| Blend      | Transportation Sector*                             |                                                                                                | Industrial Sector**         |                   |
|------------|----------------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------------|-------------------|
|            | Planned Government Roll-out                        | Actual Roll-out                                                                                | Planned Government Roll-out | Expected Roll-out |
| <b>B5</b>  | 2008                                               | 2011 (Central region)<br>2012 (Southern region)<br>2013 (Northern region)<br>2014 (Nationwide) | None                        |                   |
| <b>B7</b>  | January 1, 2015                                    | January 1, 2015                                                                                | Pending                     | Pending           |
| <b>B10</b> | October 1, 2015<br>July 1, 2016<br>January 1, 2017 | Pending                                                                                        | N/A                         | N/A               |
| <b>B15</b> | 2020                                               |                                                                                                | N/A                         | N/A               |

\*Cars, trucks, vans, pickups and small fishing vessels using B7 biodiesel.

\*\*Diesel boilers.

### Price support subsidies

To ensure the biofuel program was financially viable, GOM used “Automatic Pricing Mechanism” (APM) to set biodiesel prices. Although GOM never revealed how the APM was calculated, based on research by post graduate students of the University of Technology Malaysia entitled, “*Socio economic and feasibility study of utilizing palm oil derived biofuel in Malaysia*,” the APM is calculated based on the formula below.\*\* The calculation provides an estimate on how much subsidies GOM spends to support the B7 biodiesel program.

$$B_{xx} = \frac{(0.xx) \times A}{1,104.3622} + (1 - 0.xx) \times C$$

$B_{xx}$  = Price of biodiesel for the respective blending number  
XX- for example B5, B7 or B10

A = Price of Refined Bleached and Deodorised Palm Olein (Rm/t)

C = Price of unsubsidized petroleum diesel (RM/Liter)

The denomination 1,104.3622 is a density of RBD olein = 0.9055 kg/litre

\*\**Socio economic and feasibility study of utilizing palm oil derived biofuel in Malaysia by Muhamad Hanafi, Asril Rajo Mantari, Mohammad Nazri, Mohd Jaafar and Adrian Paul Raj.*

**Table 2. Eestimated price of B7 biodiesel based on APM calculations and GOM published prices of B7 biodiesel retailed at petrol station from January 2016 to June 2017.**

| <b>Time Period</b> | <b>RBD Olein<br/>US\$/MT</b> | <b>Oil price<br/>US\$/Barr el</b> | <b>Estimated price<br/>diesel/ liter</b> | <b>Estimated price<br/>B7 Biodiesel *</b> | <b>B7 price sold at<br/>petrol station</b> | <b>%<br/>differen ce</b> |
|--------------------|------------------------------|-----------------------------------|------------------------------------------|-------------------------------------------|--------------------------------------------|--------------------------|
| Jan-16             | 535.00                       | 29.44                             | 0.23                                     | 0.30                                      | 0.37                                       | 19.41%                   |
| February           | 605.50                       | 32.66                             | 0.25                                     | 0.33                                      | 0.32                                       | -0.72%                   |
| March              | 630.50                       | 37.73                             | 0.29                                     | 0.36                                      | 0.32                                       | -<br>12.38%              |
| April              | 703.00                       | 41.86                             | 0.32                                     | 0.40                                      | 0.40                                       | 0.06%                    |
| May                | 691.00                       | 50.08                             | 0.38                                     | 0.46                                      | 0.37                                       | -<br>22.62%              |
| June               | 653.00                       | 49.10                             | 0.38                                     | 0.45                                      | 0.39                                       | -<br>15.87%              |
| July               | 610.00                       | 42.35                             | 0.33                                     | 0.40                                      | 0.40                                       | 0.48%                    |
| August             | 676.50                       | 45.46                             | 0.35                                     | 0.42                                      | 0.43                                       | 0.12%                    |
| September          | 730.50                       | 48.96                             | 0.38                                     | 0.45                                      | 0.41                                       | -<br>10.45%              |
| October            | 675.00                       | 47.47                             | 0.36                                     | 0.44                                      | 0.42                                       | -3.93%                   |
| November           | 699.00                       | 50.18                             | 0.39                                     | 0.46                                      | 0.44                                       | -4.14%                   |
| December           | 738.00                       | 54.53                             | 0.42                                     | 0.49                                      | 0.41                                       | -<br>19.49%              |
| Jan-17             | 752.00                       | 53.29                             | 0.41                                     | 0.48                                      | 0.45                                       | -6.07%                   |
| February           | 757.00                       | 54.33                             | 0.42                                     | 0.49                                      | 0.47                                       | -2.77%                   |
| March              | 706.50                       | 50.85                             | 0.39                                     | 0.46                                      | 0.48                                       | 5.36                     |
| April              | 679.00                       | 49.43                             | 0.38                                     | 0.45                                      | 0.52                                       | 13.81                    |
| May                | 693.50                       | 48.37                             | 0.37                                     | 0.44                                      | 0.48                                       | 7.60                     |
| June               | 673.50                       | 46.04                             | 0.35                                     | 0.43                                      | 0.49                                       | 12.39                    |

\*Estimated prices based on APM calculation inclusive of operational cost, oil companies' margin and station dealers' margin.

Malaysia ended fuel subsidies on December 1, 2014. Since then, fuel prices are based on the rolling average price of crude oil during the previous week and adjusted on a weekly basis.

**Table 3.** Retail price of petroleum products in Malaysia for consumer vehicles from June to August 2017. For year 2014, petroleum products in Malaysia were subsidized by the Government.

| <b>Period</b>  | <b>RON 95</b> | <b>RON 97</b> | <b>B7 (Biodiesel)</b> | <b>Euro 5 diesel</b> | <b>LPG</b> |
|----------------|---------------|---------------|-----------------------|----------------------|------------|
| August 3-9     | RM 2.07       | RM 2.32       | RM2.05                | RM2.15               | RM1.16     |
| July 27- Aug 2 | RM 2.03       | RM 2.28       | RM 1.99               | RM 2.09              | RM1.16     |
| July 20-26     | RM 1.97       | RM 2.22       | RM 1.96               | RM 2.06              | RM1.16     |
| July 13-19     | RM 1.97       | RM 2.22       | RM 1.96               | RM 2.06              | RM1.16     |
| July 6-12      | RM 1.93       | RM 2.19       | RM 1.91               | RM 2.01              | RM1.16     |
| June 29-July 5 | RM 1.89       | RM 2.15       | RM 1.84               | RM 1.94              | RM1.16     |
| June 22-28     | RM 1.91       | RM 2.17       | RM 1.88               | RM 1.98              | RM1.16     |
| June 15- 21    | RM 1.98       | RM 2.24       | RM 1.88               | RM 1.98              | RM1.16     |
| June 8-14      | RM 2.05       | RM 2.31       | RM 1.94               | RM 2.04              | RM1.16     |
| June 1-7       | RM 2.10       | RM 2.38       | RM 2.02               | RM 2.12              | RM1.16     |

*(Exchange rate August 3, 2017 : RM4.28: USD\$1.00)*

| <b>Year</b> | <b>RON 95</b> | <b>RON 97</b> | <b>B5 (Biodiesel)</b> | <b>LPG</b> |
|-------------|---------------|---------------|-----------------------|------------|
| 2014        | RM 2.26       | RM 2.46       | RM2.23                | RM0.65     |

*(Exchange rate December 30, 2014 : RM3.50 : USD\$1.00)*

In 2014, GOM allocated \$79 million to set up needed blending facilities and infrastructure with capacity to blend up to B20 biodiesel. As of July 2017, there were six petroleum blending facilities to serve 3,500 petrol stations throughout Malaysia. Apart from setting up facilities, funds were used to support the price of B7 biodiesel. To replenish funds, additional revenue from CPO export taxes and the price differential of sales of normal petroleum diesel and B7 (which retail at a premium of 0.05 cents more per liter than B7) were used to subsidize the production of B7 biodiesel.

Full implementation of the B7 blend boosted biodiesel consumption by 50% year-on-year to 258 million liters in 2015. The B10 mandate was supposed to have been implemented on July 1, 2016, for the consumer transport sector (that covers both road and sea transport) but, to date, GOM has been silent about the roll out date. Road transport constitutes nearly 80% of usage while sea transport takes up the rest. To further boost demand for biofuels, GOM also promotes the use of B7 biofuel for industrial sectors, mainly to heat boilers and generate electricity. This, however, has been put on hold as scarce funding limits use of B7 biofuels for consumer transport.

### **Environmental sustainability**

Based on research conducted by the Malaysian Palm Oil Board (MPOB), implementation of B7 biodiesel reduced release of greenhouse gases, carbon dioxide, by as much as 1.05 million tons a year. This is in line with Malaysian commitment under the Kyoto Protocol and Paris Agreement. In 2013, Malaysia has achieved some of the commitments agreed to under the Kyoto Protocol as listed below:

**Table 4.** Summary of Emissions Reduction Achieved in 2013 and Projected for 2020 as reported by Ministry of Natural Resources in their Third National Communication (TNC)/ Biennial Update Report (BUR) for Malaysia under the United Nations Framework Convention on Climate Change (UNFCCC)

| Sector | Mitigation Action                                                                                             | Emission Reduction Achieved in 2013 (ktCO <sub>2</sub> eq) | Potential Emission Reduction Achieved in 2020 (ktCO <sub>2</sub> eq) |
|--------|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|----------------------------------------------------------------------|
| Energy | Renewal Energy (RE) implementation through Feed-in tariff mechanism.                                          | 252.78                                                     | 5,458.09                                                             |
|        | RE electricity generation by Non-Feed-in Tariff regulated public and private licensees and other mechanisms   | 948.77                                                     | 2,179.29                                                             |
|        | Use of palm-based biodiesel in blended petroleum diesel                                                       | 719.74                                                     | 1,802.49                                                             |
|        | Application of green technology                                                                               | 94.81                                                      | 1,426.35                                                             |
|        | Implementation of green building rating scheme                                                                | 60.40                                                      | 858.40                                                               |
|        | Efficient electricity consumption in all federal Government ministry buildings (baseline established in 2013) | Nil                                                        | 98.21                                                                |
|        | Reducing emissions through development and usage of energy-efficient vehicles (EEVs)                          | 40.96                                                      | 199.74                                                               |
|        | Used of compressed natural gas (CNG) in motor vehicles                                                        | 154.62                                                     | 217.57                                                               |
|        | Rail based public transport                                                                                   | 214.93                                                     | 977.51                                                               |

|                           |                                                                |                  |                  |
|---------------------------|----------------------------------------------------------------|------------------|------------------|
| <b>LULUCF**<br/>Waste</b> | Sustainable forest management                                  | 13,797.37        | 13,800.00        |
|                           | Waste paper recycling                                          | 1,993.47         | 2,159.45         |
|                           | Biogas capture from palm oil milling effluent (POME) treatment | 300.95           | 3,001.89         |
|                           | <b>Total</b>                                                   | <b>18,578.80</b> | <b>32,178.89</b> |

\* *Latest biennial update since 2013, next update is in December 2017.*

\*\* *LULUCF = land use, land use change and forestry*

Recently, the European Parliament (EP) [approved a resolution](#) to introduce a single certification scheme for palm oil entering the EU by 2020. This means, by 2020 unsustainable or non-certified palm oil biodiesel is banned from entering the EU market, and this raised concern by both Malaysia and Indonesia. The EU is one of the largest importers of biodiesel from Malaysia so such a directive will lead to a drop in total production and will severely affect the biodiesel industry.

During the recently concluded 1<sup>st</sup> Palm Biodiesel Conference (August 7-8, 2017) in Kuala Lumpur, GOM sent senior officers to the EP in September 2017 to challenge the directive. GOM believes, the EP will not implement the directive as it is discriminatory in nature, and, if it does, a compromise should be made between EP and palm oil producing countries on a commonly accepted sustainable certification standard.

### III. Gasoline and Diesel Markets

Sales of new vehicles in 2016 dropped by 13.0 percent to 580,124 units, compared to 666,674 units in 2015. For calendar year 2017, sales are forecast to drop further to 570,000 units due to depreciation of Malaysian currency by as much as 30% in the last 18 months, high financing cost, higher new vehicle prices and difficulties in securing loans for new vehicle purchases.

For the consumer fuel market, there are two types of gasolines available, RON95 and a higher octane RON97. The price differential between the two is around 5 cents. For diesel, in addition to B7 biodiesel, in early 2016, saw most petrol retailers offering Euro5 diesel to consumers as an option. Euro5 refers to European exhaust emission standards which sets limits on emissions of unhealthy pollutants from the exhaust system of motor vehicles. Euro5 diesel contains only 10 ppm of Sulphur which is an environmental selling point. (Sulphur is a chemical that creates particulate matter during combustion).

Even so, consumption of Euro 5 diesel has little impact overall on road consumption of diesel as it is more expensive than B7 biodiesel. Another fuel source available for on-road transport is liquid petroleum gas for vehicles retro-fitted with a natural gas propulsion system, commonly used by taxis and inter-city buses. (Refer to Table 2 for retail prices of petroleum products in Malaysia for consumer vehicles)

Incentives for hybrid vehicles that reduced sales tax, introduced in 2013 and 2014, were discontinued in 2015. Normally hybrid cars have engines of 1,500 cc and above. For Energy Efficient Vehicles (EEV), under the National Automotive Policy 2014, GOM introduced a special tax incentive for locally assembled vehicles with engine capacity below 1,300 cc horse power, leading to the popularity of such small engine vehicles in Malaysia, such as *Proton* and *Perodua*. There are more than 60 car models from various makes certified as EEV vehicles by the Malaysia Automotive Industry (MAI). Sales of EEV vehicles are expected to increase from 32.6% in 2015 to 70% by 2020.

However, demand for diesel vehicles, especially from commercial sectors – bus, transportation and haulage operators and small and medium business owners are expected to remain constant, in line with Post projected demand growth at 8 percent.

**Table 5. Price comparison of a hybrid and naturally aspirated engine vehicle of same make and model**

| Make and model         | Hybrid      | Naturally aspirated engine |
|------------------------|-------------|----------------------------|
| Toyota Camry 2.5liters | \$39,300.00 | \$33,600.00                |
| Honda Jazz 1.5 liters  | \$20,300.00 | \$16,200.00                |

Gasoline powered vehicles are the most common, accounting for 80 percent of new car sales. Diesel powered vehicles are growing slowly. Most diesel vehicles are trucks, buses, and pick-ups.

Overall aircraft movement in 2016 was 810,573 compared to 815,340 in 2015, a slight drop of 0.6%. This is partly attributed to reduction of domestic aircraft movements as *Firefly*, *Malaysia Airlines* and *AirAsia* consolidated domestic flights to economize. International aircraft movements, however, increased from 295,485 in 2015 to 297,752 in 2016.

**Table 6 - Fuel use history and projections**

| Fuel Use History (Million Liters) |       |       |       |       |       |        |        |        |        |        |
|-----------------------------------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|
| Calendar Year                     | 2008  | 2009  | 2010  | 2011  | 2012  | 2013   | 2014   | 2015   | 2016   | 2017   |
| <b>Gasoline Total</b>             | 3,653 | 3,622 | 3,950 | 3,370 | 4,480 | 5,230  | 5,250  | 5,774  | 6,352  | 6,987  |
| <b>Diesel Total</b>               | 3,789 | 3,568 | 3,466 | 3,600 | 3,888 | 3,953  | 4,199  | 4,534  | 4,897  | 5,289  |
| On-road                           | 3,069 | 2,890 | 2,807 | 2,916 | 3,149 | 3,202  | 3,401  | 3,673  | 3,967  | 4,284  |
| Agriculture                       | 341   | 321   | 312   | 324   | 350   | 356    | 378    | 408    | 441    | 476    |
| Construction & Mining             | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      |
| Shipping & Rail                   | 76    | 71    | 69    | 72    | 78    | 79     | 84     | 91     | 98     | 106    |
| Industry                          | 303   | 285   | 277   | 288   | 311   | 316    | 336    | 363    | 392    | 423    |
| Heating                           | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      |
| <b>Jet Fuel Total</b>             | 873   | 876   | 983   | 1,055 | 1,042 | 1,239  | 1,305  | 1,409  | 1,522  | 1,644  |
| <b>Total Fuel Markets</b>         | 8,315 | 8,066 | 8,399 | 8,025 | 9,410 | 10,422 | 10,754 | 11,717 | 12,771 | 13,920 |

  

| Fuel Use Projections (Million Liters) |       |       |       |       |       |       |       |       |       |       |
|---------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Calendar Year                         | 2018  | 2019  | 2020  | 2021  | 2022  | 2023  | 2024  | 2025  | 2026  | 2027  |
| <b>Gasoline Total</b>                 | 7,686 | 8,454 | 9,300 | 10,23 | 11,25 | 12,37 | 13,61 | 14,97 | 16,47 | 18,12 |

|                           |        |        |        |        |        |        |        |        |        |        |
|---------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                           |        |        |        | 0      | 3      | 8      | 6      | 8      | 6      | 3      |
| <b>Diesel Total</b>       | 5,712  | 6,169  | 6,663  | 7,196  | 7,771  | 8,393  | 9,064  | 9,789  | 10,573 | 11,418 |
| On-road                   | 4,627  | 4,997  | 5,397  | 5,829  | 6,295  | 6,798  | 7,342  | 7,929  | 8,564  | 9,249  |
| Agriculture               | 514    | 555    | 600    | 648    | 699    | 755    | 816    | 881    | 952    | 1,028  |
| Construction & Mining     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| Shipping & Rail           | 114    | 123    | 133    | 144    | 155    | 168    | 181    | 196    | 211    | 228    |
| Industry                  | 457    | 494    | 533    | 576    | 622    | 671    | 725    | 783    | 846    | 913    |
| Heating                   | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| <b>Jet Fuel Total</b>     | 1,775  | 1,917  | 2,071  | 2,236  | 2,415  | 2,608  | 2,817  | 3,043  | 3,286  | 3,549  |
| <b>Total Fuel Markets</b> | 15,173 | 16,540 | 18,034 | 19,662 | 21,439 | 23,379 | 25,497 | 27,810 | 30,335 | 33,090 |

#### IV. Ethanol

Although there is sugar cane plantation in Malaysia for production of raw sugar, lack of economies of scale and high cost to produce ethanol makes it economically untenable to produce ethanol from sugar cane. Molasses from sugar cane production are sold domestically as syrup for local delicacies. Ethanol produced in Malaysia is derived from Palm Oil Mill Effluent (POME). Ethanol is not produced commercially because feedstock, POME (palm trunk and palm oil mill effluent waste) would be expensive to transport from rural plantations to urban processing plants.

Palm plantations, instead, produce and use it to generate electricity to run their boilers. Although there are initiatives to produce ethanol from palm oil mill effluent (POME) commercially, lack of advanced technology and high capital investment make it unfeasible. In addition, it is difficult to source a constant supply of feedstock, palm trunk or effluent waste which is prohibitively expensive. As such, ethanol is not used as fuel or in production of industrial chemicals.

#### V. Biodiesel

**Table 7 - Biodiesel supply and demand**

| <b>Biodiesel (Million Liters)</b>           |       |       |       |       |       |       |       |       |       |       |
|---------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Calendar Year                               | 2009  | 2010  | 2011  | 2012  | 2013  | 2014  | 2015  | 2016  | 2017  | 2018  |
| <b>Beginning Stocks</b>                     | 1     | 0     | 0     | 0     | 77    | 212   | 154   | 110   | 120   | 110   |
| <b>Production</b>                           | 246   | 130   | 204   | 271   | 507   | 232   | 450   | 419   | 480   | 470   |
| <b>Imports</b>                              | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| <b>Exports</b>                              | 247   | 97    | 54    | 31    | 190   | 95    | 204   | 94    | 150   | 110   |
| <b>Consumption</b>                          | 0     | 33    | 150   | 163   | 182   | 195   | 290   | 315   | 340   | 370   |
| <b>Ending Stocks</b>                        | 0     | 0     | 0     | 77    | 212   | 154   | 110   | 120   | 110   | 100   |
| <b>Balance Check</b>                        | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| <b>Production Capacity (Million Liters)</b> |       |       |       |       |       |       |       |       |       |       |
| Number of Biorefineries                     | 18    | 13    | 13    | 14    | 15    | 16    | 18    | 17    | 17    | 17    |
| Nameplate Capacity                          | 2,880 | 2,050 | 1,363 | 2,101 | 3,010 | 2,726 | 2,647 | 2,352 | 2,556 | 2,783 |

|                                            |       |       |       |       |       |       |       |       |       |       |
|--------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Capacity Use (%)                           | 8.5%  | 6.3%  | 15.0% | 12.9% | 16.8% | 8.5%  | 17.0% | 17.8% | 18.8% | 16.9% |
| <b>Feedstock Use for Fuel (1,000 MT)</b>   |       |       |       |       |       |       |       |       |       |       |
| Crude Palm Oil (CPO)                       | 217   | 114   | 180   | 239   | 446   | 204   | 396   | 369   | 423   | 414   |
|                                            |       |       |       |       |       |       |       |       |       |       |
| <b>Market Penetration (Million Liters)</b> |       |       |       |       |       |       |       |       |       |       |
| Biodiesel, on-road use                     | 0     | 33    | 150   | 163   | 182   | 195   | 290   | 315   | 340   | 370   |
| Diesel, on-road use                        | 3,282 | 3,188 | 3,312 | 3,577 | 3,637 | 3,863 | 4,172 | 4,506 | 4,866 | 5,255 |
| Blend Rate (%)                             | 0.0%  | 1.0%  | 4.5%  | 4.5%  | 5.0%  | 5.0%  | 7.0%  | 7.0%  | 7.0%  | 7.0%  |
| Diesel, total use                          | 3,568 | 3,466 | 3,600 | 3,888 | 3,953 | 4,199 | 4,534 | 4,897 | 5,289 | 5,712 |

\*Exports are based on MPOB data sourced directly from biofuel plants so deemed more accurate than from export declaration forms (official GOM data) filled out by exporters who may use different HS code to avoid paying additional tariff and import taxes imposed by importing countries.

## Production

Production of biodiesel in Malaysia is still far below full capacity. Delay in implementation of the B10 mandate lead to a utilization rate of 18.8% (480 million liters) for production of B7 as compared to 24.5% (625 million liters) if B10 were fully implemented in 2017. This is way below industry full capacity of 2.5 billion liters. Lack of public awareness and GOM initiative of recycling cooking oil and fats, and small scale livestock slaughter plant facilities made recycling of livestock wastes into biofuels economically impractical. In addition, GOM does not provide any incentive, either monetary or tax incentives, for companies to recycle used cooking oil or animals waste programs.

Due to industry overcapacity and GOM's no longer issuing new licenses for biofuel processing plants, Post does not foresee further expansion in biofuel plant production capacity in Malaysia, both in the short and medium terms. Some of the plants have even converted to produce other oleo-chemical products. Based on observation by Post and interviews with industry stakeholders, most biofuel plants in Malaysia operate below capacity. Nearly three-quarters of those biofuel plants registered do not produce biodiesel (palm methyl ester), but instead produce other oleo-chemical products such as fatty acids, fatty alcohol, soap, noodles and glycerin. (Refer to "Appendix" for biodiesel plants).

As for the implementation of the B15 transport mandate by year 2020, the utilization rate of biofuel production capacity is forecasted at 29% capacity, based on industry feedback, for a 6 days a week operation. Production capacity should be around 65% unless plants are decommissioned. They are converted to the production of other products such as fatty acids, fatty alcohol, and glycerine.



**Palm Methyl Ester 100% concentration before blended with diesel and sold at petrol stations in Malaysia (left). Palm oil fresh fruit bunch, source of crude palm oil used to produce palm methyl ester (biodiesel) (right).**

*(Source: FAS Kuala Lumpur)*

## Consumption

The average national blend of biodiesel in Malaysia's transport diesel pool has steadily increased since 2011. From 1% in 2010, it increased to 4.5% in 2011 (where biofuel was only available in the central region of Negeri Sembilan and Selangor states), it gradually covered the whole peninsular Malaysia in 2012 and steadily increased to 5% in 2013. By 2014 the B5 mandate were fully implemented throughout Malaysia. B5 mandate was phased out and replaced by B7 mandate on January 1, 2015 in which it drastically increased the consumption of feedstock used from 204,000 ton in 2014 to 396,000 tons in 2015.

Delayed introduction of B10 mandate supposedly on July 1, 2016, dampened forecast consumption of CPO at 390,000 tons if fully implemented. In 2016, total consumption of B7 biodiesel was 315 million liters and production of biodiesel for 2016 was 419 million liters, equivalent to feedstock use for fuel of 369,000 tons of CPO. For 2017 and 2018, the average blend rate is forecast at 7% with biodiesel consumption forecast at 340 million liters in 2017 and 370 million liters in 2018 respectively.

During the first Malaysia Biofuel seminar on August 7-8, 2017, GOM indicated extending the B7 mandate to off-road application, alongside B10 implementation. This only would be possible if the market fulfilled the below conditions:

- 1- If price of oil were above \$80 per barrel
- 2- If price of crude palm oil (CPO) were below \$520
- 3- If automotive manufacturers honored warranties for diesel vehicles using B10 biodiesel.

With the above conditions still out of sight, it will be some time before GOM is able to roll out B10 biodiesel for on-road and fishing sectors and B7 biodiesel for off-road uses.

To ensure a successful transition to higher blending, the government needs to supply consistently high-quality fuels and educate consumers on the use of higher blends. Transparency in research findings and active engagement with industry players, mainly vehicle manufactures, biodiesel producers, fuel distributors and fleet managers, is the best way to ensure success.

## **Trade**

Exports of biodiesel in 2016 dropped by 53.3% to 94.3million liters (83,581tons) in 2016 against 204 million liters (178,942 tons) in 2015. The European Union remained the major export destination of biodiesel in 2016 and accounted for 83.5% of total overall exports. The Netherlands imported 35.4 million liters (31,408 tons), Spain at 31.6 million liters (28,036 tons), Italy at 5.6 million liters ( 5,000 tons), United Kingdom at 5.7 million liters (5,019 tons) and Germany at 0.3 million liters (303 tons).

Exports for the first five months of the calendar year 2017 were 106 million liters higher than 35 million liters recorded during the same period of 2016 (January thru May). Drastic drops in biodiesel exports in 2016, was due to lower demand from the European Union which consumed more domestically produced biodiesel made from soybean oil, thus offsetting palm oil biodiesel imports.

### **European Parliament (EP) voted a non-binding resolution to phase-out palm oil in biofuels.**

In March 2017, palm oil producing countries, Indonesia, Malaysia, Costa Rica, Ecuador, Honduras, Colombia and Guatemala, warned the European Parliament (EP) about possible trade disputes regarding the non-binding resolution by the European parliament (EP) to phase-out palm oil in biofuels approved on June 2017 by the EP which called for the European Commission (EC) to phase out vegetable oils, specifically uncertified palm oil, by 2020. The resolution required all palm oil products exported to the EU to be certified sustainable by a “single sustainability certification scheme.” It is uncertain which scheme this refers to as there are various such as Roundtable on Sustainable Palm Oil (RSPO), Indonesia Sustainable Palm Oil (ISPO) and Malaysian Sustainable Palm Oil (MSPO).

In Malaysia, RSPO is set up by industry players such as plantation companies, import traders and palm oil buyers (food producers) and exercises strict interpretation of sustainability requirements. Big plantation companies with abundant resources are able to adhere to RSPO requirements and become RSPO certified. However, small holders and medium sized plantation companies with limited resources find it difficult to meet RSPO requirements so cannot be certified.

To overcome the sustainability certification barrier to trade, the Malaysian government introduced MSPO, its initiative for sustainable palm oil which has more lenient sustainability requirements. MSPO is voluntary for plantation companies, but by the end of 2019, it will be required for all, thus ensuring plantation companies in Malaysia including small holders, are sustainability certified.

The uncertainty about which scheme would be chosen makes palm oil producing countries nervous. If the EP specifies RSPO, this would not bode well for Malaysia’s biodiesel exports to European countries

which would be severely hampered. This, in turn, would lead to a drop in total production as domestic consumption of biodiesel is limited to the commercial passenger vehicle sector.

Information on Malaysian Sustainable Palm Oil (MSPO) certification is linked below:

<https://www.mpocc.org.my/mspo-certification-scheme>

Information on Round Table Sustainable Palm Oil (RSPO) certification is linked below:

<http://www.rspo.org/certification>

**Table 8 – Exports of biodiesel by tons and millions of liters\***

| <b>COUNTRY</b> | <b>2015<br/>Quantity (Tons)</b> | <b>2015<br/>Quantity<br/>(Millions Liters)</b> |
|----------------|---------------------------------|------------------------------------------------|
| European Union | 152,440                         | 173.82                                         |
| Switzerland    | 19,552                          | 22.00                                          |
| China P.R      | 1,741                           | 1.90                                           |
| Japan          | 2,662                           | 3.00                                           |
| India          | 203                             | 0.20                                           |
| USA            | 167                             | 0.19                                           |
| Singapore **   | 2,177                           | 2.40                                           |
| <b>TOTAL</b>   | <b>178,942</b>                  | <b>203.51</b>                                  |
| <b>COUNTRY</b> | <b>2016<br/>Quantity (Tons)</b> | <b>2016<br/>Quantity<br/>(Millions Liters)</b> |
| European Union | 69,766                          | 79.00                                          |
| Albania        | 10,002                          | 11.00                                          |
| China P.R      | 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                                           |
| <b>TOTAL</b>   | <b>83,581</b>                   | <b>94.29</b>                                   |

(Source: *Malaysian Palm Oil Board (MPOB)*)

\*\*Mainly for re-export

\* Exports are based on MPOB data as it is sourced directly from biofuel plants and not from export declaration forms (official GOM data). For official GOM data, exporters use different HS codes in classifying palm biodiesel to avoid paying additional tariffs and import taxes imposed by importing countries.

## Stocks

There are no significant changes in stock. Closing and opening stocks are calculated by balancing calendar year production with exports and consumption. Consumption is calculated based on the fraction of total consumption of on-road diesel usage of the calendar year to reflect current blending rate of the year.

## **VI. Advanced Biofuels**

Although research of second generation renewable fuels from palm biomass and biogas has been ongoing since 2002, product development commercialization has been hindered by lack of investment and low oil price environment since 2014. In addition, high cost of transporting feedstock, and alternative usage of the feedstock for other high value items, such as pharmaceutical grade sugar, has so far limited interest in advanced biofuels.

## **VII. Statistical Notes**

Sources of information:

1. Malaysian Palm Oil Board – [www.mpob.gov.my](http://www.mpob.gov.my) (for export data)
2. MPOB – Economics and Industry Development Division - <http://bepi.mpob.gov.my/> (for export data)
3. Energy Commission of Malaysia - The Malaysia Energy Information Hub - <http://meih.st.gov.my/home> (for diesel on-road data)
4. Malaysian Biodiesel Association - <http://www.mybiodiesel.org.my/index.php> (for updates)

Post used MPOB data as it reflects actual quantity produced at source, i.e., from plants rather than from Department of Statistics Malaysia data which rely on Bill of Lading and Malaysian Customs' K1 form information that may reflect incorrect HS Codes. Most commodities analyst and research institutions use MPOB data instead of GTA data. MPOB records data at the factory whereas GTA data is based on customs declaration forms which exporters fill out.

## Appendix

| <b>Table 9 – Operating biodiesel plants in Malaysia</b> |                                                |                                 |
|---------------------------------------------------------|------------------------------------------------|---------------------------------|
|                                                         | <b>Name</b>                                    | <b>Location</b>                 |
| 1                                                       | CarotinoSdn.Bhd.                               | Pasir Gudang, Johor             |
| 2                                                       | YPJ Palm International Sdn. Bhd.               | Pasir Gudang, Johor             |
| 3                                                       | Malaysia Vegetable Oil Refinery Sdn. Bhd.      | Pasir Gudang, Johor             |
| 4                                                       | Nexsol (Malaysia) Sdn. Bhd.                    | Pasir Gudang, Johor             |
| 5                                                       | PGEO BioproductsSdn. Bhd.                      | Pasir Gudang, Johor             |
| 6                                                       | Vance Bioenergy Sdn. Bhd.                      | Pasir Gudang, Johor             |
| 7                                                       | Felda Global Ventures Downstream Sdn Bhd       | Kuantan, Pahang                 |
| 8                                                       | CarotechBerhad (Chemor Plant)                  | Chemor, Perak                   |
| 9                                                       | CarotechBerhad (Lumut Plant)                   | Setiawan, Perak                 |
| 10                                                      | KL-Kepong OleomasSdn. Bhd.                     | Port Klang, Selangor            |
| 11                                                      | Sime Darby Biodiesel Sdn. Bhd.-Carey Island    | Pulau Carey, Selangor           |
| 12                                                      | Sime Darby Biodiesel Sdn. Bhd.-Panglima Garang | Teluk Panglima Garang, Selangor |
| 13                                                      | KLK Bioenergy Sdn. Bhd. (ZoopSdn. Bhd.)        | Shah Alam, Selangor             |
| 14                                                      | Future Prelude Sdn. Bhd.                       | Port Klang, Selangor            |
| 15                                                      | Global Bio-Diesel Sdn. Bhd.                    | Lahad Datu, Sabah               |
| 16                                                      | SPC Bio-diesel Sdn. Bhd.                       | Lahad Datu, Sabah               |
| 17                                                      | Senari Biofuels Sdn. Bhd. (Global Bonanza)     | Kuching, Sarawak                |

(Source: MPOB: [\*Biodiesel plants currently in operation in Malaysia\*](#))