Required Report - public distribution

**Date:** 9/9/2015

**GAIN Report Number:** MY5012

# Malaysia

# Biofuels Annual

# 2015

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**Report Highlights:**
With full implementation of a 7 percent blend in 2015, biodiesel production is forecast to reach 537 million liters, up from 359 million liters in 2014. A 10 percent blend is expected to be introduced in October 1, 2015, which, if successfully implemented, could further spur production to 703 million liters in 2016. Nonetheless, expectations for widespread use of the 10 percent blend are clouded by initial resistance from manufacturers of cars that utilize diesel.

**Post:**
Kuala Lumpur

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## I. Executive Summary:

After several delays, nationwide availability of a 7 percent biodiesel blend (B7) began on January 1, 2015. Crude palm oil (CPO) is the feed stock. In 2015, with the national B7 mandate in force, some exports and no imports, biodiesel production is forecast to reach 537 million liters, up from 359 million liters annually under the 5 percent blend mandate the previous year.


Launching of the B10 mandate by Minister of Plantation Industries and Commodities, Datuk Douglas Uggah Embas and MPOB's Director General Datuk Dr. Choo Yuen May
(Source: *Thestar.com.my)*

The introduction of B10 scheduled for October 2015, could further spur biodiesel production to 703 million liters in 2016. However, this forecast hinges upon acceptance from key automobile manufacturers, who are still resistant to the 10 percent blend, claiming it may have adverse effects on the engine and lubrication systems. Malaysia ended fuel subsidies on December 1, 2014. Since then, price of fuel is based on the rolling average price of crude oil during the previous month.

Ethanol is not produced in significant commercial quantities as costs are high.

## II. Policy and Programs

Under the National Biofuel Policy released on March, 21, 2006, the Government of Malaysia's (GOM) objectives are to use environmentally friendly and sustainable energy sources to reduce dependency on fossil fuels and to stabilize and boost palm oil prices. According to this plan, biofuels are to be produced for transport, industry, and export, and GOM will 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.

Although the initial plan was to initiate B5 in 2008, it only began in 2011, and full implementation was not achieved until the end of 2014. With growing CPO stocks and declining prices, GOM was under pressure to further increase the CPO quantity blended for biodiesel, which led to the B7 mandate in 2015. With full incorporation, the B7 blend is expected to boost biodiesel production to 537 million liters annually. Still hoping to increase CPO usage for biodiesel, GOM hopes to begin a B10 mandate in October, 1, 2015. When fully mandated, the 10 percent blend will push biodiesel production to

703 million liters.

However, most manufacturers of cars using diesel have expressed reservations about using a 10 percent blend. Leading manufacturers even issued press statements claiming the higher blend could damage engines and that the availability in Malaysia of B10 may affect warranty coverage. While GOM will need to assuage car manufacturers' concerns, they still have great hopes for the future of using CPO for biodiesel. The recently released Eleventh Malaysia Plan (2016-2020) includes a goal to have a B15 mandate by year 2020.

Needless to say, distribution, quality control, safety and user education issues need to be overcome to successfully reach this level of biodiesel use in the diesel pool. Lack of programs to educate on the benefits of biodiesel and dispel consumer concerns about the potential damage to the engine are the immediate issues that need to be addressed by GOM. In addition, GOM is seriously considering the extension of the program to include industrial and agricultural sectors beyond principally commercial vehicle usage to widen biodiesel usage.

**Table 1 - Fuel use projections**

| Fuel Use Projections (1,000 Liters) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Calendar Year | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** | **2022** | **2023** | **2024** |
| **Gasoline Total** | 24,399,026 | 25,009,001 | 25,634,226 | 26,275,082 | 26,931,959 | 27,605,258 | 28,295,389 | 29,002,774 | 29,972,784 |
| **Diesel Total** | 8,537,239 | 8,750,670 | 8,969,437 | 9,193,672 | 9,423,514 | 9,659,102 | 9,900,580 | 10,148,094 | 10,401,796 |
| On-road | 5,549,205 | 5,687,935 | 5,830,134 | 5,975,887 | 6,125,284 | 6,278,416 | 6,435,377 | 6,596,261 | 6,761,167 |
| Agriculture | 1,109,841 | 1,137,587 | 1,166,027 | 1,195,177 | 1,225,057 | 1,255,683 | 1,287,075 | 1,319,252 | 1,352,233 |
| Construction/mining | 426,862 | 437,533 | 448,472 | 459,684 | 471,176 | 482,955 | 495,029 | 507,405 | 520,090 |
| Shipping/rail | 1,109,841 | 1,137,587 | 1,166,027 | 1,195,177 | 1,225,057 | 1,255,683 | 1,287,075 | 1,319,252 | 1,352,233 |
| Industry | 341,490 | 350,027 | 358,777 | 367,747 | 376,941 | 386,364 | 396,023 | 405,924 | 416,073 |
| Heating | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Jet Fuel Total** | 4,390,612 | 4,724,298 | 5,083,345 | 5,469,679 | 5,885,375 | 6,332,664 | 6,813,946 | 7,331,805 | 7,889,022 |
| **Total Fuel Markets** | 37,326,876 | 38,483,969 | 39,687,008 | 40,938,433 | 42,240,848 | 43,597,024 | 45,009,915 | 46,482,673 | 48,018,661 |

Sales of new vehicles in 2014 increased to 666,465 units, compared to 655,793 in 2013. Gasoline powered vehicles remain 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.

Aircraft movement in 2014 was 928,733, up 5 percent from 2013. The increase can be partly attributed to the opening of the new low cost carrier hub. For 2015, aircraft movement is forecast to drop slightly as *Malaysia Airlines* downsizes but will be offset by new local carriers.

## III. Ethanol

There is no significant production of ethanol in Malaysia using biomass. Although there are some initiatives to produce ethanol from palm oil mill effluent (POME), lack of advanced technology and high capital investment make it unfeasible. In addition, difficulties in sourcing a constant supply of feedstock pose significant challenges.

## IV. Biodiesel

### Production

The need to reduce end stocks and maintain price lead to the acceleration of B5 mandate to B7 and ultimately to a B10 mandate in less than 24 months. As the decisions are politically motivated to reduce end stocks and maintain the price of CPO, the constant drop in crude oil prices for the past few months, the GOM needed to pay increased subsidies to biodiesel producers and blenders. With GOM budget in deficit, the increase will need to be absorbed by consumers.

### Consumption

Full implementation of B5 in 2014 resulted in production of 359 million liters of biodiesel. With B7, biodiesel production is forecast to grow to 537 million liters in 2015. Domestic consumption was 263 million liters in 2014, and is forecast to grow to 382 million liters in 2015, which equates to a blending rate of 5.0% in 2014 and 7.0% in 2015. As for the introduction of B10 expected in October 2015, consumption is expected to further increase to over 557 million liters in 2016, from the production of 703 million liters of biodiesel. Introduction of B15 in 2020, may potentially boost biodiesel production of more than 2.17 billion liters.

### Trade

Exports of biodiesel dropped considerably from 190 million liters in 2013 to 94 million liters in 2014. The big drop was due to lower demand from key importing countries in Europe and China. Over 90 percent went to the European Union.

Exports for the first five months of 2015 were 57 million liters. Based on this pace, total exports are forecast to reach 153 million liters. This increase is attributed from increased exports to key importing countries such as China, South Korea and Singapore (mainly for re-export).

### Stocks

There are no significant changes in stock.

## Table 2 - Biodiesel supply and demand

| Biodiesel (Liters - 1,000 liters) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Calendar Year | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** |
| **Beginning Stocks** | 2,174 | 7,609 | 21,632 | 15,654 | 20,653 | 19,566 | 8,418 | 5,206 | 5,465 | 9,272 |
| **Production** | 108,700 | 211,965 | 241,314 | 103,481 | 54,350 | 152,180 | 357,992 | 359,016 | 537,052 | 703,594 |
| **Imports** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Exports** | 103,265 | 197,942 | 247,292 | 97,395 | 54,350 | 31,504 | 190,260 | 94,955 | 153,124 | 146,947 |
| **Consumption** | 0 | 0 | 0 | 1,087 | 1,087 | 131,824 | 170,944 | 263,802 | 380,121 | 557,610 |
| **Ending Stocks** | 7,609 | 21,632 | 15,654 | 20,653 | 19,566 | 8,418 | 5,206 | 5,465 | 9,272 | 8,309 |
| BalanceCheck | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | | | |
| **Production Capacity** | | | | | | | | | | |
| Number of Biorefineries | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| Nameplate Capacity | 2,880,550 | 2,880,550 | 2,880,550 | 2,880,550 | 2,880,550 | 2,880,550 | 2,880,550 | 2,880,550 | 2,880,550 | 2,880,550 |
| Capacity Use (%) | 3.8% | 7.4% | 8.4% | 3.6% | 1.9% | 5.3% | 12.4% | 12.5% | 18.6% | 24.4% |
| **Feedstock Use (1,000 MT)** | | | | | | | | | | |
| Crude Palm Oil | 100 | 195 | 222 | 95 | 100 | 140 | 329 | 330 | 494 | 647 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| **Market Penetration (Liters - specify unit)** | | | | | | | | | | |
| Biodiesel, on-road use | 52,176 | 10,870 | 0 | 1,087 | 2,354 | 131,824 | 170,944 | 263,802 | 380,121 | 557,610 |
| Diesel, on-road use | 4,459,427 | 4,569,085 | 4,681,440 | 4,796,557 | 4,914,505 | 5,035,354 | 5,159,174 | 5,286,039 | 5,416,024 | 5,549,205 |
| Blend Rate (%) | 1.2% | 0.2% | 0.0% | 0.0% | 0.0% | 2.6% | 3.3% | 5.0% | 7.0% | 10.0% |
| Diesel, total use | 5,563,000 | 5,622,000 | 5,467,000 | 5,027,000 | 6,039,000 | 5,566,000 | 6,526,000 | 6,852,300 | 7,400,484 | 8,537,239 |

| **Table 3 - Biodiesel plants registered in Malaysia 1/** | | |
|---|---|---|
| **1** | AJ Oleo Industries Sdn. Bhd. | Segamat, Johor |
| **2** | AM Biofuel Sdn. Bhd. | Pasir Gudang, Johor |
| **3** | CarotinoSdn.Bhd. | Pasir Gudang, Johor |
| **4** | YPJ Palm International Sdn. Bhd. | Pasir Gudang, Johor |
| **5** | Malaysia Vegetable Oil Refinery Sdn. Bhd. | Pasir Gudang, Johor |
| **6** | Nexsol (Malaysia) Sdn. Bhd. | Pasir Gudang, Johor |
| **7** | PGEO BioproductsSdn. Bhd. | Pasir Gudang, Johor |

| | | |
|---|---|---|
| **8** | PZ Bioenery Sdn Bhd | Pasir Gudang, Johor |
| **9** | Supervitamins Sdn Bhd | Pasir Gudang, Johor |
| 10 | Vance Bioenergy Sdn. Bhd. | Pasir Gudang, Johor |
| 11 | Mission Biofuels Sdn. Bhd / Felda | Kuantan, Pahang |
| 12 | Mission Biotechnologies Sdn. Bhd / Felda | Kuantan, Pahang |
| 13 | Plant Biofuels Corporation Sdn. Bhd. | Kuantan, Pahang |
| 14 | CarotechBerhad (Chemor Plant) | Chemor, Perak |
| 15 | CarotechBerhad (Lumut Plant) | Setiawan, Perak |
| 16 | Lereno Sdn. Bhd. | Setiawan, Perak |
| 17 | KL-Kepong OleomasSdn. Bhd. | Port Klang, Selangor |
| 18 | Man Jang Bio Sdn. Bhd. | Port Klang, Selangor |
| 19 | Intrack Technology (M) Sdn. Bhd. | Rawang, Selangor |
| 20 | Sime Darby Biodiesel Sdn. Bhd.-Carey Island | Pulau Carey, Selangor |
| 21 | Sime Darby Biodiesel Sdn. Bhd.-Panglima Garang | Teluk Panglima Garang, Selangor |
| 22 | Artistic Support Sdn Bhd (FIMA Biodiesel S/B) | Port Klang, Selangor |
| 23 | Weschem Technologies Sdn. Bhd. | Batang Kali, Selangor |
| 24 | KLK Bioenergy Sdn. Bhd. (ZoopSdn. Bhd.) | Shah Alam, Selangor |
| 25 | Future Prelude Sdn. Bhd. | Port Klang, Selangor |
| 26 | Kris Biofuels Sdn Bhd | Port Klang, Selangor |
| 27 | Gomedic Sdn Bhd | Port Klang, Selangor |
| 28 | Innovans Bio Fuel Sdn. Bhd. | Port Klang, Selangor |
| 29 | Greentech Chemical Sdn Bhd (Completed) | Port Klang, Selangor |
| 30 | Global Bio-Diesel Sdn. Bhd. | Lahad Datu, Sabah |
| 31 | Green Edible Oil Sdn. Bhd. (Green Biofuels) | Sandakan, Sabah |
| 32 | SPC Bio-diesel Sdn. Bhd. | Lahad Datu, Sabah |
| 33 | Platinum  Greens Chemical (Platinum Biofuels) | Seremban, Negeri Sembilan |
| 34 | Senari Biofuels Sdn. Bhd. (Global Bonanza) | Kuching, Sarawak |

Sources: *MPOB*: Biodiesel plant in operation in Malaysia

Table 3 shows the biodiesel plants currently registered in Malaysia.  However, only few are operating.

**Table 4 - Export trade matrix**

| COUNTRY | 2013 Quantity (Tons) |
|---|---|
| European Union | 141,532 |
| China, P.R | 20,332 |
| Indonesia** | 8,278 |
| Taiwan | 2,343 |
| South Korea | 1,227 |
| India | 764 |
| Australia | 334 |
| Japan | 162 |
| Singapore** | 40 |
| Other countries | 20 |
| **TOTAL** | **175,032** |

| COUNTRY | 2014 Quantity (Tons) |
|---|---|
| European Union | 79,750 |
| China P.R | 1,598 |
| Japan | 1,021 |
| India | 1,010 |
| Hong Kong | 101 |
| South Korea | 81 |
| Singapore** | 3,794 |
| **TOTAL** | **87,355** |

Source*: Malaysian Palm Oil Board (MPOB)*

**Mainly for re-export

## V. Advanced Biofuels

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

## VI. Biomass for heat and power

**Table 5 - Biomass Megawatt (MW)**

| **Biogas (MW)** | | | | | | |
|---|---|---|---|---|---|---|
| **Calendar Year** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** |
| **Biogas Landfill / Sewage** | 93.00 | 14.00 | 16.00 | 9.00 | 36.00 | N/A |
| **Biomass Field Crops/Manure** | 372.00 | 421.00 | 447.00 | 446.00 | 454.00 | N/A |
| **Total** | 465.00 | 435.00 | 463.00 | 455.00 | 490.00 | 0.00 |

Data from *Energy Commission Malaysia* - www.st.gov.my (2006-2010). Data for 2011 is not available.

**Table 6 - Biomass Megawatt Hour (MWh)**

| **Biogas (MWh)** | | | | |
|---|---|---|---|---|
| **Calendar Year** | **2012** | **2013** | **2014** | **2015** |
| **Biogas Landfill / Sewage** | 7,563.51 | 21,694.74 | 45,071.89 | 3,795.05 |
| **Biomass Field Crops/Manure** | 104,544.39 | 220,551.84 | 191,317.34 | 58,775.11 |
| **Total** | 112,107.9 | 242,246.58 | 236,389.23 | 62,570.16 |

Data from *Sustainable Energy Development Agency Malaysia* - www.seda.gov.my

As of 2014, 60 mills had biogas facilities, 14 biogas were under construction, and 150 facilities were planned. Most of electricity generated from biomass and biogas in palm mills is used to generate power for mill operations and surrounding estate houses.