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Report Highlights:

Philippine ethanol production in 2019 is expected to increase to 320 million liters (ML) from 296 ML the previous year due to increased capacity utilization amidst declining sugarcane production and high prices. Blending peaked at 10 percent in 2014 but declined to under 9 percent in recent years. There are moves to allow molasses imports, but this will require an amendment to existing laws. For biodiesel, consumption growth is driven by increased diesel use since 2009 with the blend rate peaking at 2.8 percent in 2016 due to increased motor vehicle sales. The planned 5 percent blend in 2015 has not happened due to feedstock supply concerns. The Philippine Department of Energy has maintained the current ethanol and biodiesel blends (10 and 2 percent, respectively) through 2019, but it is unclear when and whether blend targets from 2020 onward will be revised.

Executive Summary:

Philippine ethanol and biodiesel blends (10 and 2 percent, respectively) are mandated by the Biofuels Act of 2006 or RA 9367. Set in 2012, the Philippine government's (GPH) aspirational goal was to raise the biofuels blend to E20 and B10 by 2020. However, inadequate investments in new biofuel plants and distribution infrastructure, inadequate tax policy, and no other support programs for biofuels are forcing the GPH to review its plans and targets. This is embodied in the DOE's Philippine Energy Plan (PEP) 2017-2040, which recommends maintaining the current blend targets, i.e., E10 and B5, through 2019, and revisiting biofuels blends and feedstock availability (while continuing biofuels feedstock research and development programs) in the medium- to long-term.

Ethanol demand is largely a function of the mandated blend and has risen over the last decade but slowed considerably in 2014, and has remained largely flat since then. Imports, which initially dominated ethanol supply thru 2015, have since covered close to half of total domestic use as local production increased consistently since 2012. Although Section 5.2 of the Biofuels Act allows ethanol imports only up to four years after the 2009 blend implementation or 2013, inadequate local production has forced importation. The quota allocation scheme of locally produced ethanol, domestic feedstock limitation for local fuel ethanol production, and efforts to maintain E10 combine to make the Philippines one of the most open economies for ethanol imports.

Biodiesel imports are prohibited and there have never been any exports due to tight supplies. Biodiesel consumption is met entirely by local production, which has consistently supplied the one percent blend set in 2007 and the 2 percent blend (B2) since 2009. Not implemented was a B5 blend in 2015 due to high coconut oil (CNO) prices and therefore, the higher cost of biodiesel-blended diesel at the pump without subsidy support. In 2019, advocates in the Philippine government and the biofuels industry continued the push for an increased biodiesel blend mandate, particularly with the lower prices of copra. While CNO prices have been depressed through 2019 as a result of a global vegetable oil glut, CNO exporters avoid trade disruptions as they have longstanding export commitments to their preferred buyers.

II. Policy and Programs

Signed in January 2007, the Biofuels Act or Republic Act (RA 9367) made the Philippines the first country in Southeast Asia to have biofuels legislation in place. Molasses from sugarcane is now only used in Philippine ethanol production, whereas the industry initially used mostly cane juice. The feedstock for biodiesel is coconut oil (CNO). The current official blend mandates are 10 percent (E10) and 5 percent (B5) for ethanol and biodiesel, respectively. This target blend rate was first achieved for ethanol in 2014, but there has been some difficultly fully meeting it since. The actual rate for biodiesel has remained lower, ranging somewhere below three percent. The Biofuels Act gives priority to local ethanol over imports, but the mandated blend historically has largely been met through imports. Biodiesel imports are not allowed under the Biofuels Act.

RA 9367 seeks to develop indigenous renewable energy (RE) to reduce dependence on imported oil; mitigate greenhouse gas emissions; increase rural employment; and ensure the availability of RE

without detriment to the environment and food security. Implemented in June 2007, RA 9367 provides fiscal incentives to biofuels producers and distributors including income tax holidays, duty-free importation, value added tax (VAT) exemptions, among others. The Department of Environment and Natural Resources (DENR) has no specific mandate provided by RA 9367, while the DOE must ensure that standards and guidelines for biofuels (as well as biofuel-blended gasoline and diesel) are compliant with Philippine National Standards. In addition, the Biofuels Act provides that water effluents used in production shall conform to the Philippine Clean Water Act, subject to the monitoring and evaluation of the DENR.

RA 9367 created the National Biofuels Board (NBB), a cabinet-level body that ensures biofuel policy is consistent with the goal of balanced economic growth. The following table shows the ethanol blend targets and implementation dates since inception.

ETHANOL TARGETS	Blend
Year	**%**
2009	5
2011	10
2015	10
2020	20
2025	20/85*
2030	20/85*

*aspirational & voluntary goal
Source: DOE

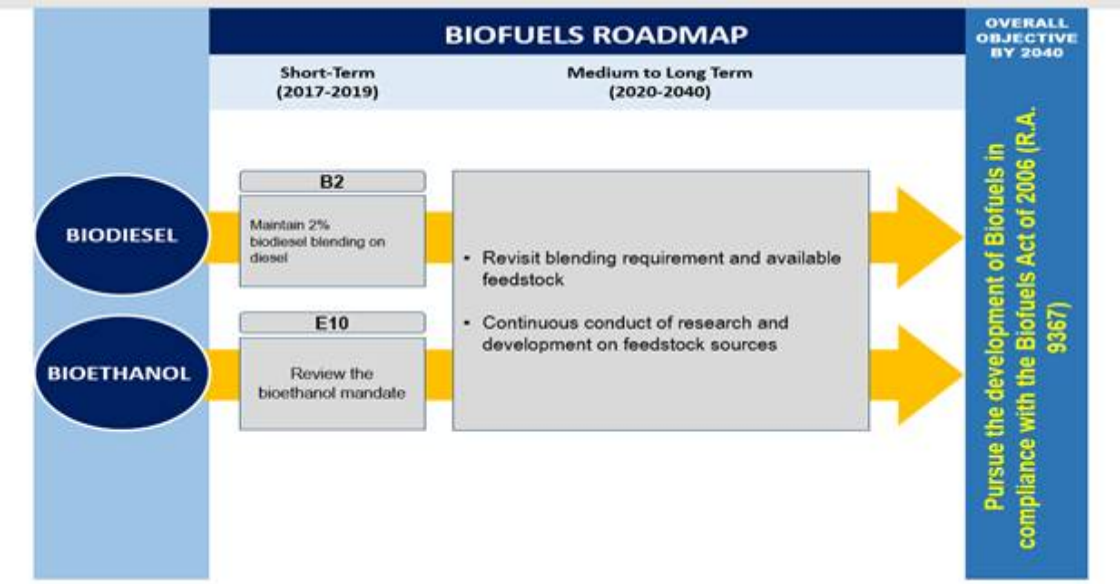
For biodiesel, RA 9367 mandated the use of a minimum one percent biodiesel blend in all diesel fuels (off-road and on-road) by February 2007, to increase to a 2 percent blend by 2009. Following are the biodiesel blends targets through 2030:

BIODIESEL TARGETS	BLENDS
Year	**%**
2007	1
2009	2
2015	5
2020	10
2025	20
2030	20

Source: DOE

The NBB may adjust the biofuel blends only within the first four years of implementation. Hence, the 5 and 2 percent blend mandates for ethanol and biodiesel, respectively, cannot be decreased thereafter.

As an aspirational goal, the DOE wants to make available an 85 percent ethanol blend for voluntary promotion by 2025. Attaining this goal is unlikely and is manifest in the PEP 2017-2040's biofuels roadmap below that recommends maintaining the current ethanol and biodiesel blends at E10 and B2, respectively, through at least 2019 and revisiting blending requirements onwards through 2040. The DOE's PEP is the basis of the country's biofuels strategy expressed in the National Biofuels Plan (NBP). The PEP and the NBP are 'living documents' and regularly reviewed and adjusted.



Source: PEP 2017-2040 Sectoral Plans and Roadmaps

The DOE rationalizes the distribution of locally produced ethanol by determining the volume of production and allocating this quantity to local oil companies on a monthly basis. Oil companies are required to purchase the entire monthly allocation before they can import ethanol. The quota allocation system for locally produced ethanol ensures that imports do not displace locally produced ethanol. Although Section 5.2 of the Biofuels Act allows ethanol imports only up to four years after the 2009 blend implementation or 2013, inadequate local production has forced importation. The quota allocation scheme, domestic feedstock limitation for local fuel ethanol production, and efforts to maintain E10 combine to make the Philippines one of the most open economies for ethanol imports.

The Renewable Energy (RE) Act or RA 9513 was passed in 2008. The country at the time was the world's second largest producer of geothermal energy and the first country in Southeast Asia to establish a commercial wind farm and a grid-connected solar photovoltaic power plant. Under RA 9153, a Feed in Tariff (FIT) system is provided for power developers for a period of 20 years. Each RE technology was given a different allocation and rate over a period of three years.

In February 2017, Philippine President Rodrigo Duterte signed the Paris Agreement on Climate Change. The Philippines has committed to reduce its greenhouse gas emissions by 70 percent by 2030 but needs technical and financial support. By 2040, the GPH aims to have RE installed capacity at 20,000 MW.

A major program of the Duterte administration is a comprehensive tax reform package. The first tranche, the Tax Reform for Acceleration and Inclusion (TRAIN), or RA 10963, was signed on December 27, 2017. TRAIN lowered personal income tax rates while imposing new excise taxes on petroleum products and motor vehicles, among others, starting January 1, 2018.

III. Gasoline and Diesel

Fuel Use (Million Liters)										
Calendar Year	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019f**
Gasoline Total	3,918	3,882	4,114	4,365	4,547	5,211	5,741	6,028	6,253	6,666
Diesel Total	6,588	6,696	7,004	7,394	7,778	8,793	9,535	10,159	10,158	10,516
On-road	5,631	5,566	5,819	6,187	6,579	7,334	7,701	8,086	8,200	8,413
Jet Fuel Total	291	380	454	536	673	551	737	630	785	811
Total Fuel Markets	10,797	10,958	11,572	12,295	12,998	14,555	16,013	16,817	17,196	17,993

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Source: DOE through 2017; FAS/Post estimated for 2018 and 2019.

The local industry is deregulated, with gasoline and diesel prices varying by company and area. Diesel is the dominant transport fuel used in the Philippines and has a price advantage over gasoline efficiently. Diesel engines reportedly can save close to 30 percent more on fuel consumption compared to gasoline-driven ones, due to diesel's higher energy content and engine efficiency. Although environmental consciousness is growing, price considerations remain the dominant factor in motor vehicle sales and fuel use in the Philippines.

Local gasoline stations generally offer regular, mid-grade, and premium or high-octane gasoline. These have octane ratings of 91, 95, and 97-octane or higher, respectively. Low to mid octane gasoline engines dominate Philippine gasoline-powered vehicles. The growth rates for both ethanol-gasoline and biodiesel-diesel pools has remained unusually high compared to most countries and is expected to continue given little progress on other initiatives to shift demand toward public transport or to natural gas or electricity for public or private transport.

Compressed Natural Gas (CNG)

In 2004, Executive Order No. (EO) 290 entitled "*Implementing the Natural Gas Vehicle Program for Public Transport*" initiated the pilot testing of locally sourced natural gas as fuel for 200 public utility buses using compressed natural gas (CNG) from the Malampaya gas field (located 65 kilometers northwest of the island of Palawan). While the test proved it was technically feasible to use CNG for public utility buses, the establishment of CNG depots was a major economic challenge due to the absence of supply pipelines. Likewise, while Malampaya provides virtually all the country's natural gas requirements, supply is projected to be short of demand starting 2022. The DOE had estimated a market potential of 16,000 public units of utility buses shifting to CNG.

Flexi-fuel

Contacts estimate the number of flexi-fuel vehicles (FFVs) at 10-20 percent of overall vehicles. Post considers this on the high side. In 2007, Ford Motor Company Philippines, Inc. (FMCPI) opened a new P4 billion ($74 million) assembly plant in Santa Rosa, Laguna which manufactured and subsequently sold FFVs to the market. In 2012, FMCPI announced the cessation of its operations citing "lack of supply base and economies of scale." On March 2014, another motor company acquired the assembly plant.

Liquefied Petroleum Gas (LPG)

In 2010, an estimated 17,500 taxi units were running on liquefied petroleum gas (LPG). The availability of new car models (for taxis), low gasoline prices (in 2014-2015) and the negative health perception, however, dampened the interest of fleet operators to convert to LPG. The numbers have been declining, as a result. From 17,500 in 2010, LPG taxis declined to 9,718 units in 2015, dropping further to 8,415 units in 2016. The number of refilling stations also declined, from 218 stations in 2014 to 192 stations in 2015-2016, according to the DOE. Despite this, the DOE asserts that LPG vehicles will form part of the public transport sector being promoted by the department, along with electric and other natural gas-fueled vehicles.

E-Vehicles

Unconfirmed estimates place the number of electric vehicles (e-vehicles) in the Philippines at 2,000 units. In 2006, EO 488 was issued to support the manufacturing of e-vehicles by reducing tariffs for e-vehicle components. Although e-vehicles, mostly PUVs, can be seen on some roads in major urban centers, charging stations are grossly inadequate. The first oil company had its e-vehicle charging facility installed only in late 2017. Based on data from the Finance Department, in 2017, there were nine e-vehicle manufacturers but only three availed of the fiscal incentives. Industry forecasts e-vehicles to comprise 10 percent of the total 200,000 PUVs over the next five years, but this is not expected to happen under the present policy environment.

Although e-vehicles are already exempt from the TRAIN excise taxes (mentioned in the Policy section), there are ongoing efforts in the Philippine Senate to consolidate several bills filed to accelerate the development of the e-vehicle industry. All the bills provide fiscal incentives to e-vehicle (and other green vehicles) producers such as the removal of import duties and other fiscal perks. The DOE has been supportive and has proposed additional non-fiscal incentives such as free charging and parking, as well as exemption from number coding and other traffic management schemes.

On June 19, 2017, the Philippine Department of Transportation (DOTR) officially launched the country's Public Utility Vehicle (PUV) Modernization Program. Involved is the phase out of PUVs, including jeepneys or PUJs (i.e., jeeps used as public utility vehicles), aged 15 years and older, to be replaced with more environment-friendly vehicles with more efficient engines (i.e., Euro-4 compliant or electrically powered) by 2020. There are an estimated 220,000 jeepney units operating throughout the country. The Land Bank of the Philippines estimates that each jeepney replacement will cost around ₱1.4 million ($27,500) to ₱1.6 million ($31,400). The actual cost of a jeepney, however, may reach ₱2.1 million or $41,200 (based on an interest rate of 6 percent per annum and a payment period of 7 years). Some transport groups have criticized the program as "anti-poor" and have strongly opposed the program. The PUV modernization plan is about two years behind schedule, according to a media article, and the DOTR will be re-evaluating program targets.

IV. Fuel Ethanol

Ethanol Used as Fuel and Other Industrial Chemicals (Million Liters)										
Calendar Year	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019f**
Beginning Stocks	0	0	0	0	0	0	0	0	0	0
Fuel Begin Stocks	0	0	0	0	0	0	0	0	0	0
Production										
Fuel Production	10	4	35	72	115	168	230	235	296	320
Imports										
Fuel Imports	140	215	248	297	339	311	260	276	285	345
Exports										
Fuel Exports	0	0	0	0	0	0	0	0	0	0
Consumption										
Fuel Consumption	150	219	283	369	454	479	490	511	581	665
Ending Stocks										
Fuel Ending Stocks	0	0	0	0	0	0	0	0	0	0
Total Balance Check	0	0	0	0	0	0	0	0	0	0
Fuel Balance Check	0	0	0	0	0	0	0	0	0	0
Refineries Producing Fuel Ethanol (Million Liters)										
Number of Refineries	3	3	4	4	8	8	10	10	12	12
Nameplate Capacity	79	79	133	133	222	222	282	282	380	380
Capacity Use (%)	12.7%	5.1%	26.3%	54.1%	51.8%	75.7%	81.6%	83.3%	77.9%	84.2%
Co-product Production (1,000 MT)										
Bagasse	48	0	144	150	150	45	17	12	3	0
Feedstock Use for Fuel Ethanol (1,000 MT)										
Sugar Cane	160	0	480	500	500	150	55	40	10	0
Molasses	0	16	20	155	340	650	930	950	1,200	1,306
Sugar	0	0	2	10	5	0	0	0	0	0
Market Penetration (Million Liters)										
Fuel Ethanol Use	150	219	283	369	454	479	490	511	581	665
Gasoline Use	3,918	3,882	4,114	4,365	4,547	5,211	5,741	6,028	6,253	6,666
Blend Rate (%)	3.8%	5.6%	6.9%	8.5%	10.0%	9.2%	8.5%	8.5%	9.3%	10.0%

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Source: DOE and SRA

Consumption

Ethanol demand is largely a function of the mandated blend and has risen over the last decade but slowed considerably in 2014, and has remained largely flat since then. Blend compliance, monitoring, and enforcement remain concerns mainly due to the archipelagic and geographical terrain of the

Philippines. The distribution infrastructure is inadequate and has compounded inefficient feedstock production and milling operations. As a result, high prices characterize vital links in the ethanol production distribution system.

The following table shows the retail pump price range for the common gasoline grades for October 4, 2018 and October 2, 2019, as well as the ethanol reference price index during the previous month. Local gasoline (RON 91, 95, and 97) prices declined roughly 10 percent from an average of P58.72 ($1.15) per liter in October 2018 to P52.84 ($1.0) per liter in October 2019. Local ethanol prices, on the other hand, increased seven percent from P55.07 ($1.08) per liter in October 2018 to P58.93 ($1.16) per liter in October 2019. As a result, the pump-price difference of ethanol and gasoline has reversed from a positive P3.65 ($0.07) in October 2018, to a negative P6.09 ($0.12) per liter in October 2019 (latest data available).

LOCAL GASOLINE VS. LOCAL ETHANOL PRICES, Manila		
	Price Range (P/Li)	
Gasoline	Oct. 4, 2018	Oct. 2, 2019
RON 97	55.25-66.35	49.60-56.25
RON 95	53.05-63.27	50.10-56.55
RON 91	52.55-61.82	49.05-55.47
	Average for Sep. 2018	Average for Sep. 2019
Ethanol	55.07	58.93

Source: DOE and SRA

The price differential between locally produced ethanol and imports was even greater in the first half of October 2019 when local ethanol was priced around P59 or $1.15 per liter, according to preliminary data from the Sugar Regulatory Administration (SRA). This compares to around P17 or $0.33 price per liter of imported ethanol around the same period.

Production

Ethanol output in 2019 is projected to increase 8 percent to 320 ML from 296 ML in 2018 due to improved capacity utilization. For 2020, production is again likely to increase as additional distilleries begin operations. In 2018, there were 12 fuel ethanol plants operating with a combined capacity of 380 ML, 35 percent higher than the 282 ML aggregate capacity in 2017. No additional ethanol plants are expected to operate in 2019 although two plants (with a combined capacity of 68 ML) are undergoing construction and are due to operate in 2020. Ethanol plants in the Philippines are small in scale by international standards for commercial operations supplying fuel ethanol.

Competitiveness of the local sugarcane industry is a major challenge. The Philippines has one of the lowest average sugarcane yields in Asia. Total raw sugar production in MY 2019/20 (December/November) will reach 2.1 million metric tons (MMT), unchanged from the previous year, with cane production expected to be about 22 MMT. The industry has switched from sugarcane to a molasses based industry in recent years. High and increasing sugar prices (and consequently of molasses) is a serious challenge. From Sep. 1, 2019 to Oct. 20, 2019, the average ex-mill price of

molasses was P12,153 ($238) per ton or 52 percent from the P8,014 ($157) per ton average mill site price during the Sep. 2 to Oct. 21, 2018 period.

Close to 80 percent of total molasses in the country is used for ethanol production. A proposal to import molasses to augment local feedstock supply is being studied at the Philippine Senate as local ethanol producers can only import molasses when approved by the SRA.

Trade

Overall ethanol imports in 2019 are projected to increase 23 percent to 345 ML from 285 ML in 2018. In 2018, fuel ethanol imports from the United States accounted for 100 percent of all Philippine fuel ethanol imports. Based on U.S. export data, the country was the sixth largest market for U.S. ethanol in 2018 with U.S. shipments of 310.6 million liters valued at $128.4 million, 34 percent higher in volume and 27 percent higher in value than 2017. Although 2019 U.S. exports through August are down four percent year over year, increased ethanol shipments from other countries (e.g. Korea) will result in higher overall Philippine imports.

FUEL ETHANOL IMPORTS (ML)			
Country of Origin	**2016**	**2017**	**2018**
Australia	16.60	3.85	
Brazil			
Korea	1.91	5.69	
Thailand			
USA	241.04	263.07	284.59
Vietnam		2.96	
Others			
Total	259.55	275.56	284.59

Source: SRA and DOE

Ethanol tariffs (2207.10 and 2207.20) under various free trade agreements within ASEAN, including the Philippines, fell to zero in 2016 and remain duty free. Likewise, Most Favored Nation (MFN) tariffs for World Trade Organization (WTO) member countries remain at zero percent in 2018. A duty of one percent is imposed if the ethanol is used for fuel-blending purposes under the Philippine Fuel Ethanol Program, according to the DOE.

V. Biodiesel/Renewable Diesel

Biodiesel (Million Liters)										
Calendar Year	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019f**
Beginning Stocks	8	7	17	18	20	29	32	41	57	72
Production	124	133	138	155	172	204	227	220	220	220
Imports	0	0	0	0	0	0	0	0	0	0
Exports	0	0	0	0	0	0	0	0	0	0
Consumption	125	123	137	153	163	201	218	204	205	225
Ending Stocks	7	17	18	20	29	32	41	57	72	67
Balance Check	0	0	0	0	0	0	0	0	0	0
Production Capacity (Million Liters)										
Number of Biorefineries	8	9	9	9	11	11	11	11	11	11
Nameplate Capacity	436	350	393	393	585	585	575	575	575	575
Capacity Use (%)	28.4%	38.0%	35.1%	39.4%	29.4%	34.9%	39.5%	38.3%	38.3%	38.3%
Feedstock Use for Fuel (1,000 MT)										
Coconut Oil	114	122	127	142	158	187	208	202	202	202
Market Penetration (Million Liters)										
Biodiesel, on-road use	125	123	137	153	163	201	218	204	205	225
Diesel, on-road use	5,631	5,566	5,819	6,187	6,579	7,334	7,701	8,086	8,200	8,413
Blend Rate (%)	2.2%	2.2%	2.4%	2.5%	2.5%	2.7%	2.8%	2.5%	2.5%	2.7%
Diesel, total use	6,588	6,696	7,004	7,394	7,778	8,793	9,535	10,159	10,158	10,516

f-forecast
Source: DOE

Consumption

High coconut oil (CNO) prices as a result of tight copra supplies have delayed raising the blend to B5 mandated since 2015. The decision to remain at two percent was supported by a 2016 USAID-funded policy study recommending the postponement of the higher blend, at least, in the short-run. While the study affirms there are positive environmental and health benefits in raising the blend, it recognized that meeting the required coconut/copra requirements for a 5 percent blend would be difficult solely relying on the domestic copra industry despite the optimistic production projections by the Philippine Coconut Authority (PCA). In the medium to long term, the study suggested a review of the Biofuels Act "as several economic studies (such as de Gorter and Just, 2009) point to the distortive

effects of mandates and subsidies in addressing climate change issues." Consistent with the USAID policy recommendation is the guidance from the PEP 2017-2040 recommending the biodiesel blend be maintained at B2.

CNO prices started to decline in 2018 due to an oversupply in global vegetable oils and have remained depressed through 2019. Despite the low CNO prices, 11 refineries produced 220 MLs, flat compared to the previous year. At a 2.5 percent blend level, capacity utilization was only at 38 percent of total aggregate capacity of 575 ML in 2018, likewise unchanged from the previous year's level. The blend rates in the table are higher than the 2 percent blend mandate due to the existence of a grey market which under-reports diesel imports and use.

Following are comparative diesel and coconut methyl ester (CME) prices for October 2018 and October 2019. Local diesel pump prices declined seven percent from P48.35 ($0.95) per liter in October 2018 to P44.95 ($0.88) per liter in October 2019. CME prices vary due to geography and copra seasonality. CME prices declined more steeply (12 to 24 percent) from October 2018 to August 2019 (most recent data available).

LOCAL DIESEL VS. CME PRICES, Oct. 2, 2019		
	Price Range (P/Li)	
	October 4, 2018	October 2, 2019
Diesel	48.35	44.95
CME	46-70	35-61.40*
*as of August 2019		

*Latest data available
Source: DOE

In 2019, there were efforts to implement the stalled biodiesel mandate of 5 percent (B5). A prominent Senator on March 4 urged the Department of Energy and the NBB to study the merits of a proposal to reach B5 and look for next steps to move the industry forward. In a resolution dated July 19, 2019, representatives from various coconut stakeholder groups urged the GPH to immediately implement the B5 blend. The resolution came after a roundtable discussion initiated by the Philippine Coconut Authority (PCA) as part of the agency's efforts to address low copra prices.

It is unknown if other sources of feedstock other than CME, such as tallow from slaughter houses, and even allowing biodiesel imports (and at the same time supporting existing feedstock industry expansions and efficiencies) have been considered to meet the B5 blend. All these could augment local CME supply, if short.

Production

An estimated 50 active CNO mills operate in the country, and around 20 cater to the export market while roughly 30 concentrate on servicing domestic CNO needs, according to industry contacts. Virtually all domestic biodiesel is made using CNO, also known as coconut methyl ester (CME), an oleochemical derived from coconut oil. CNO is obtained from crushing copra, the dried kernel/meat

from coconuts. Oleochemicals derived from CNO are also used in the manufacture of soaps, detergents, and other cosmetic items and toiletries.

According to the DOE, there were 11 registered biodiesel refineries in 2018, unchanged since 2014. Likewise, the aggregate annual capacity remains at 575 ML. Seven CME producers operate on the island of Luzon, while four are located on Mindanao island. Despite a slight improvement in copra supply, the number of biodiesel plants and their output in 2018 will remain flat compared to the 2017 level due to strong demand for the competing uses of CNO. With no change in the biodiesel blend in 2019, CME production will likely remain flat from 2018.

The United Coconut Association of the Philippines (UCAP) estimates coconut output in calendar year 2018 at 2.61 million tons, increasing marginally to 2.63 million tons in 2019. Industry notes that two years of increasing nut bearing is usually followed by declining output and that coconut trees are likely on the verge of stress. This 'rest' period combined with dryness in coconut growing areas in early 2019 as a result of an El Niño weather disturbance, are likely to result in a five percent decline (to 2.5 million tons) in MY 19/20 copra production compared to the previous year's level.

On a long-term basis, copra productivity is constrained by predominantly old and unproductive coconut palms or trees, which constitute an estimated 20 percent of overall Philippine coconut trees. Coconut trees have a long lifespan (80-90 years) and start to bear nuts after 6-10 years but take around 15-20 years to reach their peak.

Trade

CNO is the country's top agricultural export. According to an industry contact, traders have opposed increasing the existing two percent blend to avoid trade disruptions and satisfy longstanding export commitments to their preferred buyers.

There is no exportable supply of biodiesel given feedstock limitations, and the Biofuels Act does not permit biodiesel imports. No biodiesel exports are expected through 2019, as a result. However, if imports were permitted, the B5 blended goal for 2015-2019 set in 2007 legislation could be achieved with its associated human health and carbon emission reduction benefits.

Biodiesel imports above B30 to B100 (HS 382600) are levied a 3 percent MFN tariff while petroleum oils containing B1 to B30 (HS 271020) are duty-free. Biodiesel imports, however, are not allowed under the Biofuels Act.

VI. Advanced Biofuels

According to a local expert, algal biodiesel would be necessary to augment feedstock supply in order to comply with the higher mandate, assuming imports remain banned. However, commercialization of price competitive algal biodiesel is not foreseen in the near- to medium-term.

On the other hand, there is little information on current research and development for ethanol made from cellulose, or cellulosic fuel. Also lacking are demonstration plants that could prove the

commercial viability of this advanced biofuels technology. The development of commercial cellulosic fuel will likely entail a much longer time, closer to 2030.

VII. Notes on Statistical Data

The numbers on the Fuel Use Projections, Ethanol and Biodiesel Tables are guided by the following assumptions:

- Fuel use figures through 2017 are based on consumption estimates from the DOE.
- Gasoline and diesel use in 2018 in the Fuel Use Table are Post's estimates and much lower than the DOE's projection in consideration of increasing inflation starting 2018 and new and/or higher taxes on petroleum fuel and motor vehicle sales.
- On-road diesel was derived by multiplying total diesel use for transport by 75-80 or the estimated percentage of on-road transport over total transport.
- Ethanol imports are based on data from the DOE and SRA.
- Biodiesel production and consumption estimates through 2017 were adjusted based on DOE data.
- Post assumes ethanol stocks to be nil due to tightness in local supply.

Co-product production and feedstock use numbers are Post's estimates using the following conversion factors:

- Sugarcane co-product (bagasse) recovery of 300 kilos (kg) per ton of cane.
- For biodiesel, a ton of CNO yields around 1,090 liters of CME.
- A ton of sugarcane yields roughly 60 liters of fuel ethanol.
- A ton of molasses yields roughly 245 liters of ethanol.
- A ton of sugar yields around 500 liters of ethanol.

Attachments:

No Attachments