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Global Agricultural Information Network

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Philippines

Biofuels Annual

Philippine Biofuels Situation and Outlook

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Report Highlights:

Local ethanol production is expected to increase through 2018 with import growth not expected to fully offset rising demand. Imports are expected to increase from 260 million liters (ML) in 2016 to 300 ML in 2017, increasing again to 325ML in 2018. Since 2013, there has been no upward trend in blending, which has hovered over E9, but ethanol consumption has risen driven by a larger fuel pool. The target of E20 by 2020 is out of reach. For biodiesel, there has been no significant rise in the blend rate beyond 2.5% since 2009, so consumption growth is again driven by increased diesel use. A USAID-funded 2016 policy study recommended postponing raising the biodiesel blend originally set at B5 by 2015.

Post:

Manila

Executive Summary:

The Biofuels Act or Republic Act (RA) 9367 was signed in January 2007 making the Philippines the first country in Southeast Asia to have biofuels legislation in place. Unfortunately, the country has fallen short of delivering on the goals it set forth, while most other countries with biofuel programs continue to raise biofuel penetration (blending) rates in transport fuels. After a few early years of success for the Philippines, growth in fuel ethanol blending stagnated around E9 after 2013 as did biodiesel with no significant growth beyond B2.5 after 2009. There are multiple reasons for this track record, but key factors are inadequate investments in new distilleries and distribution infrastructure, lack of tax policy and other support favoring biofuels over fossil fuel consumption, and sharply lower petroleum fuel prices since 2014 without a similar drop in biofuel feedstock costs.

Sugarcane and molasses are used in Philippine ethanol production, while coconut oil (CNO) is the preferred biodiesel feedstock. The current official blend mandates are 10 percent and five percent for ethanol and biodiesel, respectively. However, the actual rates are lower, particularly for biodiesel. The Biofuels Act gives priority to local ethanol over imports, but the mandated blend historically has largely been met through the latter. Biodiesel imports are not allowed under the Biofuels Act.

In 2016, the Philippines was the 5th largest market for U.S. ethanol with sales reaching 218 ML valued at \$103 million. Overall ethanol imports, however, declined 20 percent to 260 ML from 311 ML in 2015 due to increased local production. Last year, there were 10 ethanol plants operating with a combined capacity of 282 ML, up from eight in 2015. Based on preliminary data from the Philippine government (GPH), the 10 percent blend will not be reached in 2016. By 2017, while three more plants are expected to operate, and production likely to again increase from the previous year, output share relative to consumption will remain fairly flat. Reaching the 10 percent mandate using locally produced ethanol is not expected in at least the medium term (3-5 years).

Local biodiesel output has consistently met the one percent blend set in 2007 and the 2-percent blend (B2) requirements since 2009, but not the five percent blend set in 2015. In 2016, 11 refineries produced 226 ML, which amounted to an estimated 2.8% blend level with carryover stocks. Capacity utilization was only at 39 percent of total aggregate capacity of 575 ML in 2016. Since biodiesel imports are prohibited and exports are uncompetitive due to high CNO prices, biodiesel consumption is met by local production. Since 2009, however, demand has been increasing only as fast as on-road diesel use because the blend rate has relatively been flat.

The planned 5-percent biodiesel blend (B5) was due in 2015. This did not happen, however, due to high CNO prices and therefore the high cost of biodiesel compared to fossil fuel. The B5 blend is not expected anytime soon due to an economic policy recommendation to postpone the higher blend rate as a result of inadequate coconut/copra supply and the price gap between fossil diesel and biodiesel. The USAID-funded study also recommends a review of the Biofuels Act in the medium to long term. Although no official policy changes have been instituted, biodiesel production is expected to decline modestly through 2018 due flat consumption and stock drawdown. Demand and increasing CNO world prices are expected to displace CNO demand for biodiesel production during the period.

Set in 2012, the GPH's goal is to raise the ethanol mandate to 20 percent by 2020. Given gasoline fuel pool projections, 1.4 billion liters (BL) of ethanol is needed to reach the 2020 blending target. With no further changes in projected production capacity of about 400 MLs in 2018, imports would have to rise from the 2018 projection of 325 MLs to 1 BLs by 2020. However, this development seems unlikely given the delivery infrastructure is entirely inadequate for such a large increase. On the demand side, a looming tax reform measure that imposes higher excise taxes on petroleum fuels as well as on new motor vehicle sales is likely to be enacted in 2018. The new taxes, if enacted for the 2018 tax year as expected, should slow the overall increase in fuel consumption including biofuels next year.

Author Defined:

II. Policy and Programs

The lead agency responsible for the country's Biofuels Program is the Philippine Department of Energy (DOE). The country's biofuels strategy is expressed in the National Biofuels Plan (NBP) which is based on the Philippine Energy Plan (PEP). The PEP reflects the mission to ensure the delivery of secure, sustainable, sufficient, affordable and environmentally-friendly energy to all economic sectors, while the NBP is a preliminary assessment of the previous year's NBP, and outlines the short-, medium- and long-term plans of the National Biofuels Board (NBB). Both the PEP and the NBP are often reviewed, and assumptions adjusted.

The Biofuels Act was signed in January 2007 making the Philippines the first country in Southeast Asia to have legislation mandating the blending of biofuels into all local gasoline and petroleum diesel distributed and sold. Section 2 of RA 9367 cites the law as a measure to:

- develop and utilize indigenous renewable and sustainably-sourced clean energy to reduce dependence on imported oil.
- mitigate toxic and greenhouse gas emissions;
- increase rural employment and income; and
- ensure the availability of alternative and renewable clean energy without any detriment to the natural ecosystem, biodiversity and food reserves of the country.

RA 9367 also created the NBB, a cabinet-level monitoring and advisory body that ensures the impacts of the biofuel policy are consistent with the goal of balanced economic growth. The law specifically targets the transport sector, the dominant oil consuming sector, through 'mandatory' volumetric blending requirements for ethanol and biodiesel. The NBB may adjust the blending requirements on the condition that the minimum blend may be decreased only within the first four years of implementation. The minimum requirements of five percent and two percent for ethanol and biodiesel respectively, could not be decreased thereafter.

Although RA 9367 does not provide for a specific mandate for the Department of Environment and Natural Resources (DENR) in its implementation, the DOE must ensure that in establishing standards and guidelines for technical fuel quality of biofuels (as well as biofuel-blended gasoline and diesel), there must be compliance with Philippine National Standards for fuel and fuel-related products. In addition, the Biofuels Act provides that the application of water effluents used in biofuel production shall conform to the Philippine Clean Water Act, subject to the monitoring and evaluation of the DENR.

To encourage investments, fiscal incentives are provided by RA 9367. Entities engaged in the plantation of biofuels feedstock are entitled to duty-free importation and value added tax (VAT)

exemption on all types of agricultural inputs and machinery. Priority is also given to potential biofuels investors by government financing agencies. RA 9367 was implemented in June 2007. 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. RA 9367 does not allow biodiesel importation.

In 2008, the Biofuels Act was strengthened with the passing of the Renewable Energy Act or Republic Act 9513 (RA 9513). When the Renewable Energy Act was signed, the country was already the world's second largest producer of geothermal energy (next to the U.S.) and was also the first country in Southeast Asia to establish a commercial wind farm as well as the first grid-connected solar photovoltaic power plant. Despite RA 9513, the contribution of renewable energy to the country's overall energy mix has been declining from 43 percent in 2009, to roughly 30 percent in 2016 as production cannot pace demand.

On May 2016, the Philippines elected Rodrigo Roa Duterte as the country's 16th president. President Duterte formally assumed office on July 1, 2016. Although public statements from senior officials of the government places economic development ahead of environmental concerns, President Duterte signed the Paris Agreement on February 2017. The Philippine Senate concurred with its ratification on March 2017. The Philippines has committed to reduce its emissions by 70 percent by 2030 but it will need technical and financial support. The GPH aims to triple renewable energy capacity by 2030 under the PEP.

Central to the Duterte administration's agenda is a Comprehensive Tax Reform Program (CTRP) that seeks to shift some burden from lower income segments towards the more affluent sectors. The first tax reform package (among five tranches) aims to lower personal income tax rates, broaden the VAT tax base, raise excise tax rates on petroleum and automobiles, and impose an excise levy on sugar-sweetened beverages. These measures are included in House Bill No. 5636 (HB 5636) or the Tax Reform for Acceleration and Inclusion (TRAIN) Act which was passed by the Philippine House of Representatives on May 31, 2017. The measure is expected to generate over P130 billion (\$2.6 billion) in its first year of implementation, according to the Philippine Department of Finance (DOF). The proceeds will help finance public investments in infrastructure, human capital and social protection for the poor.

The more relevant features of the TRAIN include the following:

- Income taxes for those earning P250,000 (\$5,000) annually or less will be abolished;
- Power or fuel (including ethanol and biodiesel) generated through renewable sources of energy such as biomass, solar, wind, hydropower, geothermal, are VAT exempt;
- Increased excise tax for petroleum fuels from 2018 to 2020 (see Gasoline and Diesel Section);
- A multi-bracket excise tax structure for automobiles with a two-year phase-in period starting 2018;
- Buses, trucks, cargo vans, and other special purpose vehicles are excluded from the proposed auto excise tax adjustments; and
- A P10 (\$0.20) per liter excise tax on sugar-sweetened beverages;
- Marking of petroleum products at refinery or offload terminal.

TRAIN requires counterpart legislation by the Senate, and a bicameral conference committee to come

up with a final bill, before it can be signed into law by the President. The Senate is expected to pass its version of the TRAIN by the end of 2017, and the final bill ready for signing by the President before Christmas 2017, according to the DOF.

A second tranche of tax reform measures, which includes a cut in corporate income tax rates, and the removal of some fiscal incentives for some industries, is also likely to be submitted to Congress in the later part of 2017. Revenues from the CTRP are expected to help raise planned GPH infrastructure spending from 5.4 percent of GDP this year, to over 7.0 percent by 2022. Under its ambitious "Build, Build, Build" program, the GPH intends to spend over P8 trillion (\$160 billion) on big infrastructure projects, specifically roads and bridges, mass urban transport and other connectivity projects from 2017-2022. More information is provided in www.build.gov.ph.

According to the World Economic Forum-Global Competitiveness Report 2015-2016, the Philippines ranks 97th out of 140 countries in terms of quality of road infrastructure. The total road network in the country is currently estimated at 216,400 kilometers.

III. Gasoline and Diesel

Fuel Use History (Million Liters)										
Calendar Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Gasoline Total	3,508	3,784	3,918	3,882	4,114	4,365	4,547	5,211	5,741	6,028
Diesel Total	6,463	6,938	7,164	7,081	7,403	7,871	8,370	9,331	10,321	10,837
On-road	5,080	5,454	5,631	5,566	5,819	6,187	6,579	7,334	7,701	8,086
Agriculture										
Construction & Mining										
Shipping & Rail										
Industry										
Heating										
Jet Fuel Total	1,407	1,503	1,529	1,721	1,808	1,910	1,975	2,073	2,359	2,477
Total Fuel Markets	11,378	12,225	12,611	12,684	13,325	14,146	14,892	16,615	18,421	19,342

Fuel Use Projections (Million Liters)										
Calendar Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Gasoline Total	6,329	6,645	6,978	7,327	7,693	8,078	8,481	8,906	9,351	9,818
Diesel Total	11,379	11,948	12,545	13,173	13,831	14,523	15,249	16,011	16,812	17,653
On-road	8,490	8,915	9,360	9,828	10,320	10,836	11,377	11,946	12,544	13,171
Agriculture										
Construction & Mining										
Shipping & Rail										
Industry										
Heating										
Jet Fuel Total	2,601	2,731	2,868	3,011	3,162	3,320	3,486	3,660	3,843	4,035
Total Fuel Markets	20,309	21,324	22,391	23,510	24,686	25,920	27,216	28,577	30,006	31,506

Philippine Gross Domestic Product (GDP) growth reached 6.8 percent in 2016, the high-end of the GPH growth target of 6-7 percent for the year, and the country's strongest in three years. For 2017, local economic planners expect GDP to grow 6.5-7.5 percent, increasing to 7-8 percent in the medium-term. The World Bank, in its June 2017 Global Economic Prospects report, affirmed its Philippine GDP growth rate at 6.9 percent in 2017, again 6.9 percent in 2018, and 6.8 percent in 2019. Meanwhile, the Asian Development Bank (ADB) in its supplement to its Asian Development Outlook 2017, upgraded

its growth projection for the Philippines this year to 6.5 percent from 6.4 percent. For 2018, ADB expects GDP to expand to 6.7 percent from 6.6 percent earlier projected.

Continued economic growth, coupled with an expanding population (over 100 million, roughly half of which is below 25 years of age), is expected to drive increasing fuel demand for the long-term. Fuel use numbers for the period 2009-2016 are based on actual consumption estimates from the DOE, while the projections for the next 10 years are Post’s estimates based on an annual growth of five percent.

Before the passage of Republic Act No. 8479 or the Downstream Oil Industry Deregulation Act of 1998, close to 100 percent of the Philippine petroleum market was dominated by a handful of big players. As more players entered the market, the market share of large players declined to roughly 70 percent in 2014, and further slid to 60 percent in 2015. Small industry players, which are generally supportive of biofuels, are estimated to have a market share of 40 percent.

The common gasoline in the Philippines includes unleaded gasoline RON 91, 95 and 97 (octane rating). Since the local industry is deregulated, gasoline prices differ by company, and by area. Most of the petroleum players in the Philippines use the Means of Platts, Singapore benchmark for their pricing.

The following is a comparative table between the current and proposed excise tax rates for gasoline, diesel and aviation (AV) turbo jet fuel under HB 5636.

Fuel Type	Current Excise Tax (per Liter)	HB 5636 Proposed Excise Tax		
		2018	2019	2020
Leaded Premium Gasoline	P5.35 (\$0.11)	P7.00 (\$0.14)	P9.00 (\$0.18)	P10.00 (\$0.20)
Unleaded Premium Gasoline	P4.35 (\$0.09)	P7.00 (\$0.14)	P9.00 (\$0.18)	P10.00 (\$0.20)
Diesel	-	P3.00 (\$0.06)	P5.00 (\$0.10)	P6.00 (\$0.12)
AV Turbo Jet Fuel	P3.67 (\$0.07)	P7.00 (\$0.14)	P9.00 (\$0.18)	P10.00 (\$0.20)

Source: Philippine House of Representatives

In addition to the excise tax, petroleum products, including diesel, are subject to a 12 percent VAT, unchanged from the previous VAT rate.

According to preliminary data from the Philippine Land Transportation Office (LTO), there were roughly 9.3 million registered motor vehicles in 2016, up from 8.7 million in 2015. In 2014, there were 8.1 million motor vehicles registered.

The Chamber of Automotive Manufacturers of the Philippines Inc. (CAMPI), Truck Manufacturers Association (TMA) and the Association of Vehicle Importers and Manufacturers (AVID), total industry sales in 2016 reached over 417,000 units for a 30 percent increase from the previous year’s level. The industry has a sales target of selling 500,000 units by 2020 but at the current pace, may be realized as early as 2018, according to press articles.

There are now two car models that have qualified under the Comprehensive Automotive Resurgence Strategy Program (CARS). The CARS or Executive Order No. 182 (EO 182) which implements the CARS was signed by former President Benigno Aquino III on May 29, 2015. The CARS aims to make the country a regional hub for car manufacturing through 2022, with the possibly to export to the

Association of Southeast Asian Nations (ASEAN) market. Under CARS, incentives worth P4.5 billion (\$90 million) will be provided annually for six years to support the manufacturing of three vehicle models. A car maker can qualify for incentives for a model if it produces at least 200,000 units over six years. Fiscal support will be in the form of non-transferable tax payment certificates that can be used to pay for taxes and import duties.

While the looming higher excise taxes are expected to temper motor vehicle demand when enacted, increased car sales in 2017 is projected as buyers avoid higher prices. Electric and hybrid vehicles, however, are exempt from excise taxes under both HB 5636 and SB 1408.

On June 19, 2017, the Philippine Department of Transportation (DOTR) officially launched the country's Public Utility Vehicle (PUV) Modernization Program meant to improve the mass transport sector. A major component of the three-year program is the phase out of PUVs, including jeepneys, 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). Jeepneys were originally made from left-over U.S. military jeeps from World War II and adapted as public utility jeepneys (PUJs). The DOTR cites PUJs as a major source of carbon dioxide emission. Although specifications of the replacement-vehicle have yet to be released, the majority of the estimated 200,000 PUJ operators have expressed opposition to the planned phase-out. The modernization program likewise includes changes in the franchising system, the updating of transport routes, and the corresponding training for PUV drivers. According to a press report, the GPH recently signed an agreement to set up an initial P2.2 billion (\$44 million) credit facility that will help affected PUJ drivers/operators modernize their fleets.

IV. Ethanol

Ethanol Used as Fuel and Other Industrial Chemicals (Million Liters)										
Calendar Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
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	23	10	4	35	72	115	168	230	274	280
Imports										
Fuel Imports	64	140	215	248	297	339	311	260	300	325
Exports										
Fuel Exports	0	0	0	3	4	0	0	0	0	0

Consumption										
Fuel Consumption	87	150	219	283	369	454	479	490	574	605
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
Production Capacity (Million Liters)										
Number of Refineries	2	3	3	4	4	8	8	10	11	13
Nameplate Capacity	49	79	79	133	133	222	222	282	322	397
Capacity Use (%)	47	13	5	26	54	52	76	82	85	71
Co-product Production (1,000 MT)										
Bagasse	92	46	0	144	150	180	83	15	12	12
Feedstock Use for Fuel (1,000 MT)										
Sugar Cane	308	154	0	480	500	600	277	50	40	40
Molasses	12	0	16	18	150	300	612	900	1,100	1,200
Sugar	0	0	0	2	9	7	0	0	1	0
Market Penetration (Million Liters)										
Fuel Ethanol	87	150	219	283	369	454	479	490	574	605
Gasoline	3,784	3,918	3,882	4,114	4,365	4,547	5,211	5,741	6,028	6,329
Blend Rate (%)	2.30	3.83	5.64	6.88	8.45	9.98	9.19	8.54	9.52	9.56

Production

According to the DOE, there were 10 ethanol plants operating in 2016, up from eight the previous year. Production increased 37 percent reaching 230 ML in 2016, compared to 168 ML in 2015. Another plant is expected to operate in 2017 with output forecast to reach 274 ML for a 19 percent increase from the 2016 level.

As mentioned in the previous annual report, the increase in number of distilleries is the result of potable alcohol plants shifting to fuel ethanol production. The shift is cheaper compared to building a new facility, and the adjustments take only two to three months, according to industry. The trend explains the shift from cane to molasses as the primary feedstock used. This trend is likely to continue in the medium term (3-5 years).

Another distillery with a 40 ML capacity is expected to operate in 2017, bringing aggregate capacity to 322 ML, up from the previous year's 282 ML. Capacity utilization would be around 85 percent in 2017. Two additional ethanol plants with a combined 75 ML capacity are expected to operate in 2018 bringing total capacity to 397 ML. Output in 2018 is expected to slightly grow but capacity utilization should decline from the 2017 level as production is constrained by marketing and distribution infrastructure limitations.

The Philippines is a major sugarcane producer but in addition to domestic requirements, it is also a major U.S sugar quota recipient (largest in FY 2017). There are research and development efforts in using sweet sorghum (for conventional sugar fermentation) and lignocellulosic biomass as an alternative or complementary feedstock. However, commercial cultivation of sweet sorghum for fuel will require vast tracks of land, and is expected to be constrained by a longstanding Philippine agrarian reform law (which limits private land ownership to five hectares).

Consumption

Increasing motor vehicle sales, accelerating construction activities, a growing population and continued

expansion of the Philippine economy, all translate to increased fuel consumption in the next 3-5 years.

The Biofuels Act mandated that at least five percent ethanol comprise the annual total volume of gasoline distributed by oil companies in the country by February 2009. That goal was only first met and surpassed two years later in 2011. The original schedule required a 10 percent blend by 2011. An assessment of the market shows blending fell far short of that goal reaching only 5.6% in 2011 and first reached E10 in 2014. Since then, there has been no upward movement and at times the blend rate has fallen slightly.

The following table shows the ethanol blend targets and implementation dates since inception. As an aspirational goal, the DOE wants to make available an 85 percent ethanol blend to be promoted voluntarily by 2025.

Ethanol Targets	Blend
Year	%
2009	5
2011	10
2015	10
2020	20
2025	20/85*
2030	20/85*

*aspirational & voluntary goal

Source: DOE

According to data from the SRA, the fuel ethanol reference price in June 2017 was at P50.14 (\$1.00) per liter, 16 percent lower compared to P59.62 (\$1.19) per liter the previous year. Ethanol reference prices have consistently declined from August 2016 through May 2017.

The following Table shows the average local retail price differential per liter ethanol vs. gasoline. While local ethanol prices have gone down by over 16 percent from June 2016 to June 2017, gasoline prices have remained fairly flat and have even risen slightly. As a result, the price difference of ethanol and gasoline declined from P18.48 (\$0.37) in June 2016, to P2.73 per liter in May 2017 (latest data available). The blend rate is expected to increase from 8.5 percent in 2016 to 9.5 percent in 2017 due to this narrowing price differential. The blend rate is expected to slightly increase in 2018 due to higher gasoline prices as a result of new and higher excise tax rates.

Month/Year	Gasoline	Ethanol	Ethanol/Gas
	Peso per liter*		Price Differential
June 2016	41.14	59.62	18.48
July	39.86	59.14	19.28
August	37.68	60.52	22.84
September	38.65	59.61	20.97
October	42.46	58.45	15.99
November	42.67	58.09	15.43
December	44.77	56.49	11.72
January 2017	46.69	56.01	9.32
February	47.53	54.70	7.17
March	45.74	51.61	5.87
April	44.25	48.69	4.44

May	44.71	47.44	2.73
June	N.A.	50.14	N.A.

*Average retail price after taxes

Source: DOE and SRA

In 2017, of the 11 distilleries operating, six are located in Luzon island and the remaining five are found in the Visayas region. Four of the five distilleries in the Visayas are found in the island of Negros, which accounts for roughly 60 percent of domestic Philippine sugar production. According to contacts, the distillers from Negros supply the ethanol requirements of the entire Visayas and the southern island of Mindanao which represent around 30 percent of overall ethanol demand. The SRA estimates the cost of transporting ethanol out from Bacolod at P450 (\$9) per ton. According to the same source, this is why new ethanol plants are being set up in Luzon, where an estimated 70 percent of demand is located. However, since Luzon has less than 40 percent of national sugar production, feedstock supply is an issue.

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 are allowed to resort to importation. Existing distribution infrastructure is limited and inadequate ethanol storage facilities are likely to dampen increased domestic ethanol usage.

Trade

Ethanol tariffs under various free trade agreements within ASEAN, including the Philippines, fell to zero in 2016, and remain duty free in 2017. Most Favored Nation (MFN) tariffs for World Trade Organization (WTO)-member countries, including the U.S., remain at zero percent in 2017. A duty of one percent is imposed if the ethanol is used for fuel-blending purposes under the Philippine Fuel Ethanol Program.

Mainly due to increased local production, fuel ethanol imports in 2016 declined 16 percent from 311 ML in 2015 to 260 ML in 2016, according to data from the SRA and the DOE. Official customs trade data reported to international organizations and picked up by firms like IHS Markit (published via the World Trade Atlas) is deemed inaccurate and not used in this report. Imports from the U.S., however, increased 35 percent to 241 ML in 2016 from 178 ML in 2015. The U.S. maintained its dominance accounting for 93 percent of total ethanol imports in 2016, increasing its share from 57 percent in 2015.

According to U.S. Census data, the Philippines was the 5th largest market for U.S. ethanol in 2016, with sales reaching 218 ML valued at \$103 million.

Ethanol Imports (ML)			
Country of Origin	2014	2015	2016
Australia	0	8.26	16.60
Brazil	13.91	0	0
Indonesia	28.15	0	0
Korea	2.47	7.4	1.91
Philippines (Subic)	12.34	112.54	0
Singapore	3.34	4.74	0
Thailand	4.13	0	0
USA	246.03	177.67	241.04
Vietnam	28.29	0.07	0
Others	0.4	0	0
Total	339.06	310.68	259.55

Number of Biorefineries	10	8	9	9	9	11	11	11	11	11
Nameplate Capacity	350	436	350	393	393	585	585	575	575	575
Capacity Use (%)	39.1%	28.4%	38.0%	35.1%	39.4%	29.4%	34.9%	39.3%	36.5%	34.8%
Feedstock Use for Fuel (1,000 MT)										
Coconut oil	125	113	122	126	142	157	186	207	192	183
Feedstock B										
Feedstock C										
Feedstock D										
Market Penetration (Million Liters)										
Biodiesel, on-road use	131	125	123	137	153	163	170	218	218	218
Diesel, on-road use	5,454	5,631	5,566	5,819	6,187	6,579	7,334	7,701	8,086	8,490
Blend Rate (%)	2.4%	2.2%	2.2%	2.4%	2.5%	2.5%	2.3%	2.8%	2.7%	2.6%
Diesel, total use	6,938	7,164	7,081	7,403	7,871	8,370	9,331	10,321	10,837	11,379

Production

An estimated 50 active CNO mills operate in the country, and around 20 cater to the export market while roughly 30 concentrate in servicing domestic CNO needs, according to industry contacts. Virtually all domestic biodiesel is made using CNO and is therefore also referred to as coconut methyl ester (CME), an oleochemical derived from CNO. CNO is obtained from crushing copra. Oleochemicals 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 2016, unchanged from the previous year. Aggregate annual capacity, however, was slightly lower last year at 575 ML compared to 585 ML, according to data from the DOE. Seven CME producers operate in the island of Luzon while four are located in Mindanao island.

Although there are two registered biodiesel applicants that have obtained DOE's notice to proceed with construction – both located on the southern island of Mindanao with a combined capacity of 165 ML – the recommendation of a USAID-funded study to postpone raising the existing 2.7% blend (national average) is likely to discourage the construction (refer to Consumption, Biodiesel). As a result, we do not believe the two new plants will be built keeping capacity unchanged, and biodiesel production expected to modestly decline through 2018 due to strong CNO export demand and a drawdown in stocks.

Although coconut production in recent years has been weak due to an extended dry spell brought about by the El Nino weather pattern, the Philippines was the top CNO exporter in 2016. Copra (the dried meat of the coconut) production in MY 16/17 is forecast at 2.2 million tons (which approximates the 2017 production forecast by the United Coconut Associations of the Philippines, Inc. (UCAP)) up 5 percent from 2.1 million tons in MY 15/16 as coconut trees begin to recover from drier-than-normal conditions. Output is expected to slightly increase to 2.3 million tons in MY 17/18 as precipitation improved during the latter part of 2016. Post estimates MY 16/17 CNO production at 1.42 million tons and projects MY 17/18 production at 1.48 million tons due to a mild recovery in copra output.

Consumption

Except for 2010, biodiesel production has consistently exceeded consumption since the implementation of the Biofuels law. Production reached 204 ML in 2015 accounting for 120 percent of demand as refineries anticipated a surge in consumption as a result of the B5 official blend during the same year.

Of course, the B5 blend was not met so stocks accumulated though 2016.

RA 9367 had mandated the use of a minimum one percent biodiesel blend in all diesel fuels by February 2007, to increase to a two percent blend by 2009. Following are the biodiesel blends targets through 2030:

Biodiesel Targets	Blend
Year	%
2007	1
2009	2
2015	5
2020	10
2025	20
2030	20

Source: DOE

Biodiesel blending remains near 2.5 percent. As mentioned in previous reports, high CNO/CME prices have resulted in delays in raising the blend to B5 (the blend goal effective beginning 2015). CME prices in May 2017 (latest available) ranged from P70.50-P90 (\$1.41-\$1.80) per liter, substantially higher compared to local diesel prices. CME prices (at the high end) were roughly triple diesel prices from June 2016 to May 2017.

Month/Year	Diesel	CME	CME-Diesel Price Differential	
	Peso per liter*		Low End	High End
June 2016	27.86	45-85	17.14	57.14
July	27.54	45-82	17.46	54.46
August	25.44	45-82	19.56	56.56
September	25.96	45-82	19.05	56.05
October	27.93	45-82	17.07	54.07
November	27.32	45-82	17.68	54.68
December	29.03	45-82	15.97	52.97
January 2017	30.72	45-92	14.28	61.28
February	31.16	45-92	13.84	60.84
March	31.01	45-90	13.99	58.99
April	30.74	50-90	19.26	59.26
May	30.29	70.50-90	40.21	59.71
June	N.A.	N.A.	N.A.	N.A.

*Average retail price after taxes

Source: DOE

Results of the economic study on the impact of the higher biodiesel mandate (mentioned in the previous annual report) were released in late 2016. According to the USAID-UPECON Foundation, Inc.'s Economic Policy Development Program (EPDP) policy brief entitled "*Welfare Effects of Higher-Blended Biodiesel on the Philippine Economy*," although there are positive environmental and health benefits in raising the biodiesel blend from 2 percent to 5 percent, it has negative economic impacts with the net loss amounting to P3.26 billion in 2016. The brief adds that the higher blend would also raise fuel costs (it did not evaluate the option of permitting imports of lower-priced biodiesel). Furthermore, it concluded that meeting the required coconut/copra requirements for a higher 5% blend would be difficult despite the optimistic production projections by the Philippine Coconut Authority (PCA). The brief recommends the postponement of the higher blend, at least in the short run. In the medium to long term, the brief further suggests 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."

Although no change in the biodiesel mandate has been approved and issued as a result of the recommendation, the current official target (B2) is expected to remain unchanged through 2018. Biodiesel demand is expected to remain flat through 2018, while the actual blend rate is likely to decline marginally due to expected higher prices and strong export demand for CNO. CNO is the top Philippine agricultural export commodity generating roughly \$1 billion sales annually. According to UCAP data, average world CNO prices in March 2017 (latest data available) were at \$1,761 per ton, roughly 50 percent higher than the \$1,178 per ton price in March 2016. The CNO export price was at \$1,137 in March 2015. The United States is the top buyer of Philippine CNO exports.

Trade

Biodiesel imports are not permitted by the Biofuels Act. Exports remain zero as producers hold on to stocks anticipating a higher official blend. According to industry contacts, CNO exporters avoid trade disruptions as they have longstanding export commitments to their preferred buyers.

Stocks

Biodiesel stocks have been increasing in recent years in anticipation of the shift from B2 to B5 in 2015 (which did not happen). As this is not likely to occur anytime soon (as recommended by the USAID-funded study), stocks are expected to decline gradually through 2018 putting downward pressure on production during the period.

VI. Advance Biofuels

The DOE aims to have B20 by 2025. 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. Commercialization of price competitive algal biodiesel is not foreseen in the near to medium-term. There is little information on current research and development for cellulosic fuel available, as well as on demonstration plants that prove the commercial viability of 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 2016 are based on actual consumption estimates from the DOE.
- Fuel use estimates for the 2017-2027 period are based on a five percent annual growth rate starting from the 2016 level.
- Ethanol and biodiesel consumption numbers are based on sales figures from the DOE and/or the SRA through 2016.
- Ethanol imports are based on data from the DOE and SRA.
- Post assumes zero carryover ethanol stocks due to tightness in local supply.
- Biodiesel ending stock levels are derived estimates by Post.

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

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

LIST OF ACRONYMS

Asian Development Bank	ADB
Association of Southeast Asian Nations	ASEAN
Aviation	AV
Association of Southeast Asian Nations	ASEAN
Association of Vehicle Importers and Manufacturers	AVID
2-percent biodiesel blend	B2
Billion Liters	BLs
Chamber of Automotive Manufacturers of the Philippines, Inc.	CAMPI
Coconut oil	CNO
Coconut methyl ester	CME
Comprehensive Automotive Resurgence Strategy	CARS
Comprehensive tax reform program	CTRP
Department of Energy	DOE
Department of Environment and Natural Resources	DENR
Department of Transportation	DOTR
Department of Finance	DOF
Economic Policy Development Program	EPDP
Electric	E
10-percent ethanol blend	E10
Ethyl tert-butyl ether	ETBE
Fiscal Year	FY
Gross Domestic Product	GDP
House Bill	HB
Land Transportation Office	LTO
Market Year	MY
Million Liters	MLs

Million Metric Tons	MMT
Most Favored Nation	MFN
National Biofuels Board	NBB
National Biofuels Plan	NBP
Octane rating	RON
Philippine Energy Plan	PEP
Philippine Government	GPH
Public Utility Vehicle	PUV
Public Utility Jeepney	PUJ
Republic Act	RA
Senate Bill	SB
Sugar Regulatory Administration	SRA
Tax Reform for Acceleration and Inclusion	TRAIN
Truck Manufacturers Association	TMA
United Coconut Associations of the Philippines, Inc.	UCAP
Valued-added tax	VAT
World Trade Organization	WTO