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Biofuels Annual

Philippine Biofuels Industry Situation and Outlook

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Report Highlights:

The Philippines is a regional pioneer in renewable energy (RE) and has mandates in place that require the blending of biodiesel and ethanol in diesel fuel and gasoline. Five years after implementation of the Philippine Biofuels Law, there have been no compliance issues with the mandated two percent biodiesel blend in diesel fuel due to the abundance of coconut oil in the country, and a higher blending requirement is likely by 2013. Compliance with the mandated ten percent ethanol blend in gasoline, however, continues to be problematic due to the inadequate capacity of existing sugarcane distilleries. The issuance of feed-in tariffs (FITs) is expected in the second half of 2012 and should eventually create incentive for expanded ethanol production in the country. Although this is the case, ethanol imports are expected to increase through at least 2013 in order to satisfy the ethanol-blend mandate.

Post:

Manila

Executive Summary:

The Philippines is a pioneer in Asia in the use of biofuels and has a Renewable Energy Law in place. The Biofuels Act of 2006 (Republic Act 9367) mandated the blending of biodiesel and ethanol in all locally distributed diesel and gasoline (currently at two and ten percent, respectively). Sugarcane and coconut methyl ester (CME) are the current ethanol and biodiesel feedstock of choice in the country. Since 2007, when RA 9367 took effect, compliance with the mandated biofuels blends has been mixed.

There are currently nine biodiesel producers with total annual capacity of 395 million liters (Mli) and three ethanol producers with total annual capacity of 79 Mli. The estimated CME-based biodiesel and sugarcane-based ethanol volumes required to meet the biofuel mandates in 2012 are 149 and 420 Mli, respectively. An additional 133 Mli of ethanol production capacity is expected by the end of 2013 with the completion of three new distilleries. Despite this anticipated additional capacity, local ethanol production will still fall far short of meeting the current ten percent blend mandate. Existing Philippine biodiesel refineries, on the other hand, are currently more than sufficient and have the capacity to satisfy an even higher CME-based blending mandate.

The Government of the Philippines (GPH) is currently reviewing the National Biofuels Program (NBP) and approval of FITs to encourage more investment in ethanol production is expected in the third quarter of 2012. Despite the pending issuance of FITs, compliance with the ten percent ethanol blend using only locally produced ethanol will continue to be problematic. As a result, ethanol imports are expected to increase through at least 2013. Most-Favored-Nation (MFN) tariffs for ethanol imports are scheduled to remain at ten percent through 2015. An additional one percent duty will be applied to any import that the Philippines Department of Energy (DOE) certifies as for fuel-blending purposes. For CME, imports will be levied a three percent MFN tariff through 2015 but may be imported duty-free if coming from ASEAN-member countries.

Author Defined:**Policy and Programs****Overview**

Information on the current Philippine energy situation and outlook is difficult to obtain as targets and assumptions are often revised and adjusted. Unless otherwise specified, energy figures for 2010 (most recent data available) in this report are based on the proposed Philippine Energy Plan 2011-2030 (PEP 11-30) prepared by the country's DOE.

In 2010, the country's total energy mix according to the PEP 11-30, reached 40.7 million tons of oil equivalent (MTOE), 3.2 percent higher than the 39.5 MTOE reported in 2009. The increase was the result of an 8.5 percent increase in total net energy imports, according to the PEP 11-30, which grew

from 16 MTOE in 2009 to 17.3 MTOE in 2010. The increase in total net energy imports compensated for the 0.3 percent decline in total indigenous energy production. Based on the same report, in 2010 the Philippines was 57.5 percent energy self-sufficient, down from the 59.5 percent self-sufficiency level in 2009.

The percentage contribution of the 2010 energy sources follow:

| 2010 PHILIPPINE PRIMARY ENERGY MIX | |
|---------------------------------------|------------|
| | Percent % |
| Oil | 36 |
| Geothermal | 21 |
| Coal | 17 |
| Biomass | 13 |
| Natural Gas | 7 |
| Hydro | 5 |
| Wind & Solar | 0 |
| Biofuels | 1 |
| TOTAL | 100 |

Source: PEP 2011-2030

The Philippines has one of the highest, if not the highest, power rates in Asia. Intermittent power shortages in Mindanao island are becoming more frequent. The power outages, coupled with the increasing demand for electricity by the growing Philippine economy, are likely forcing the GPH to give expansion and development priority to more traditional power plants such as those that run on coal.

Renewable Energy

Mindanao island has the lowest generation charge among the country's island groupings at an estimated P2.8 (\$0.07) per kilowatt-hour (KWh) compared to approximately P4.3 (\$0.10) in Luzon and about P4.0 (\$0.10) in the Visayas region. With largely hydro-based power, Mindanao has the highest RE generating capacity in the total power mix ratio which is estimated at 60 percent. This compares to around 40 percent in the Visayas region, and an estimated 30 percent ratio in the main island of Luzon. Inadequate maintenance and climate change realities (e.g. dredging and droughts), however, have resulted in unstable power supply in Mindanao.

In 2010, RE sources (geothermal, biomass, hydro, wind and solar) accounted for 39 percent of the country's energy mix, according to the PEP 11-30. This was slightly down from the 43 percent RE contribution in 2009. The decline in contribution of RE sources to the overall primary energy mix is expected to continue in the next 3-5 years.

Uncertainty over incentives (such as FITs) has hampered the development of local RE sources. The

FITs would guarantee investments in renewable energy through fixed rates that would be shouldered by consumers over a period of time. The FITs proposal currently under review by the Energy Regulatory Commission (ERC) carries the following rates:

- Biomass - P7 (\$0.17) per KWh
- Hydro - P6.15 (\$0.15) per KWh
- Wind - P10.37 (\$0.25) per KWh
- Ocean energy - P17.65 (\$0.42) per KWh
- Solar power - P17.95 (\$0.42) per KWh

Local RE developers will be allowed to put up a total of 760 MW within a 3-year period, following the issuance of the FITs. This is broken down as follows:

- Biomass - 250 MW
- Hydro - 250 MW
- Wind - 200 MW
- Ocean energy- 10 MW
- Solar power- 50 MW

The ERC expects the issuance of the FITs by the second half of 2012, according to media reports.

Biofuels

Republic Act 9367 or the Biofuels Act of 2006 provides the legal framework of the Philippine NBP. After more than 5 years since it was signed into law, the GPH is conducting a review of the NBP. Ethanol assumptions used in this report are largely based on the review and recommendations by the NBP-Technical Working Group (NBP-TWG Review).

According to the review, progress has been made since the first year the Biofuels Act was implemented and the NBB-Technical Working Group has found it necessary to craft a new vision/mission statement that will guide and inspire the implementation of the law towards the year 2030.

For the period 2012-2030, the following vision and mission have been adopted:

Vision: The Philippines is a major user and leading net exporter of biofuels by 2030.

Mission: To increase energy self-sufficiency through sustainable production of biofuels

Pertinent text of the revised vision, mission and goals through 2030 follow:

“Being the pioneering country in Asia to legislate and mandate the use of biofuels, the Philippines shall continue to produce premium quality biofuels from the finest feedstock and design superior technologies for biofuel production and utilization in the country. The Philippines shall also continue to take the lead in the development of a competitive biofuels industry, both locally and globally.

The short-term goal (by 2016) is for indigenous biodiesel to replace at least 3-5% of total diesel

utilization and to be self-sufficient in meeting the mandated 10% ethanol blend in gasoline. By 2022, the country will begin to shift to 10% volume of biodiesel and 20% volume of bioethanol mandates. By 2030, the program desires to achieve a mandate of 20% volume of biodiesel and a 20% -85% volume of bioethanol.”

Following are the target ethanol and biodiesel blends through 2030:

| Year | 2012 | 2013-2015 | 2016 | 2020 | 2025 | 2030 |
|--------|------|-----------|-------|------|------|---------|
| Target | B2 | B3 | B3/B5 | B5 | B10 | B20 |
| Blend | E10 | E10 | E10 | E10 | E20 | E20/E85 |

Source: NBB-TWG Review

Climate Change

The Philippines is playing an active role in the global campaign to mitigate disaster risks brought about by global warming. It passed the Climate Change Act of 2009 (Republic Act No. 9729), which created the Climate Change Commission, as well as the Philippine Disaster Risk Reduction and Management Act of 2010 (RA 10121).

From February 6-8, 2012, the country sponsored the APEC Agricultural Technical Cooperation Working Group (ATCWG) Symposium entitled “APEC Symposium on Climate Change: Adaptation Strategies with Mitigation Potential for Food and Water Security”. The symposium was undertaken by the Philippines to fulfill one of its commitments in the APEC Action Plan on Food Security, as embodied in the Niigata Declaration approved during the APEC First Ministerial Meeting on Food Security in 2010.

As a follow up activity to the May 2011 EC-LEDS initial visit, a Planning and Technical Meeting on Greenhouse Gas (GHG) Inventory for the Philippines was conducted by participants from the DA, DENR and the Philippine Climate Change Commission from February 29-March 2, 2012. The need for a GHG inventory for the Philippines was underscored as a prerequisite to developing a low emissions strategy during the meeting.

Ethanol

Production

Philippine ethanol production utilizes sugarcane and molasses for its feedstock. Post uses a 65 Li/MT conversion rate in the required Ethanol PSD Table and a sugarcane co-product (bagasse) recovery rate of 300 kilos (kg) per ton cane. The Sugar Regulatory Administration (SRA) is mandated to secure both the production of sugar and feedstock for ethanol under the Biofuels Act.

There are currently 8 ethanol producers registered with the Philippine Board of Investments with a combined annual capacity of roughly 245 Mli, according to the NBP-TWG Review.

| |
|--|
| Registered Bioethanol Companies |
|--|

| Registered Enterprise | Annual Capacity |
|--|-----------------|
| | (Mli) |
| 1. Leyte Agri Corp. | 3.9 |
| 2. San Carlos Bioenergy, Inc. | 27.3 |
| 3. Biofuels 88 Corp. | 19.8 |
| 4. JG Summit Holdings, Inc. | 30.0 |
| 5. Roxol Bioenergy Corp. | 30.0 |
| 6. Cavite Biofuel Producers, Inc. | 36.2 |
| 7. South Bukidnon Bioenergy Corp. | 45.8 |
| 8. Canlaon Alcogreen Agro Industrial Corp. | 52.2 |
| Total | 245.2 |

Source: NBB-TWG Review

Of the 8 registered distilleries, only 3 (Leyte Agri Corp., San Carlos Bioenergy Inc. and Roxol Bioenergy Corp.), with a combined capacity of 79 Mli, are currently in operations.

An additional 133 Mli production capacity is expected by the end of 2013 with the completion of the Green Futures Innovations (54 million liters), Cavite Biofuels (34 million liters) and Canlaon Alcogreen (45 million liters) distilleries. All 3 will use sugarcane as a feedstock. Green Futures, which is not listed in the table above but has been recently accredited, is expected to be in commercial operations by the third quarter of 2012.

Despite the additional distilleries, local ethanol production will still fall short of satisfying the mandated ethanol blend. According to the NBB-TWG Review, 13 more distilleries with an annual capacity of 30 Mli are required to meet the 10 percent ethanol blend by 2012.

San Carlos Bioenergy Inc., recently produced 14,000 liters of ethanol fuel using sweet sorghum as feedstock during a two-day trial, according to unconfirmed press reports. The commercial research project was reportedly undertaken through a memorandum of agreement between SCBI, the University of the Philippines-Los Baños (UPLB), and Biomass Resources Inc. UPLB is also involved in advanced biofuel research (refer to Advanced Biofuels).

Consumption

Beginning 2009, the Biofuels Act mandated the sale and distribution of five percent ethanol-blended gasoline by volume by all gasoline stations. The higher ten percent ethanol blend was implemented in August 2011 (after a transition period of six months for oil companies to attend to distribution and logistics infrastructure concerns) with some exemptions on certain gasoline grades. By the 5th year of implementation of RA 9367 (on February 6, 2012), all gasoline grades were mandated to be of ten percent blend.

The following table is based on the earlier PEP 2009-2030 which outlines projected gasoline demand and the fuel displaced at varying ethanol blends. The same Table for the PEP 2011-2030 is not yet readily available.

| Fuel Ethanol - Measureable Targets | | | |
|---|------------------------|----------------------|--------------------------|
| Year | Gasoline Demand | Ethanol Blend | Fuel Displacement |
| | (Mli) | % | (Mli) |
| 2009 | 3,380 | 5 | 169 |
| 2010 | 3,571 | 5 | 179 |
| 2015 | 4,305 | 15 | 646 |
| 2020 | 5,213 | 20 | 1,043 |
| 2025 | 6,014 | 20 | 1,202 |
| 2030 | 6,704 | 20 | 1,341 |

Source: PEP 2009-2030

The Philippine transport industry has been the dominant final energy consuming sector for at least the past 14 years, according to the PEP 2011-30. From 8.9 MTOE in 2009, energy consumption by the sector has grown 1.5 percent to 9.0 percent MTOE in 2010. Accounting for 79 percent of 2010 total transport demand is road transport consumption, followed by international civil aviation (11 percent), water transport (8 percent), domestic air and rail transport (3 percent).

Petroleum products comprised approximately 98 percent of the transport sector's total energy demand in 2010. Diesel, which is mainly used by public utility vehicles, had the biggest share (48 percent) followed by gasoline (32 percent). The balance is shared by fuel oil (3.2 percent), jet (13.5 percent), LPG (0.8 percent) and Avgas (0.04 percent). The considerable share of both gasoline and diesel may be attributed to the increasing number of registered motor vehicles through 2010.

Trade

Ethanol falls under HS 2207.20.11 or Ethyl Alcohol Strength by Volume of Exceeding 99 percent, according to contacts from the Philippine Tariff Commission (PTC). There are no entries under HS 2207.20.11 in the Global Trade Atlas (GTA), however, and the figure in the following trade matrix represent imports under the general heading for alcohol of any strength (HS 2207.20). Imports under HS 2207.20 in 2011 reached 140,831 MT, slightly down from the imports in 2010.

| PHILIPPINE IMPORT STATISTICS (MT) Jan-Dec 2009-2011 | | | |
|--|---------------|----------------|----------------|
| HS 220720 - Ethyl Alcohol & Other Spirits, Denatured, Of Any Strength | | | |
| | 2009 | 2010 | 2011 |
| South Korea | 14,305 | 54,536 | 33,942 |
| Singapore | 7,955 | 35,188 | 29,049 |
| China | 6,001 | 22,340 | 0 |
| United States | 98 | 14,997 | 24,756 |
| Pakistan | 992 | 7,116 | 0 |
| Indonesia | 3,777 | 6,407 | 3,253 |
| Thailand | 0 | 4,847 | 25,552 |
| Netherlands | 0 | 4,406 | 1,158 |
| Cambodia | 8,854 | 1,706 | 0 |
| Brazil | 2,454 | 0 | 0 |
| Taiwan | 2,620 | 0 | 0 |
| Others | 2,305 | 7,233 | 23,121 |
| TOTAL | 49,361 | 158,776 | 140,831 |

Source: Global Trade Atlas

Ethanol imports were converted from MT to Mli using the rate of 1MT:1267 liters in the following table.

| PHILIPPINE IMPORT STATISTICS (Mli) Jan-Dec 2009-2011 | | | |
|--|-------------|-------------|-------------|
| HS 220720 - Ethyl Alcohol & Other Spirits, Denatured, Of Any Strength | | | |
| | 2009 | 2010 | 2011 |
| South Korea | 18 | 69 | 43 |
| Singapore | 10 | 45 | 37 |
| China | 8 | 28 | 0 |
| United States | 0 | 19 | 31 |
| Pakistan | 1 | 9 | 0 |
| Indonesia | 5 | 8 | 4 |
| Thailand | 0 | 6 | 32 |
| Netherlands | 0 | 6 | 1 |
| Cambodia | 11 | 2 | 0 |
| Brazil | 3 | 0 | 0 |
| Taiwan | 3 | 0 | 0 |
| Others | 3 | 9 | 29 |
| TOTAL | 63 | 201 | 178 |

Source: Global Trade Atlas

Executive Order No. 61 was signed October 2011 and modified tariffs for various products. Ethanol MFN tariffs, however, were left unchanged at ten percent, and will remain at this level through 2015. Ethanol imports will be subject to an additional one percent MFN tariff if certified by the DOE that the imported ethanol will be used for fuel-blending purposes. If originating from ASEAN-member countries (i.e., Cambodia, Laos & Malaysia), imports will be levied a five percent duty.

No realistic conclusion can be drawn from trade data of HS 2207.20 and import numbers in the Fuel Ethanol PSD Table are Post's estimates.

Ending Stocks

No ending fuel ethanol stocks are expected through 2013.

| Fuel Ethanol - Conventional & Advanced Fuels (Mil. Liters) | | | | | | | | |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Calendar Year | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
| Production, Total | 0 | 0 | 0 | 25 | 10 | 29 | 100 | 120 |
| Advanced Only | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Imports | 0 | 0 | 9 | 64 | 140 | 236 | 320 | 350 |
| Exports | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Consumption | 0 | 0 | 9 | 89 | 150 | 265 | 420 | 470 |
| Ending Stocks | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Production Capacity - Conventional | | | | | | | | |
| No. of Biorefineries | 0 | 0 | 0 | 2 | 3 | 3 | 5 | 6 |

| | | | | | | | | |
|---|---|---|---|-----|-----|-----|-------|-------|
| Capacity (Mil. Liters) | 0 | 0 | 0 | 40 | 79 | 79 | 167 | 195 |
| Capacity Use (%) | - | - | - | 63% | 13% | 37% | 60% | 62% |
| Production Capacity - Advanced | | | | | | | | |
| No. of Biorefineries | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Capacity (Mil. Liters) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Capacity Use (%) | - | - | - | - | - | - | - | - |
| Co-product Production - Conventional only (1,000 MT) | | | | | | | | |
| Product Y | 0 | 0 | 0 | 116 | 48 | 134 | 462 | 555 |
| Product Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Feedstock Use - Conventional (1,000 MT) | | | | | | | | |
| Feedstock A | 0 | 0 | 0 | 385 | 160 | 445 | 1,540 | 1,850 |
| Feedstock B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Feedstock C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Feedstock D | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Feedstock Use - Advanced (1,000 MT) | | | | | | | | |
| Feedstock A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Feedstock B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Feedstock C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Feedstock D | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Notes: 2012-13 numbers are Post's estimates.

Market for Ethanol Used as Other Industrial Chemicals

Information for ethanol used for other industrial purposes (other than for beverages) in the Philippines is not readily available. Hence, the numbers in the flowing PSD Table are estimates by Post arrived at through discussions with industry contacts. Overall ethanol production for industrial use is estimated at 138 Mli in 2011. Of this amount, potable alcohol comprises an estimated 117 Mli.

Ethanol used for other industrial uses but not for beverages is considered inferior in quality compared to potable alcohol and are produced in smaller amounts, according to industry. This type of ethanol is used as solvents in paints, leaching agents, and in the production of sanitizers and other toiletries. Total production volume under this category in 2012 is projected at 20 Mli by an estimated ten distilleries with a combined capacity of 100 Mli annually. Mainly due to the rapidly growing Philippine population, ethanol used for these purposes are expected to grow at a commensurate rate or around two percent annually.

| Ethanol Used as Other Industrial Chemicals (Mil. Liters) | | | | | | | | |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Calendar Year | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
| Production | 18 | 18 | 19 | 19 | 19 | 20 | 20 | 21 |
| Imports | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exports | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Consumption | 18 | 18 | 19 | 19 | 19 | 20 | 20 | 21 |
| Ending Stocks | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Production Capacity | | | | | | | | |
| Capacity (Mil. Liters) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Capacity Use (%) | 18% | 18% | 19% | 19% | 19% | 20% | 20% | 21% |

Source: Post's estimates

Biodiesel

Production

CME is the Philippine biodiesel feedstock, and is an oleochemical derived from coconut oil (CNO). CNO is derived from copra, the dried meat of the coconut. Copra meal and glycerine are by-products in the CNO extraction process. Oleochemicals are used in the manufacture of soaps, detergents and other cosmetic items and toiletries. Because CME has many uses, determining CME used for biodiesel production is difficult to ascertain.

The following copra: CNO: CME conversion is used in this report based on the Coconut Industry Development Roadmap (2011-2016) of the Philippine Coconut Authority (PCA).

1 kg. copra = 0.63 kg. CNO
1kg. CNO =1 liter CME

There are currently nine CME biodiesel producers operating with a combined annual capacity of approximately 393 Mli, according to the PCA.

| The Philippine CME Industry | |
|---------------------------------------|-----------------------|
| Company | Capacity (Mli) |
| 1. Chemrez Technologies Inc. | 75 |
| 2. Pure Essense Int'l, Inc. | 60 |
| 3. Golden Asian Oil Int'l, Inc. | 60 |
| 4. JNJ Oleochemicals | 60 |
| 5. Mt. Holly Coco Industrial Co. Ltd. | 50 |
| 6. Bioenergy 8 Corporation | 30 |
| 7. Tantuco Enterprises, Inc. | 30 |
| 8. Freyvonne Milling Services | 16 |
| 9. Philippine Biochem Products, Inc. | 12 |
| T o t a l | 393 |

Source: Philippine Coconut Authority

The PCA continues to be optimistic on the industry's capability to supply the copra required to make CNO for CME production even at a higher five percent mandated blend requirement. A five percent blend would require an estimated 378 Mli of biodiesel and would utilize approximately 97 percent of the existing CME industry's capacity.

The PCA is also aggressively pursuing a coconut replanting/planting program. Likewise, a coconut fertilization program is being implemented to raise coconut productivity. In addition, the PCA is seriously considering using palm oil as an additional biodiesel feedstock to augment CME use. The Philippines currently has approximately 55,000 hectares of oil palm in Northern Mindanao.

Consumption

Even before the Biofuels Law was signed in 2007, the GPH had required the use of CME-blended diesel by all GPH government vehicles. There have been no compliance-related issues with using CME as the biodiesel feedstock.

Following is the projected biodiesel demand and the corresponding biodiesel requirement based on increasing mandated blends through 2030

| Projected Biodiesel Demand, 2012-2030 | | | |
|--|-----------------------|----------------------|------------------------|
| Year | Mandated Blend | Diesel Demand | Biodiesel Req't |
| | (%) | (Mli) | (Mli) |
| 2012 | 2 | 7,465 | 149 |
| 2013 | 3 | 7,745 | 232 |
| 2014 | 4 | 8,035 | 321 |
| 2015 | 10 | 8,325 | 833 |
| 2016 | 11 | 8,615 | 948 |
| 2017 | 12 | 8,905 | 1,069 |
| 2018 | 13 | 9,195 | 1,195 |
| 2019 | 14 | 9,485 | 1,328 |
| 2020 | 15 | 9,775 | 1,466 |
| 2025 | 20 | 11,225 | 2,245 |
| 2030 | 20 | 12,675 | 2,535 |

Source: National Biofuels Program (2012-2030) Planning Workshop, May 21-25, 2012

The CME production and consumption figures (i.e., 232 Mli) in the Biodiesel PSD Table for 2013 reflect a mandated three percent CME blend. Unconfirmed reports from GPH contacts have pointed to the possibility of adopting a higher five percent biodiesel blend by 2013. At this blend, the required blend will approximate the current biodiesel capacity of existing CME plants.

Trade

According to EO 61, CME is classified under the tariff heading 3824.90.90B. There are no records in the GTA under this heading, however. Imports in the following trade tables cover imports under HS 3824.90 or Other Chemical Industrial Products and Preparations of the Chemical or Allied Industries. Imports in 2011, reached 38,602 MT, higher than the 34,275 MT imports the previous year. Items under this grouping are levied a three percent MFN tariff through 2015 but may be imported duty-free if coming from ASEAN-member countries.

| PHILIPPINE IMPORT STATISTICS (MT) Jan-Dec 2009-2011 | | | |
|--|-------------------------------|-------------|-------------|
| HS 382490 - Chemical Products & Preparations of the Chemical or | Allied Industries, NES | | |
| | 2009 | 2010 | 2011 |
| China | 12,019 | 14,936 | 17,077 |
| South Korea | 1,265 | 3,136 | 3,796 |
| Malaysia | 1,887 | 2,230 | 1,694 |
| Singapore | 2,388 | 2,099 | 2,266 |

| | | | |
|---------------|---------------|---------------|---------------|
| United States | 1,569 | 2,056 | 2,463 |
| Spain | 528 | 1,146 | 296 |
| Japan | 1,297 | 1,103 | 1,691 |
| Taiwan | 1,341 | 1,015 | 1,463 |
| Others | 5,782 | 6,554 | 7,856 |
| TOTAL | 28,076 | 34,275 | 38,602 |

Source: Global Trade Atlas

Imports under HS 3824.90 were converted using the rate of 1MT: 1136 liters, per the reporting instructions, in the following table.

| PHILIPPINE IMPORT STATISTICS (Mli) Jan-Dec 2009-2011 | | | |
|---|-------------|-------------|-------------|
| HS 382490 - Chemical Products & Preparations of the Chemical or Allied Industries, NES | | | |
| | 2009 | 2010 | 2011 |
| China | 14 | 17 | 19 |
| South Korea | 1 | 4 | 4 |
| Malaysia | 2 | 3 | 2 |
| Singapore | 3 | 2 | 3 |
| United States | 2 | 2 | 3 |
| Spain | 1 | 1 | 0 |
| Japan | 1 | 1 | 2 |
| Taiwan | 2 | 1 | 2 |
| Others | 7 | 7 | 9 |
| TOTAL | 32 | 39 | 44 |

Source: Global Trade Atlas

No realistic conclusion can be drawn from trade data of HS 3824.90 and the import numbers in the Biodiesel PSD Table are Post's estimates. Unlike ethanol, there is no provision for biodiesel importation in the Biofuels Act. The Philippines is the world's top CNO exporter and Post expects CME imports in 2012 and 2013 to remain nil.

Ending Stocks

No ending CME stocks are expected through 2013.

| Biodiesel - Conventional & Advanced Fuels (Mil. Liters) | | | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Calendar Year | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
| Production, Total | 2 | 38 | 65 | 130 | 139 | 144 | 149 | 232 |
| Advanced Only | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Imports | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exports | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Consumption | 2 | 38 | 65 | 130 | 139 | 144 | 149 | 232 |
| Ending Stocks | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Production Capacity - Conventional | | | | | | | | |
| No. of Biorefineries | 10 | 12 | 12 | 12 | 12 | 12 | 9 | 9 |
| Capacity (Mil. Liters) | 150 | 325 | 325 | 395 | 395 | 395 | 395 | 395 |

| Capacity Use (%) | 1% | 12% | 20% | 33% | 35% | 36% | 38% | 59% |
|--|----|-----|-----|-----|-----|-----|-----|-----|
| Production Capacity - Advanced | | | | | | | | |
| No. of Biorefineries | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Capacity (Mil. Liters) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Capacity Use (%) | - | - | - | - | - | - | - | - |
| Feedstock Use - Conventional (1,000 MT) | | | | | | | | |
| Feedstock A | 1 | 70 | 65 | 130 | 139 | 144 | 149 | 232 |
| Feedstock B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Feedstock C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Feedstock D | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Feedstock Use - Advanced (1,000 MT) | | | | | | | | |
| Feedstock A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Feedstock B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Feedstock C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Feedstock D | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Note: 2012-13 numbers are Post's estimates.

Advanced Biofuels

The UPLB has an existing program covering R & D on alternative biofuels feedstock. For ethanol, R & D programs are being pursued on cellulosic materials, grass, agricultural waste material, forest waste and residues, and microalgae. For biodiesel, UPLB is conducting research studies on jatropha and macroalgae.

The Philippine Department of Science and Technology (DOST) has a pilot processing facility with laboratory support where oil extraction and production of jatropha methyl ester (JME) from jatropha seeds are done. JME yields of 83.0 to 89.0 percent have been reported, almost similar to CME (which is around 90 percent). Other biodiesel R & D programs carried out by the DOST include microalgae, filtered crude coconut oil and used vegetable oil.

The UPLB also has a roadmap on alternative biofuels feedstock that covers the period 2005 to 2020. The roadmap reportedly includes 2005-2010 for feedstock developments and conversion improvement; 2010-2015 for pre-commercial and commercial stages; 2015-2020 for advanced by product and waste utilization.

STATISTICAL INFORMATION

The following conversion rates were used in the Bioethanol and Biodiesel Tables:

65 Li ethanol = 1 MT of sugarcane = 300 kgs bagasse

1 Li of biodiesel = 1 Li CME

1MT ethanol = 1267 Li

1 MT biodiesel = 1136 Li

