

INTRODUCTION

The use of biofuels for transport is a major thrust of the Philippines to reduce the country's dependence on imported fossil fuels and to mitigate greenhouse gas emissions. To pursue this objective, the government is implementing the National Biofuels Program to promote investments in biofuel productions and encourage the utilization of this product. Other activities that coincide with this program are the establishment of support mechanisms to ensure adequate supply of feedstocks and the adoption of appropriate technology for vehicles/engines to be able to use alternative fuels.

At present, bioethanol is mainly produced by sugar fermentation and distillation process. This activity started when both Leyte Agri Corporation and San Carlos Bioenergy, Inc. commenced operations in 2008.

MARKET OPPORTUNITY

Huge and increasing demand

- The Biofuels Act of 2006 created a market for bioethanol because of the mandate for oil companies to blend 5% bioethanol by volume in 2009 increasing to at least 10% in 2011 on all gasoline fuel products distributed and sold in the Philippines.
- current annual capacity: only 79 million liters in contrast to the demand of more than 400 million liters for 2011

Demand-Supply gap (in liters)

Year	Blend	Total Demand* (B)	Total Installed Capacity** (A)	Surplus/[Deficit] (A-B)
2010	5%	191,800,000	19,800,000	[172,000,000]
2011 a	5%	200,000,000	80,000,000	[120,000,000]
2011 b	10%	400,000,000	80,000,000	[320,000,000]

*Based on DOE demand estimate for bioethanol

**For 2010, volume was computed based on the actual production of bioethanol companies. For 2011, volume was computed based on the submitted annual capacities of BOI and DOE-registered bioethanol companies (San Carlos Bioenergy, Inc., Leyte Agri Corp. and Roxol Bioenergy Corp.)

- At present, capacity of existing bioethanol producers cannot meet the domestic demand based on the mandated blend of the law thus, the need for additional investments.

Big volume of imports

- The existing bioethanol plants still cannot fully supply the requirements for the 5% blend mandated by the law; thus, oil companies resort to importation of bioethanol to meet the requirement.

PHILIPPINE ADVANTAGE
Resources

- Available Land
 - more than 500,000 hectares of land area identified suitable for the plantation bioethanol crops
- Major Sources of Raw Materials
 - sugarcane - ranks 5th major crop grown in the country in terms of area planted (total in 2009: 404,000 hectares)
 - sweet sorghum - a very promising feedstock for ethanol production according to the Merritt Partners 2008 report but this is not yet grown on a commercial scale in the country
 - cassava - the island of Mindanao hosts the most cassava plantations with the Autonomous Region in Muslim Mindanao (ARMM) as the top regional cassava producer in the country with 57% share

Comparative Analysis of the different Bioethanol Feedstock

	Sugarcane	Sweet Sorghum	Cassava
Agricultural Yield	65 metric tons per hectare	50 metric tons per hectare from stalk; 3 metric tons per hectare from grain	8 metric tons per hectare
Ethanol Yield	Juice yield – 70 liters per metric ton or 4,550 liters per hectare	Juice yield – 5,000 liters per hectare per year from stalks; 2,250 liters per hectare per year from grains	180 liters per metric ton
Crop Description	Most reliable feedstock for bioethanol; only ethanol from sugarcane can be produced in a totally renewable and environment-friendly process through the utilization of bagasse	Early maturing can be planted as a component crop in a multi-cropping system; commercial field crop in the tropics which can be successfully grown in dry areas; drought tolerant; fits well in various cropping system	Grown throughout the country; low cost; few diseases, can weather storms and grow on the mountain side; tubers are used for starch and ethanol and the leaves are edible; used for food production, for feeds and can be used for alcohol production
Varieties	Some of the varieties used for planting: Phil 98-255; Phil 97-3933; Phil 94-0913; and Phil 93-3489	Recommended varieties: SPV 422, NTJ2, and ICSR 93034	Starch rich varieties: VC-1; VC-2; VC-3; Datu; Lakan; Golden Yellow
Suitable Areas	Region with pronounced wet and dry seasons are most suitable for sugarcane; has high moisture requirement for its rapid growth and development	Can be planted after rained lowland rice, upland rice, corn and legumes; can be successfully grown in dry areas	Grows in region with evenly distributed rainfalls; sandy loam or clay loam soil; planted predominantly in Mindanao and Eastern Visayas
Planting	Propagated commercially by means of asexual method; to ensure optimum sugarcane yield, planting distance should also be considered	Best planted in June; a hectare of land would require a kilogram of seeds; spacing 60cm between rows and 15cm within	Plant cuttings in furrow as 1m apart; 15cm of the cutting should be buried or covered with soil; use of compost or organic fertilizer is highly recommended
Cropping Cycle	1 cropping per year	2-3 croppings per year	1 cropping per year; cassava plant takes 8 months to grow on the average
<i>Source:DOE</i>			

Ideal locations

Region	Suitability (in hectares)	
	Very suitable for bioethanol crops	Suitable for bioethanol crops
CAR	12,991.74	26,093.22
Region I	34,700.06	29,128.14
Region II	24,712.23	22,162.84
Region III	62,844.87	31,174.30
Region IV-A	57,524.04	4,240.16
Region IV-B	119,256.28	10,651.99
Region V	81,703.56	50,486.51
Region VI	95,515.88	90,316.31
Region VII	61,406.82	27,125.10
Region VIII	77,213.91	109,671.10
ARMM	22,343.59	4,065.54
CARAGA	32,515.29	50,425.25
Region IX	28,762.53	8,967.95
Region X	28,218.17	10,680.22
Region XI	17,728.31	21,227.51
Region XII	11,811.07	11,743.62
TOTAL	769,248.35	508,159.76

Source: Soil Suitability Atlas for Biofuels, PADCC & BSWM

Support industries/infrastructures

- irrigation projects by the National Irrigation Administration (NIA)
- Contract growing scheme is available for those who do not want to go into plantation. It is a popular practice in the country where many farmers are willing to enter into with processors or manufacturers.

Human resources

- Availability
 - big labor force that is highly skilled, educated, English proficient and has strong and good work ethics
 - The country, being an agricultural country, has many readily-available farm workers who are very knowledgeable on the details and technicalities of farming in the Philippines.

INDUSTRY PLAYERS

Existing and on-going projects

- Bioethanol-producing companies in commercial operation:
 - Leyte Agri Corporation (Negros Occidental)
 - San Carlos Bioenergy, Inc. (Leyte)
 - Roxol Bioenergy Corporation (Negros Occidental)
- Several projects being developed include: Cavite Biofuel Producers, Inc. (Cavite), Green Future Innovations (Isabela) and Canlaon Alcogreen (Negros Occidental)

Investments

- total investment: PhP 4.4 Billion (USD 98 Million)

Installed capacity

Company Name	Production Capacity per Annum (in liters)
Leyte Agri Corporation	9,000,000
San Carlos Bioenergy, Inc.	40,000,000
Roxol Bioenergy Corporation	30,000,000

Contribution to the economy

- Employment generation and livelihood improvements in the rural areas
- Foreign exchange savings brought about by the decrease in fuel importation

GOVERNMENT SUPPORT

Laws and policies

- The Biofuels Act of 2006 (RA 9367)
 - mandates the blending of biofuels with all fuel products distributed and sold by oil companies in the Philippine market
- Omnibus Investment Code (EO 226)
 - grants incentives to biofuel investment projects/activities that are included in the Investment Priorities Plan
- PEZA Law (RA 7196)
 - grants incentives to investment projects/activities that are located within economic zones
- JAO 2008-1
 - provides guidelines governing the biofuel feedstock production, and biofuels and biofuel blends production, distribution and sale

Development plans and programs

- The program of the government for the bioethanol industry is provided for in the National Biofuels Program, 2007-2012 under the this framework:
 - Feedstock development, production and extension
 - Research development and deployment
 - Industry development
 - Policy formulation and dissemination
 - Investments, incentives and promotions
 - Standards and quality assurance

National Biofuels Board (NBB)

- Mandated by the Biofuels Act to monitor the implementation of the National Biofuels Program including the monitoring of the supply and utilization of biofuels and biofuel blends

Market/Technical/R&D support

- R&D Priority Areas as provided for by the National Biofuels Program are as follows:
 - S&T Services (NBB website development and hosting with GIS capability and testing facility/analytical laboratory)
 - Sugarcane (varietal improvement, dehydration process, process enhancement, performance testing and standards development)
 - Sweet Sorghum (varietal selection, crop management, demonstration/pilot plant, by-products value-added development, performance testing and standards development)
 - Cassava/Sweet Potato (agro & processing techno-economic study)

Financial support/guarantee

- Credit assistance provided for by the Land Bank of the Philippines and the Development Bank of the Philippines for agri-based and renewable/alternative energy sources projects

INCENTIVES

Fiscal

- RA 9367 (The Biofuels Act of 2006)
 - zero specific tax
 - VAT exemption
 - Wastewater charges exemption
 - Financing activities by government financial institutions
- EO 226 (Omnibus Investment Code)
 - Income Tax Holiday
 - Importation of consigned equipment for 10 years
- RA 9337 (R-VAT Law)
 - zero rate for ethanol and biodiesel
- RA 7196 (PEZA Law)
 - Income Tax Holiday
 - special 5% tax on gross income
 - tax and duty-free importation
 - exemption from export taxes, wharfage dues, impost and fees
 - exemption of payment of local government fees
 - Zero percent VAT

Non-fiscal

- EO 226 (Omnibus Investment Code)
 - Employment of foreign nationals
- RA 7196 (PEZA Law)
 - Special Investor's Visa
 - employment of foreign nationals
 - simplified import and export duties

COSTS OF DOING BUSINESS
Project cost for a distillery capacity of 100,000 liters per day

Related Expenses	Cost (in Million USD)	
	Adjunct	Stand Alone
<u>Industrial</u>		
Civil Works, Land, Buildings	2.90	6.21
Machinery	11.59	17.59
Energy System, Environmental	2.07	3.10
<u>Agricultural</u> (if not yet developed):		
7,000 has	14.48	14.48
Total	31.04	41.38
<i>Note: Green areas will require 20%-30% more expenses agriculturally due to clearing and more extensive pre-development operations (add USD 4.14 M). The high investment cost will necessitate a sound overall environment, specifically addressing the cane supply issue, before any investment will be realized.</i>		

CONTACTS
Board of Investments

Evariste M. Cagatan
 Director, International Marketing Department
 Industry and Investments Building
 385 Sen. Gil J. Puyat Avenue, Makati City 1200
 Tel. No. (+632) 896-8907
 Fax No. (+632) 895-3521
 E-mail Address: EMCagatan@boi.gov.ph
 Website: [http:// www.boi.gov.ph](http://www.boi.gov.ph)

Philippine Economic Zone Authority

PEZA Building Roxas Boulevard corner San Luis Street
 Pasay City, Metro Manila
 Tel. No.: (+632) 551-3436 / (+632) 551-3438
 E-mail: info@peza.gov.ph

Department of Energy (DOE)

Zenaida Monsada
 Tel. No.: (+632) 840-2114
 Fax No.: (+632) 840-2095

DA-Agribusiness Lands and Investment Center (Phil Agribiz Center)

Marriz Agbon
 President
 Department of Agriculture
 Elliptical Road, Diliman, Quezon City
 Tel. No.: (+632) 928-8741 loc. 212