

Biofuels Initiatives in the Philippines

Dr. N. A. Orcullo, Jr.

Professor, De La Salle University-Dasmariñas

Cavite, Philippines

Delivered during the **Biofuels and the Automotive Industry Seminar** held at the Siam City Hotel, Bangkok, Thailand on October 24, 2007 under the auspices of the ASEAN-U.S. Enhanced Partnership.



Biofuels and biodiesel contextualized

As provided for under **RA 9367**, **Biofuels** refer to **bioethanol** and **biodiesel** and other fuels made from biomass and primarily used for motive, thermal and power generation with quality specifications consistent with the Philippine National Standards (PNS).

Biodiesel as referring to Fatty Acid Methyl Ester (FAME) or mono-alkyl ester delivered from vegetable oil, or animal fats and other biomass-derived oils that shall be technically proven and approved by the DOE for use in diesel engines, with quality specifications in accordance with the PNS.

Operationally, and as it is right now, Biodiesel in the Philippine basically refers to the blend of commercial diesel fuel and coconut methyl ester (CME) comprising of **99 percent diesel** and **1 percent CME** by volume. This is the kind of product now being sold in all commercial outlets throughout the Philippines.

Bioethanol refers to ethanol (C_2H_5OH) produced from feedstock and other biomass. It refers to hydrous or anhydrous bioethanol suitably denatured for use as motor fuel, with specifications in accordance with the Philippine National Standards (PNS).

The mandate under the Biofuels Law (RA 9367)

1. Minimum of 1% of all diesel engine fuel displaced by biodiesel effective May 6, 2007 (B1)
2. Minimum of 2% blend of biodiesel by February 2009 (B2)
3. Minimum of 5% of all gasoline volume displaced by bioethanol by February 2009
4. Minimum of 10% blend of bioethanol by February 2011 (E10)
5. All biofuels to be blended with liquid fuels shall be sourced locally



Technical Committee on Petroleum Products and Additives(TCPPA)

- Chairmen:
- Department of Energy
 - Department of Environment and Natural Resources
- Members:
- Consumers sector:
- Filipino Car Foundation
 - Petron Corporation
- Suppliers-Manufacturers:
- Philippine Automotive Federation, Inc./Chamber of Automotive manufacturers of the Philippines, Inc.
 - Pilipinas Shell Petroleum
 - Union Oil
 - Agricultural Machinery Manufacturers and Distributors
- Association
- Caltex Philippines
- Government agencies:
- Bureau of Products Standards
 - Department of Science and Technology
- Secretariat:
- Department of Energy/Energy Industry Administration
Bureau

The Philippine National Standard on CME and Fuel Ethanol

PNS 2020:2003/DOE 002:2003) defined **Coconut Methyl Ester (CME)** is defined as fatty esters derived from coconut oil whose alkyl groups range in varying percentages from C₈ to C₁₈ suitable for compression ignition engines and other similar types of engines. Its chemical and physical characteristics is specified under Table of PNS 2020:2003/DOE 002:2003).

As stated in the PNS for Philippine CME, the final draft of the revised standard (DPNS/OE QS 002/2007) has been submitted to the DTI/BPS for promulgation. This standards update takes into account other international standards to enhance the universal appeal of Philippine CME biodiesel.

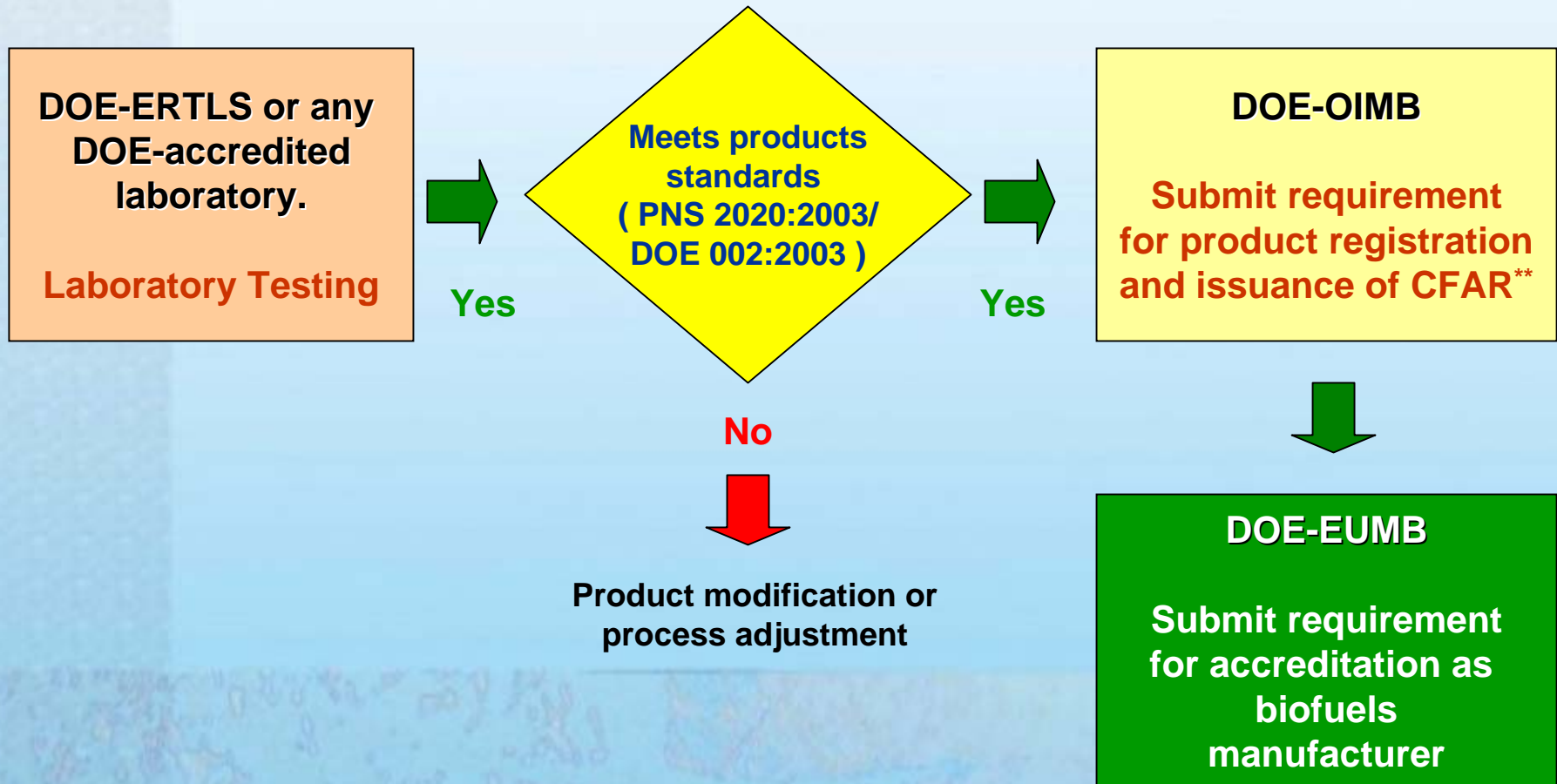
There is also an existing standards for **Anhydrous Bioethanol Fuel Specification** (PNS/DOE QS 007:2005 ICS 75.160.20) promulgated in April 18, 2006. This is a quality standard for fuel grade ethanol both pure (Bioethanol with 99.3 % purity, and denatured grade (Fuel Bioethanol with 96.9 % purity at 2 %ULG denaturant) for blending with gasoline for use as automotive spark ignition engine fuel.

Under ongoing deliberation by TCPPA is the draft standards for **Jatropha Fuel Specification**.

Technical details of the Philippine standards for CME (B₁₀₀)

Property	CME limit	Test Method
Flash Point Pensky Martens °C, min.	100.0	PNS 613/ASTM D 93
Water & sediments % by vol. max	0.050	PNS 707/ASTM D 2709
Kinematic viscosity @ 40 °C.mm ² /s	2.0 – 4.5	PNS 407 /ASTM D 445
Sulfated Ash % mass max.	0.020	PNS 2025 /ASTM D 874
Sulfur @ mass max.	0.050	PNS 504/ASTM D 2622; PNS 1685/ASTM D 5453; PNS 505/ASTM D 4294; PNS 505 / ASTM D 1266
Copper strip corrosion 3 hrs @ 50 °C, max	No. 3	PNS 379 / ASTM D 130
Cetane number, min	42 ^a	PNS 653 / ASTM D 613
Cloud point, °C max	Report	PNS 706 /ASTM D 2500
Carbon residue, 100 % sample, % mass, max.	0.050	PNS 708 / ASTM D 4530
Acid number, mg KOH/g. max	0.50	PNS 2024 /ASM D 664; PNS 2026/ASTM D 974
Free glycerin, % mass, max	0.02 ^a	PNS 2022/AOC Ea 6-51 (1989) ^a
Total glycerin, % % mass, max.	0.24 ^a	PNS 2023/AOCS Ca 14-56 (1997) ^a
Phosphorous, % mass, max.	0.001	PNS 2028/ASTM D 4951
Distillation AET 90 % recovered °C, max	360	PNS 2027/ASTM D 1160
^a Transition standard		

Flowchart for accreditation of biodiesel manufacturer



** Certificate of Fuel Additives Registration

Actual capacity for coco-biodiesel production (million liters)**

Company	Brand	2005	2006	2007
1. CHEMREZ INCORPORATED(www.chemrez.com)	Bioactif	17.2	75	75
2. SENBEL FINE CHEMICALS(www.senbel.com)	Estrol	36	36	72
3. ROMTRON PHILIPPINES, INC.	Romtron	0.16	.16	.16
4. PURE ESSENCE INTERNATIONAL, INC (www.pure-essence.biz).	Bio Pure		60	60
5. FREYVONNE MILLING SERVICES	Power Z			15.6
6. GOLDEN ASIAN OIL INTERNATIONAL INC. (www.goldenasianoil.com)	Clean Air Biodiesel			30
7. Mt. Holly Coco Industrial Corporation***			4	4
Total		53.36	75.16	256.76

**Output as of August 24, 2007.

*** With provisional accreditation

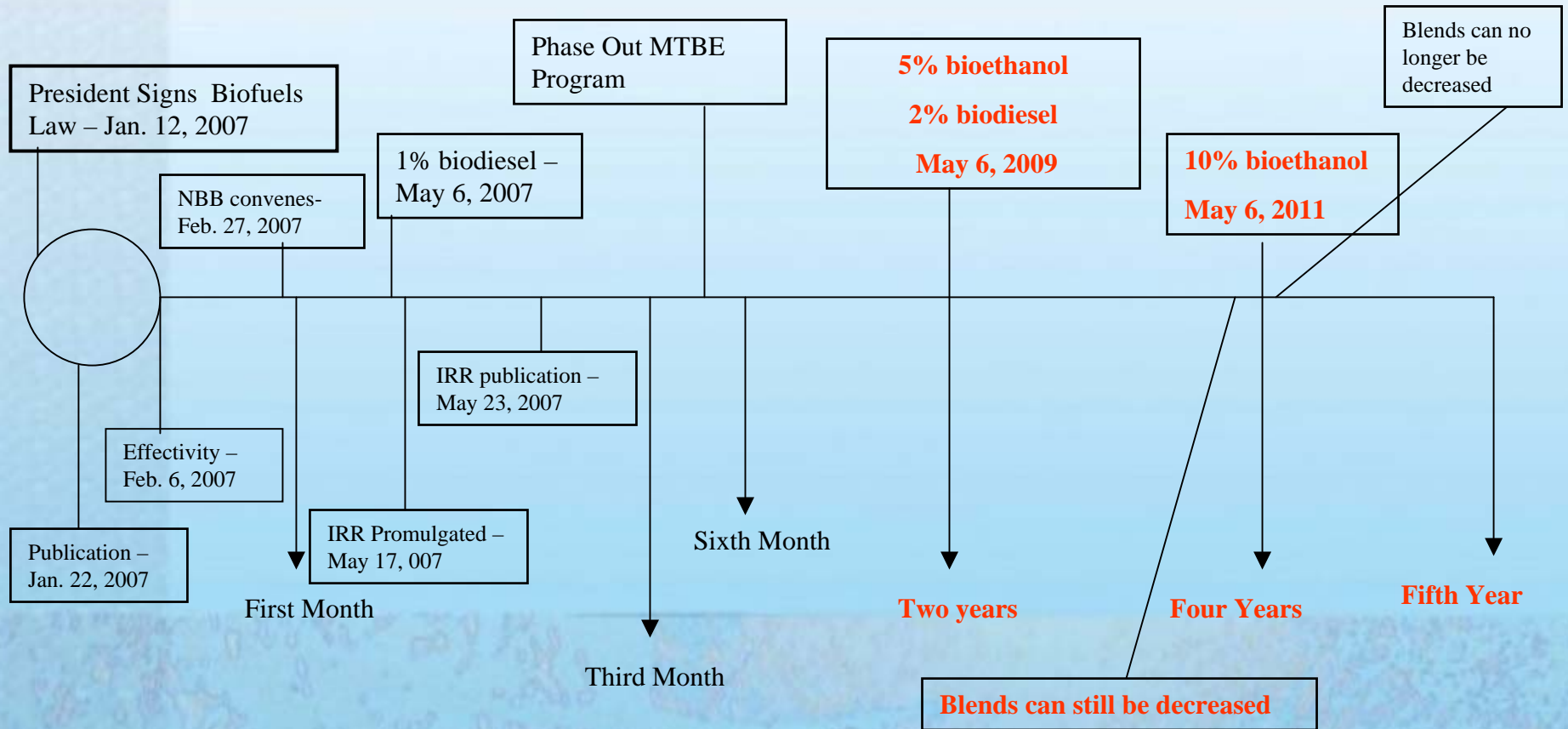
Biofuels and the automotive industry

- The automotive industry is represented in the Technical Committee for Petroleum Products Additives who developed the Philippine National Standards for Biodiesel.
- The automotive industry earlier aired apprehension on the use of biofuels citing perceived effects upon some engine parts.
- The Chamber of Automotive Manufacturers in the Philippines, Inc. (CAMPI) initially opposed the passage of the Biofuels Law when deliberated in Congress.
- Eventually, the concerns of CAMPI and the public vanished and the Biofuels Law was passed in November 29, 2006 and signed into law in January 12, 2007.

Biofuels and regulatory considerations

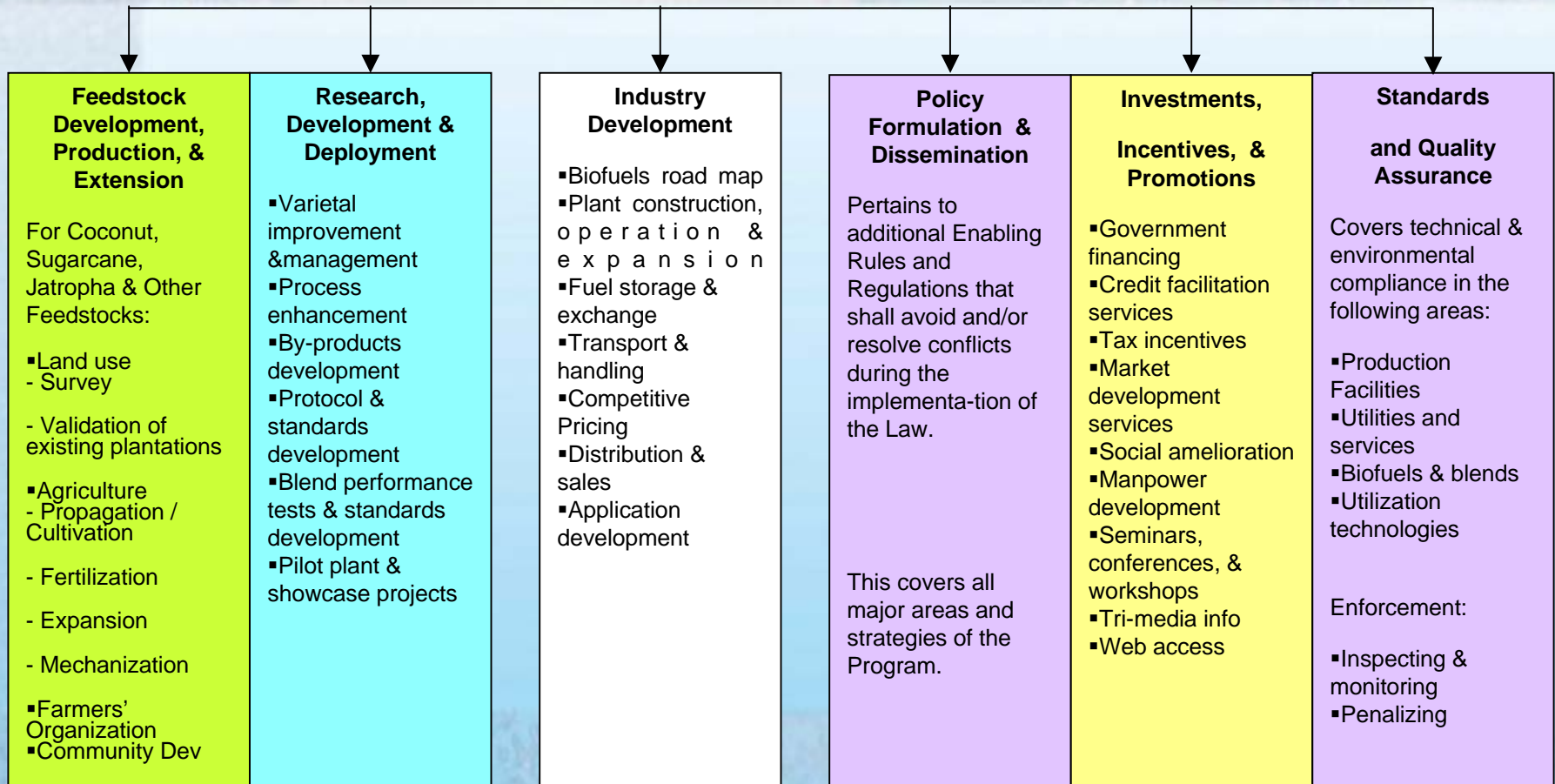
- ❖ Petroleum products supply and distribution in the Philippines is a deregulated industry/sector (i. e., product pricing) hence sourcing of petroleum products along with fuel additives is a matter of market and price considerations.
- ❖ The Clear Air Act (RA 8749) served as regulatory control as it required mandatory compliance with smoke/exhaust emission levels on matters of car registration for all vehicle categories.
- ❖ To protect the quality of petroleum products blended with biofuel additive, the only requirement is a product registration with the Department of Energy which requires evaluation as to compliance with PNS standards.
- ❖ Other than the provisions in the Clean Air Act (RA 8479) and the Biofuels Law (RA 9367) and their respective Implementing Rules and Regulations, the biofuels market is not impeded and/or deemed investor-friendly.

National Biofuels Program - Timeline of implementation



National Biofuels Program Framework

NATIONAL BIOFUELS PROGRAM



Source: Department of Agriculture, October, 2007



National Biofuels Feedstock Program

Goal

- To produce sufficient amount of feedstock to meet the demand for biofuels;
- To augment farmers income;
- To generate rural employment; and
- To spur the development of idle and marginal lands;



National Biofuels Feedstock Program Highlights

Feedstocks

Biodiesel

Primary Feedstock:

- Coconut

Emerging Feedstock:

- Jatropha
- **Oil Palm***

Bioethanol

Primary Feedstock:

- Sugarcane

Emerging Feedstock:

- Cassava
- Sweet Sorghum

*Note: Oil Palm is not yet included in the Feedstock program



The biodiesel scenario

BIODIESEL Demand

- Processing Plant Requirement (30 Million liter capacity):
 - 2007 – 3 refineries
 - 2010 – 6 to 7 refineries
 - 2015 – 7 to 8 refineries

Blend	Year	Demand (M liters)	Equivalent Feedstock Volume (MT)		Equivalent Area for Production (Has)	
			Coconut	Jatropha	Coconut	Jatropha
1%	2007	78	123,810	260,000	121,382	52,000
2%	2010	173	274,603	576,667	269,219	115,333
	2015	209	331,746	696,667	325,241	139,333

The Bioethanol situation

BIOETHANOL Demand

- **Processing Plant Requirement (30 MLi capacity):**
 - 2009 – 9 distilleries**
 - 2011 – 17 to 20 distilleries**
 - 2015 – at least 25 distilleries**

Blend	Year	Demand (M liters)	Equivalent Feedstock Volume (MT)			Equivalent Area for Production (Has)		
			Sugarcane	Sweet Sorghum	Cassava	Sugarcane	Sweet Sorghum	Cassava
5%	2009	268	3,842,857	5,380,000	1,494,444	59,121	53,800	186,806
10%	2011	594	8,485,714	11,880,000	3,300,000	130,549	118,800	412,500
	2015	721	10,300,000	14,420,000	4,005,556	158,462	144,200	500,694

Biofuels Projects - On Going (As of September 21, 2007)

LEGEND:

By Region

- 1
- 10
- 11
- 12
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- ARMM
- CAR
- CARAGA
- NCR

BENLINC

Coconut for CME production
Magsingal, Sto. Domingo,
Kabugao (Ilocos Sur)
100,000 has

Negros Biochem

Sugarcane for bioethanol
Bago City, Negros Occidental
10,000 has

Southern Bukidnon Bioenergy

Sugarcane for bioethanol
Bukidnon
2,000 has

FUELS Inc.

Sugarcane for Bioethanol
Talakag, Bukidnon
5,000 has

BASIC ENERGY

Sugarcane for bioethanol
Zamboanga del Norte
10,000 has

ALSONS POWER

Cassava for bioethanol
Misamis Oriental and Saranggani
16,000 has

ROBSON AGRO VENTURES

Cassava for bioethanol
S Cotabato and Saranggani
25,000 has

ALSONS POWER

Jatropha for Biodiesel
General Santos City
56,000 has

PNOC-AFC

Jatropha for Biodiesel
General Santos City
30,000 has

EASTERN PETROLEUM

Cassava for Bioethanol
Saranggani and General
Santos City
50,000 has

E-CANE FUEL

Lalo Cagayan
Sugarcane for ethanol production
20,000 has

PNOC-AFC

Jatropha for
Biodiesel
Quezon Province
10,000 has

Leyte Argi Corp.

Ormoc, Leyte
Molasses for bioethanol production

SAN CARLOS BIOENERGY

San Carlos City, Negros Occ.
Sugarcane for ethanol production
5,000 has

PNOC-AFC

Jatropha for Biodiesel
Bukidnon and Misamis
Oriental
160,000 has

GMC

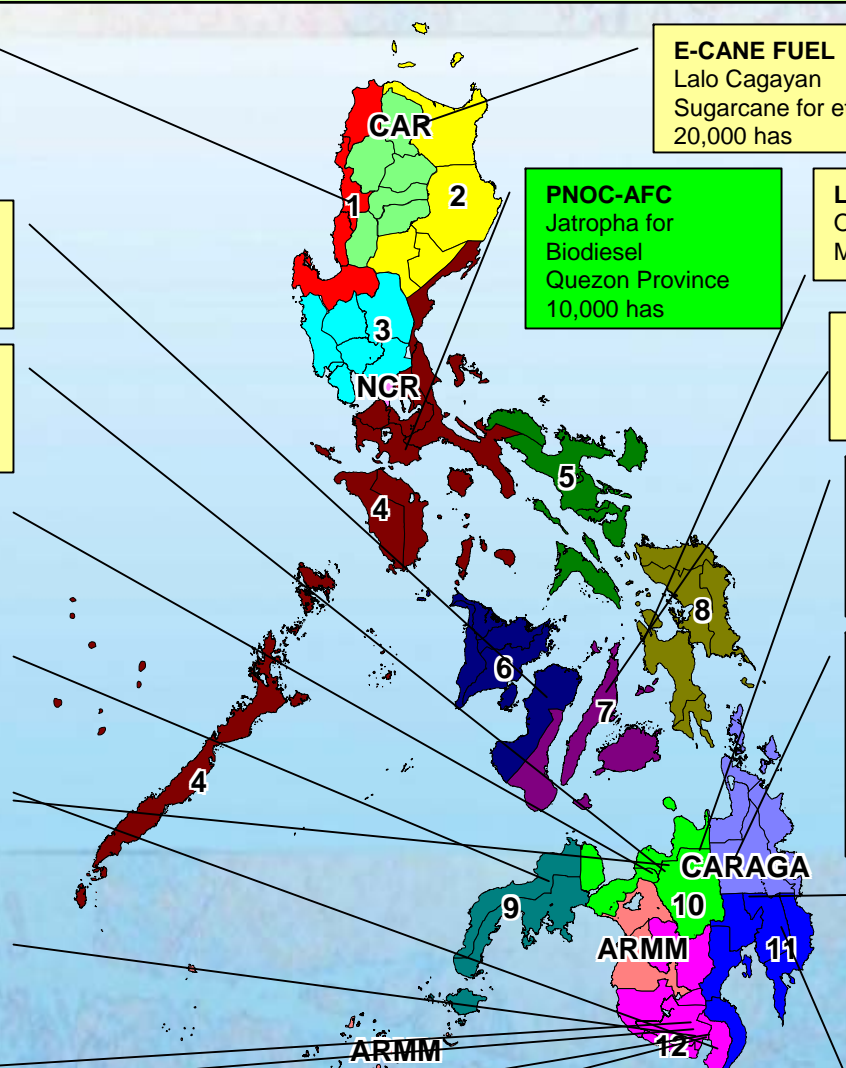
Oil Palm for Biodiesel
Production
Laak, Compostela Valley to
San Isidro and Asuncion,
Davao
30,000 has

GMC

Oil Palm for Biodiesel
production
Dalurong, Bukidnon
down to Arakan Valley,
Cotabato
30,000 has

ENERFUSE

Davao
CME for biodiesel
production



SUMMARY:
NLAQ: 248,000 Has
LUB: 20,000 Has
CP: 15,000 Has
AM: 464,000 Has

Challenges and opportunities

1. Feedstock producers/suppliers
2. Feedstocks processors
3. Feedstock trading
4. Biofuels product trading
5. Backward integration opportunity
6. Biofuels technology providers/suppliers
7. Engine/vehicle manufacturers
8. Biofuels export potentials
9. Local government units

The biggest challenge and opportunity in the area of biofuels is the production the needed feedstock and processing facilities to supply the demand of the National Biofuels Program.

Looking beyond

- ✓ The use of biofuels either in biodiesel or bioethanol form at varying levels and using any kind of feedstocks is all systems go for the Philippines.
- ✓ It is no more of a technical issue or a matter of leadership choice but something that need to be done by virtue of the mandate of the Biofuels Law.
- ✓ While biodiesel using CME as blender has gone a long way and now being sold throughout the country at 1 percent level, production, testing and commercial use of biofuels from other feedstock is yet to be undertaken.
- ✓ Feedstock supply and processing facilities for bioethanol are yet to be fully put in place and implementation of the bioethanol blend is yet to be made two years from now.
- ✓ The challenge at hand is the production of crops/feedstocks and needed to produce the fuel blender both in biodiesel and bioethanol forms as well as the necessary infrastructure to support the end purpose of the Biofuels Law.
- ✓ It appears that the government initiative in addressing the challenges and opportunities for biofuels program has the necessary elements and inputs to achieve its aspirations on biofuels market development.

Let's go biofuels because

- ✓ It is more than just promoting the use of renewable energy and localizing energy supply to address sufficiency objectives and it is a part of the solution on the impacts of dependence of imported fossilized fuels.
- ✓ It is a catalyst to investments and economic activities resulting to livelihood and employment opportunities with high potentials for addressing agricultural/rural development concerns.
- ✓ It is an effective response to environmental degradation and climate change initiatives.

Let's go
for biofuels!



Thank you
very much!