

POTENTIAL, UTILIZATION AND DEVELOPMENT OF BIOFUELS IN THE PHILIPPINES

Jessie C. Elauria, Ph.D.

Focal Point, Biomass Energy in Asia-
Philippines

I. CURRENT BIOMASS SITUATION

Table 1. Historical Energy Mix (In Million Barrels of Fuel-Oil-Equivalent, MMBFOE)

Energy Source	2002		2003	
	<i>Vol.</i>	<i>%Share</i>	<i>Vol.</i>	<i>%Share</i>
Indigenous Energy	128.14	47.60	139.06	50.10
Conventional	21.60	8.02	28.27	10.19
NRE	106.55	39.58	110.80	39.92
Biomass, Solar and Wind	76.76	28.51	80.29	28.93
Geothermal	17.66	6.56	16.94	6.10
Hydro	12.13	4.52	13.57	4.89
Imported Energy	141.06	52.40	138.49	49.90
Oil	117.34	43.59	116.66	42.03
Coal	23.72	8.81	21.83	7.87
TOTAL ENERGY	269.20	100.00	277.55	100.00

Sources: Philippine Energy Plan 2005 Update

- **ENERGY CONSUMPTION IN 2003 (277.55 MMBFOE) WAS 3.0% HIGHER THAN 2002 (269.2 MMBFOE)**
- **NRE CONTRIBUTED 110.80 MMBFOE OR 39.92% IN 2003**

Table 2. Breakdown of NRE Contribution to the Energy Mix, 2003

Item	2003	% Share
Biomass, Solar and Wind	80.29	100.00
Biomass	79.69	99.26
Bagasse	8.28	10.31
Fuelwood	51.06	63.60
Coconut husk/shell	14.89	18.55
Rice husk	5.54	6.90
Charcoal	4.58	5.70
Others	0.59	0.74

Source: Energy Sector Annual Report

▪ **79.69 MMBFOE OR 99.26 % FROM BIOMASS IN 2003**

▪ **FUEL WOOD CONTRIBUTES 51.06 MMBFOE or 63.60 %**

▪ **SOLAR, WIND ENERGY, AND MICRO-HYDRO SYSTEMS CONTRIBUTES ONLY 0.74 %**

Table 3. Use of biomass in the Philippines by Sector

Sector	Percentage of total
Residential	73
Commercial/Industrial	27

Notes: a) Estimates of the residential sector obtained from the World Bank ESMAP Project.

b) Estimates for the Industrial Sector were obtained from the Department of Energy-NonConventional Division's NonConventional Energy Systems Census.

•73% OF THE BIOMASS CONSUMED IN THE COUNTRY WAS IN THE RESIDENTIAL SECTOR AND 27 % IN THE COMMERCIAL AND INDUSTRIAL SECTOR

Table 4. Biomass Fuel Consumption in the Industrial Sector by Type of Technology, Philippines.

Technology	Percentage of Total
Boiler	91.91
Furnace	4.27
Biogas	2.41
Oven	0.90
Cookstove	0.18
Others	0.34

- In terms of conversion systems or equipment used by the sector, almost 92 % was consumed by boilers.
- The sugar industry consumed the most (about 73 %), followed by boilers using wood and other agricultural residues.
- Other conversion systems used in the industrial sector are furnaces, kilns, ovens, cookstoves, grills and biogas.

Table 5. Use of biomass for Fuel in the Industrial Sector by Application, Philippines

Application	Percentage of Total
Steam and power generation	83.95
Commercial applications	14.75
Baking	0.90
Commercial Cooking	0.40

- Industrial sector used biomass mainly for steam and power generation accounted for 84 %.
- Followed by commercial applications like drying of agricultural crops and marine products, ceramic processing, metal works and brick making.

TABLE 6. UTILIZATION FACTOR OF MAJOR BIOMASS RESOURCES

BIOMASS	UTILIZATION FACTOR
Rice Hull	10-20%
Coconut	40-50%
Bagasse	60-70%

Source: Biomass Resource Survey Project, DOE

EXISTING BIOMASS ENERGY TECHNOLOGIES

- A. Stoves, furnaces, ovens, gasifiers
- B. Boilers for sugar and paper mills
- C. Biogas systems
- D. Fluidized Bed Combustors
- E. Village level Alcohol production

II. DEMAND FOR BIOMASS

Table 7. Projected Demand for Biomass Energy Resources
(‘000 BFOE)

BIOMASS	1998	1999	2004	2008
Animal Wastes	17	71	359	610
<i>Municipal Solid Wastes</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>701</i>
Bagasse	10,134	10,404	11,814	13,018
Coconut Residues	11,013	11,287	12,757	14,065
Rice Residues	4,408	4,564	5,443	6,239
Fuelwood (household)	34,231	34,998	38,807	41,731
Fuelwood (industrial)	4,100	4,305	5,494	6,678

Source: Philippine Energy Plan 1999-2008, DOE, Philippines

According to PEP 1998-2008, biomass power plant will come in by 2007. Moreover, additional capacity installation will be realized by the end of year 2008, amounting to 50 MW.

III. CURRENT PROGRAMS & PROJECTS

A. Biomass for Power Projects

Table 8. Summary of on-going biomass power projects

Biomass Power Projects	Cogeneration Projects (Ethanol Production)
<p>30 MW Talisay Bioenergy Inc. (2007) 50 MW Victorias Bioenergy Inc. (2008) 25 MW Bais City Bioenergy Inc. • on going study 25 MW Capiz Bioenergy Inc. • on going study 5 MW La Suerte Rice Hull • on going Study 5 MW Inter City Rice Hull • on going Study</p>	<p>Bukidnon Bioenergy Inc • On going study ▪9 MW/100k liters/day ethanol ▪4 MW for power generation San Carlos Bioenergy Inc. (2007) ▪9 MW/100k liters/day ethanol ▪4 MW for power generation Sarangani Bioenergy Inc. • On going study ▪9 MW/100k liters/day ethanol ▪4 MW for power generation</p>

B. Biomass in Support of Alternative Transport Fuels Program

1. COCONUT METHYL-ESTER (CME) OR *COCO-BIODIESEL* PROGRAM

POLICY INITIATIVES

- Philippine National Standards on CME: PNS 2020:2003 (*May 2003*)
- Memorandum Circular (MC) No. 55: “Directing all Government offices, ... to Incorporate the Use of 1% by Volume CME.
- DC No. 2005-04-003: “Promoting the Use of Coco-Biodiesel as an Alternative Clean Fuel” (*March 1, 2005*)

2. BIOETHANOL FUEL PROGRAM

- Senate Bill No. 1677 “National Fuel Ethanol Program”

The End

Thank you!