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Indonesia

Biofuels Annual

Indonesia Biofuels Annual 2013

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I. Executive Summary:

- Biodiesel is the most successful component of the Government of Indonesia's (GOI) Indonesian Biofuel Program, which began in early 2006.
- It is possible that the anti-dumping duties imposed by European Commission (EC) at 0-9.6 percent may not lead to significant reductions in Indonesian biodiesel exports to Europe. This will be determined by the following factors:
 - The anti-dumping duties may not be high enough to make rapeseed methyl ester (RME) price competitive over palm methyl ester (PME).
 - PME prices are declining in correlation with lower crude palm oil (CPO) prices. This may allow Indonesian biodiesel producers to discount PME for European buyers.

II. Policy and Programs

In early 2006, the GOI enacted Presidential Regulation No. 5/2006 (Regulation No. 5) which formally established Indonesia's National Energy Policy. Regulation No. 5 formalized the development of biofuels in Indonesia, to include ethanol and biodiesel, and established a five percent biofuel mandate

by 2025. According to the Regulation biofuel development, as well as other new and renewable energies¹, will help to diversify and secure energy supplies and support sustainable economic development.

In conjunction with Regulation No. 5, the Ministry of Energy and Mineral Resources (MEMR) issued Regulation No. 32/2008. This regulation established more detailed biofuel mandates through a progressive set of targeted biofuel mandates during the 2008-2025 timeframe.

BIOETHANOL (Minimum)						
Sector	2008	2009	2010	2015	2020	2025
Transportation, Public Service Obligation (PSO)	3% (Existing)	1%	3%	5%	10%	15%
Transportation, Non PSO	5% (Existing)	5%	7%	10%	12%	15%
Industry		5%	7%	10%	12%	15%

BIODIESEL (Minimum)						
Sector	2008	2009	2010	2015	2020	2025
Transportation, Public Service Obligation (PSO)	1% (Existing)	1%	2.5%	5%	10%	20%
Transportation, Non PSO		1%	3%	7%	10%	20%
Industry	2.5%	2.5%	5%	10%	15%	20%
Electricity	0.1%	0.25%	1%	10%	15%	20%

Notes: PSO stands for Public Service Obligation, it refers to subsidized fuels

The above table shows the biofuel mandate targets for several key Indonesian sectors to include transportation, industry, and electricity by 2025. Biodiesel consumption in the transportation sector (PSO) is expected to increase from a minimum of one percent in 2008 to a minimum of 20 percent of total fuel consumption in the sector by 2025.

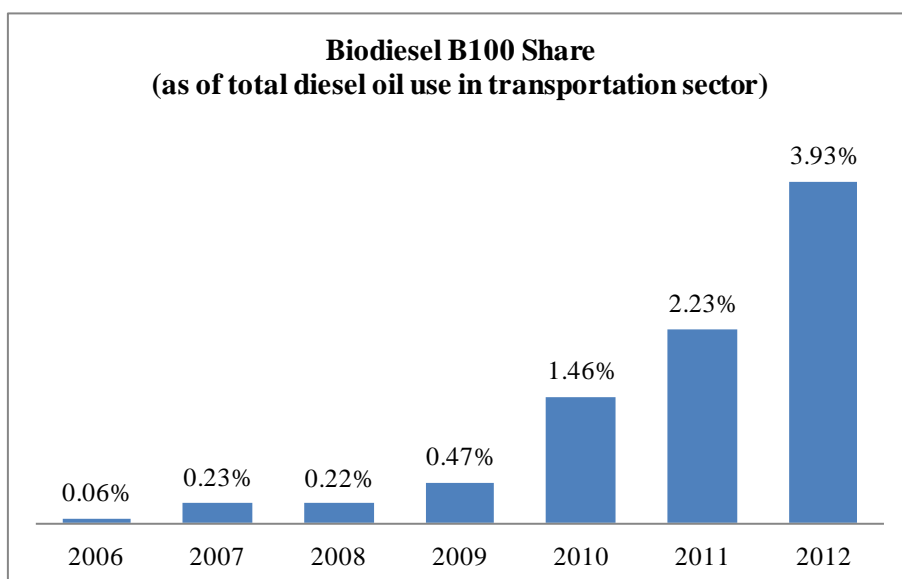
Within the framework of Regulation No. 32/2008, MEMR has included the following measures to increase biofuel use in the abovementioned key economic sectors

- In August 2010, MEMR established a Directorate General of New & Renewable Energy (DG EBTKE). One of the new DG's primary objectives is to develop strong Indonesian biofuel production and consumption.
- Updated biofuel price index to include: (1) transportation costs from producers to blending plants; and (2) new ethanol price benchmarks that better reflect domestic costs of producing ethanol.
- Increased biofuel subsidies from IDR 2,000 per liter to IDR 3,500 per liter in fiscal year (FY) 2012 and FY 2013.

¹ wind, solar, geothermal, coal-bed methane, hydrogen, liquefied and gasified coal, biomass, biogas, and nuclear.

- Increased blending rate for subsidized biodiesel from 5 percent to 7.5 percent in 2012. MEMR has proposed to parliament to further increase blending rate to 10 percent this year.
- MEMR required Indonesian gas retailers, to include PERTAMINA and foreign-operated gas stations such as Shell, Total, and PETRONAS, to blend PME with non-subsidized diesel fuel per May 1st, 2012. EBTKE may impose punitive actions for non-compliance, to include:
 - A written reprimand;
 - Suspension of operating license for three months; and
 - Revocation of operating license
- Indonesian coal and mineral mining companies are required to use two percent of biofuels in their total fuel consumption as of July 1, 2012.

The aforementioned requirements have progressed, particularly in the transportation sector, which has been the most significant in creating demand for Indonesian biodiesel since 2006. Biodiesel contribution to total diesel oil use in transportation sector increased significantly from 0.06 percent in 2006 to 3.93 percent in 2012. Conversely, biodiesel consumption in the electric and industrial sectors remains nearly nonexistent.



Source: MEMR (recalculated)

Fuel Use Projections (Million Kilo Liters)									
Calendar Year	2015	2016	2017	2018	2019	2020	2021	2022	2023
Gasoline Total	36.04	38.20	40.49	42.92	45.50	48.23	51.12	54.19	57.44
Diesel Total	28.13	29.42	30.83	32.34	33.93	35.64	37.46	39.40	41.48
On-road (Transportation)	20.61	21.95	23.38	24.90	26.51	28.24	30.07	32.03	34.11
Agriculture	NA	NA	NA	NA	NA	NA	NA	NA	NA
Construction/mining	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shipping/rail	NA	NA	NA	NA	NA	NA	NA	NA	NA
Industry	6.87	6.88	6.90	6.93	6.95	6.96	6.98	7.00	7.02
Heating	0.65	0.59	0.55	0.52	0.47	0.44	0.41	0.37	0.35
Jet Fuel Total	6.81	6.68	7.23	7.82	8.46	9.14	9.89	10.69	11.56
Total Fuel Markets	70.99	74.31	78.56	83.08	87.89	93.01	98.47	104.28	110.49

Source: Center for Energy and Mineral Resources Data and Information

Indonesian fuel consumption is projected to reach 93.01 million kiloliters by 2020, 52 percent of which

expected to be gasoline. Diesel oil consumption is expected to reach 35.64 million kiloliters during the same period. The transportation sector to include on-road, railway, and shipping is the consumer of diesel oil in Indonesia. A fuel use projection in the transportation sector, combined with mandatory biodiesel program, suggests that Indonesia could reach a target of biodiesel use at 5 percent of total diesel oil consumption in transportation sector by 2014.

Industrial diesel oil use is predicted to grow at a slower pace as industry is more diversified in terms of its energy sources, which include coal, gas, biomass, and briquette. Strong growth in Indonesian air transportation sector driven by newer low-cost air carriers will raise jet fuel use to 9.14 million kiloliters by 2020.

Indonesia currently has no sustainability criteria established for both ethanol and biodiesel. Biodiesel is a downstream industry for the Indonesian palm oil industry. The existing sustainability scheme called Indonesian Sustainable Palm Oil (ISPO) is applied to upstream sector of palm oil industry to include palm oil plantation and palm oil mill. ISPO features common sustainability criteria such as curbs on green house gas emissions, land use, biodiversity in the form of high conservation value, and labor.

III. Ethanol

Production

Indonesia has not produced fuel grade ethanol (FE) since 2010 due to a number of economic inefficiencies. Production costs associated with producing FE remains high due to the high costs of molasses. Molasses price is fluctuating within IDR 800,000 per metric tons during sugarcane harvest season to IDR 1,350,000 in off season. Molasses is a byproduct derived from sugarcane milling process. Indonesia is predicted to process 25.6 million metric tons of sugarcane in 2013 resulting in 1.28 MMT molasses this year. Domestic use of molasses is very competitive due to strong demand from feed, food, and agrochemical industry.

Production cost of FE ranges from IDR 7,000 – IDR 8,000 per liter². However, the current FE price formula (Argus Ethanol Price FOB. Thailand x 1.05) does not sufficiently cover production costs. Argus ethanol price fluctuates within US\$ 850 – 920 per metric ton. FE producers, therefore, have to sell their products at IDR 6,750 – IDR 7,300 per liter³. FE producers have proposed a new FE price formula that raises multiplication factor from 1.05 to 1.32. This new formula would increase FE's selling price to more profitable level at IDR 8,500 – IDR 9,200 per liter. Prolonged discussion among members of the Indonesian House of Representatives, MEMR, and Minister of Finance has delayed the implementation of new FE price formula.

Consumption

Consumer goods manufacturers to include pharmacy, food, cosmetics, and cigarette as well as chemical solvent producers have become the main consumers of industrial grade ethanol (IE) in Indonesia. IE consumption is increasing organically due to mature demand from the abovementioned sectors.

Trade

² Excluding profit margin and delivery cost and based on financial audit conducted by Ministry of Finance in 2012

³ Calculation is based on the following assumptions: 1 metric ton is equal to 0.78 liter of ethanol and exchange rate of IDR 9,700/US\$.

IE exports dropped from 78 million liters in 2011 to 58 million liters in 2012. IE exports are expected to remain consistent at 60 million liters in 2013 and 2014.

Stock

IE stocks are predicted to stay constant at around 50 million liters within 2011-2013 timeframe.

Ethanol Used as Fuel and Other Industrial Chemicals (Million Liters)									
Calendar Year	2006	2007	2008	2009	2010	2011	2012	2013	2014
Beginning Stocks	10	29	38	38	50	47	36	47	50
Fuel Begin Stocks	0.05	0.30	1	0	0	0	0	0	0
Production	163	166	169	172	175	200	205	210	214
Fuel Production	0.3	1.0	1.2	1.7	0	0	0	0	0
Imports	0	2.6	0.06	0.06	0.17	0.60	0.13	0.15	0.15
Fuel Imports	0	0	0	0	0	0	0	0	0
Exports	30	33	45	32	46	78	58	60	60
Fuel Exports	0	0	0	0	0	0	0	0	0
Consumption	114	128	124	128	132	134	135	147	158
Fuel Consumption	0.05	0.66	1.81	1.26	0	0	0	0	0
Ending Stocks	29	38	38	50	47	36	47	50	47
Fuel Ending Stocks	0.30	0.64	0.03	0.49	0	0	0	0	0
Production Capacity									
Number of Refineries	15	15	19	20	20	20	20	20	20
Nameplate Capacity	219	235	465	495	513	513	513	573	573
Capacity Use (%)	75%	71%	36%	35%	34%	39%	40%	37%	37%
Co-product Production (1,000 MT)									
Co-product A									
Co-product B									
Feedstock Use (1,000 MT)									
Feedstock (Industry & Fuel Ethanol) - Molasses	664	675	688	698	711	813	832	852	872
Feedstock B									
Feedstock C									
Feedstock D									
Market Penetration (Liters - specify unit)									
Fuel Ethanol	0	1	2	1	0	0	0	0	0
Gasoline	16,449	17,500	19,470	21,389	23,062	25,392	28,240	31,000	34,000
Blend Rate (%)	0.000%	0.004%	0.009%	0.006%	0.0%	0.0%	0.0%	0.0%	0.0%

IV. Biodiesel

Production

In contrast with the stagnant condition of Indonesian FE, Indonesia's biodiesel sector maintained healthy growth in 2012. Biodiesel production increased from 1.575 billion liters in 2011 to 2.2 billion liters in 2012. The anti-dumping duties imposed by EC, however, may lead to lower levels of Indonesian biodiesel production in the future. Post predicts that in 2013, Indonesian biodiesel production will stay the same as 2012 at 2.2 billion liters. Should the EC find strong evidences that Indonesia subsidizes its biodiesel exports and moves to impose higher import duties on Indonesian biodiesel, 2014 production levels in that event would likely decrease.

Palm oil, jatropha oil, and coconut oil are domestically available feedstocks for Indonesian biodiesel production. Limited supplies of domestic coconut and jatropha oil make them less competitive when compared to palm oil. Moreover, a low oil extraction rate makes jatropha-based biodiesel uneconomical. Indonesian researchers are trying to increase the economic value of jatropha by breeding high yield varieties and increasing the value added of byproducts from the milling process such as jatropha meal and glycerol.

Consumption

Indonesian biodiesel consumption increased from 358 million liters in 2011 to 670 million liters in 2012 due to increased blending rates from 5 percent in 2011 to 7.5 percent in 2012 and the expansion of biodiesel distribution to East Kalimantan.

MEMR data shows that biodiesel consumption as of January – June 17, 2013 stood at almost 350 million liters. Should a blending rate of 10 percent be realized in the fourth quarter of 2013, Indonesian biodiesel consumption could reach 800 million liters in 2013 or equivalent to 53 percent of total FY 2013 subsidy allocation for biodiesel at 1.511 billion liters. A further increase to 1 billion liters in 2014 can be achieved by escalating biodiesel distribution to Sulawesi Island and other three provinces in Kalimantan Island.

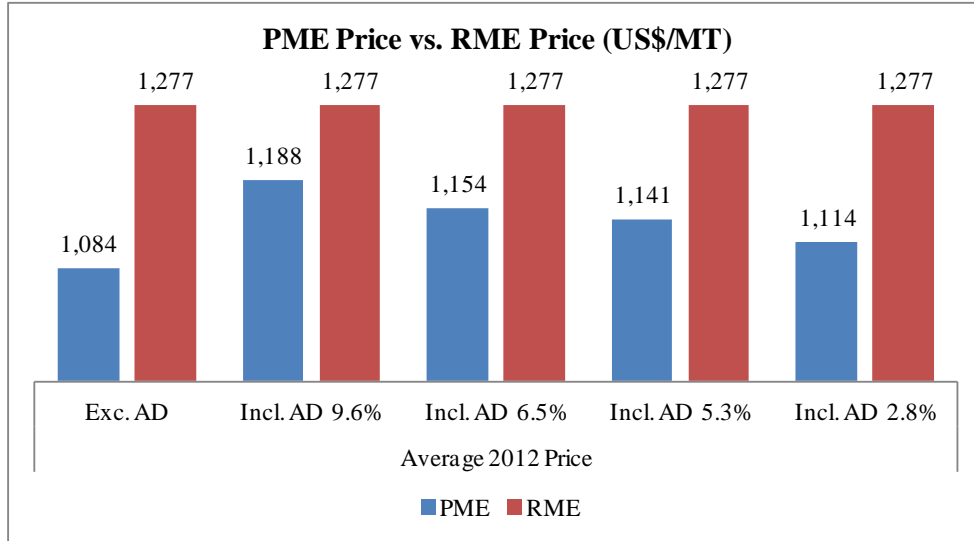
A major constraint that Indonesian biodiesel producers face in terms of distributing PME is the high costs of inter-island shipping. Producers have to spend additional shipping costs of \$60-120 per metric ton. Unfortunately, the current formula of PME's selling price to state-owned oil enterprises (PERTAMINA) is based on the CIF price. PME distribution to areas off Java tends to cut into the profit margins of Indonesian biodiesel producers due to higher shipping cost.

Trade

Indonesian biodiesel registered a strong export growth of 22 percent from 1.225 billion liters in 2011 to 1.5 billion liters in 2012. The European market accounts for approximately 88 percent of total Indonesian biodiesel exported by volume. The imposition of anti-dumping duties on Indonesian biodiesel by European Commission Within May – November 2013 timeframe, therefore, may lead to lower biodiesel export next year.

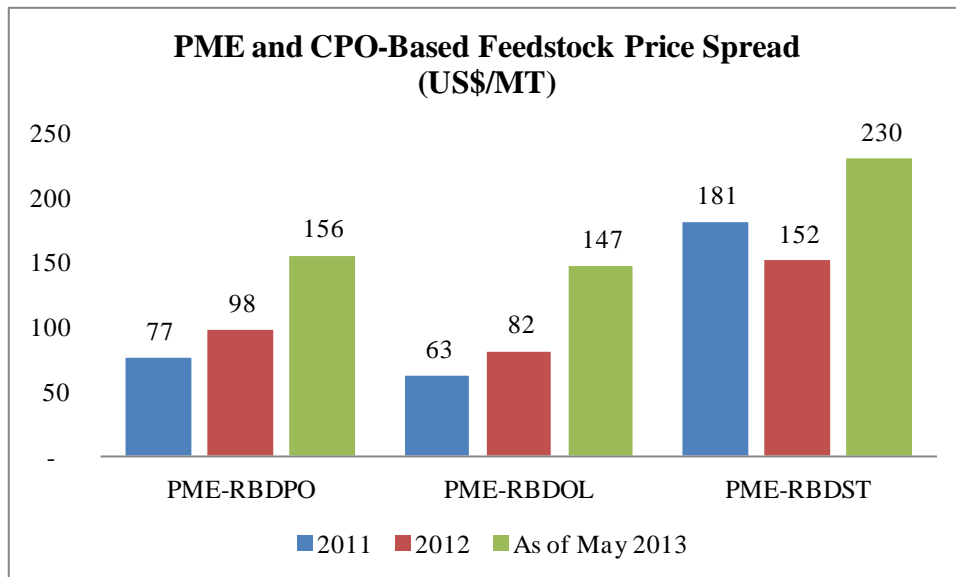
However, it is possible that Indonesian biodiesel exports to Europe would not necessarily experience a significant drop if the following played out:

- Rapeseed oil might be significantly higher than CPO and anti-dumping duties may not sufficient to make RME price as competitive as that of PME.
- The data shows that PME price was averagely 15 percent cheaper compared to that of RME in 2012. The EC's anti-dumping duties range from 0 percent to 9.6 percent, depending on the respective volumes of exports per Indonesian exporter. Exporters with larger export volume are subject to higher anti-dumping duties. The calculation shows that current anti-dumping duties imposed by EC may not sufficient enough to make RME cheaper than PME. Thus, European biodiesel blenders may not be incentivized to cut their PME purchase from Indonesia.



Source: Malaysian Palm Oil Board

- The trending down of CPO prices make Indonesian biodiesel producers enjoy cheaper CPO-based feedstock prices that account for 87 percent of total production cost.



Source: Malaysian Palm Oil Board

The above chart shows the price spread between PME and its CPO-based feedstock to include Refined Bleached Deodorized Palm Oil (RBDPO), RBD Olein (RBDOL), and RBD Stearin (RBDST) has been on the uptrend since 2011. With the current PME-CPO-based feedstock price spread at US\$147-US\$230 per metric tons, Indonesian PME producers have enough room to provide price discount that can compensate an anti-dumping duty of €24.00 to €83.84 per metric ton. Indonesian PME price, therefore, is still possible to stay attractive in European market.

The European Biodiesel Board is aware that abovementioned factors could make current anti-dumping duties ineffective to protect their members. EBB considers the level of anti-dumping duties provisional

duties imposed on Indonesian PME are still below total loss of European biodiesel industry that has been defined at 27.1 percent. EBB encourages EC to impose higher duties that covers both anti-dumping and anti-subsidy measures.

Stocks

Ending stocks are expected to register significant increase to 160 million liters in 2013 due to weaker export volume and below-target domestic consumption. Post believes that a 2013 market situation will make Indonesian PME producers scale their production down in 2014. Ending stocks, therefore, will drop to 60 million liters next year.

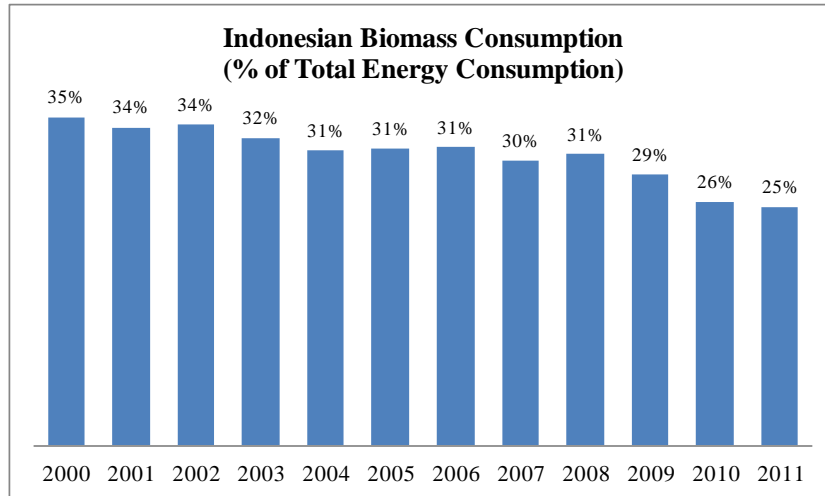
Biodiesel (Mil Liters)									
Calendar Year	2006	2007	2008	2009	2010	2011	2012	2013	2014
Beginning Stocks	0	27	18	15	81	38	30	60	160
Production	65	270	630	330	740	1,575	2,200	2,200	2,000
Imports	0	0	0	0	0	0	0	0	0
Exports	33	257	610	204	563	1,225	1,500	1,300	1,100
Consumption	5	22	23	60	220	358	670	800	1,000
Ending Stocks	27	18	15	81	38	30	60	160	60
Production Capacity									
Number of Biorefineries	2	7	14	20	22	22	26	26	26
Nameplate Capacity	215	1,709	3,138	3,528	3,936	3,936	4,280	4,280	4,280
Capacity Use (%)	30.2%	15.8%	20.1%	9.4%	18.8%	40.0%	51.4%	51.4%	46.7%
Feedstock Use (1,000 MT)									
Feedstock (CPO-Based)	64	265	619	324	727	1,548	2,162	2,162	1,966
Feedstock B									
Feedstock C									
Feedstock D									
Market Penetration (Million Liters)									
Biodiesel, on-road use	5	22	23	60	220	358	670	800	1,000
Diesel, on-road use	9,039	9,370	10,282	12,717	15,065	16,021	17,063	18,172	19,353
Blend Rate (%)	0.1%	0.2%	0.2%	0.5%	1.5%	2.2%	3.9%	4.4%	5.2%
Diesel, total use	28,131	29,421	30,830	32,342	33,932	35,636	37,464	39,401	41,484

V. Advanced Biofuels

Indonesian Science Institute (LIPI) is doing research to produce second generation ethanol that uses non-food feedstocks. Production cost of Indonesia's first generation ethanol is still very expensive due to feedstocks that come from food products with high economic value i.e. cassavas and sugarcanes. LIPI sees that oil palm stems can be used as ethanol feedstock. Oil palm stems is expected to become cheap feedstock due to their ample supply. The problem, however, come from availability of enzyme needed in the fermentation process. Price of enzyme is expensive and it cannot be produced locally.

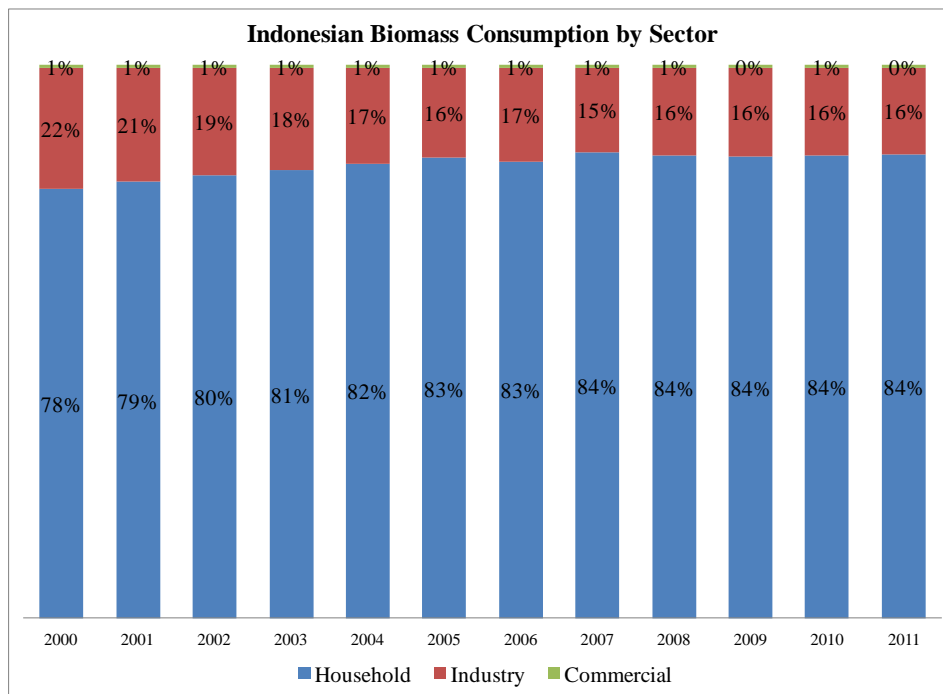
VII. Biomass for Heat and Power

Indonesian biomass consumption grew at a mild rate of 0.33 percent within 2000-2011 timeframe. Its contribution to total Indonesian energy mix, however, had been steadily decline from 35 percent to 25 percent in the same timeframe.



Source: Indonesian Energy Handbook 2012

Household, industry, and commercial are three sectors that use biomass as an energy source. Household is the largest biomass user at approximately 84 percent of total biomass consumption. Firewood, forest and agricultural waste are the most common type of biomass used by Indonesian household.



Source: Indonesian Energy Handbook 2012

Wood pellets are not currently used in Indonesia as a biofuel feedstock. However, a South Korean company called SL Agro will start producing wood pellets by August 2013. Its factory is located in South Kalimantan will produce up to 30,000 metric tons of wood pellet per year. SL Agro's production capacity is expected to reach 300,000 metric tons of wood pellet by 2015. All of SL Agro production will be exported to South Korea, and wood pellet demand from this country will reach 5 million tons per year by 2020.

VII. Notes on Statistical Data

- Crude Palm Oil to Fatty Acid Methyl Ester (FAME) conversion rate: one metric ton of palm oil is equal to 1,087 liters of palm oil, and the yield of Fatty Acid Methyl Ester (FAME) from a kilogram of CPO ranges from 83.3 to 93.5 percent. The conversion rate suggests that one metric ton of CPO can produce 905-1,016 liters of FAME. Further references on FAME yield can be read at <http://scialert.net/fulltext/?doi=jas.2009.3166.3170> and http://eprints.usm.my/13217/1/palm_oil_as_feedstocks.pdf.
- Molasses is the major feedstock to produce FE and IE in Indonesia. One metric ton of molasses yields 246 liters of FE/IE. Annual molasses production in Indonesia tends to fluctuate, depending on sugarcane production (please see the table below).

Calendar Year	Production (1000 MT)	
	Sugarcane	Molasses
2006	29,167	1,458
2007	25,676	1,284
2008	28,571	1,429
2009	25,346	1,267
2010	25,132	1,257
2011	24,000	1,200
2012	25,900	1,295
2013	26,700	1,335

Source: Post and USDA