

USDA Foreign Agricultural Service

# GAIN Report

Global Agricultural Information Network

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## **Indonesia**

## **Biofuels Annual**

**2012**

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## **Report Highlights:**

- Indonesian biodiesel production increased significantly (781 million liters) to 1.52 billion liters in 2011. Post predicts a further increase to 1.8 billion liters in 2012 and 2.2 billion liters in 2013.
- Consumption of biodiesel will increase by 196 million liters to 500 million liters in 2012. Post predicts an additional increase in consumption to 700 million liters in 2013.
- Indonesian biodiesel export increases very significantly by almost 117 percent from 563 million liters in 2010 to 1,225 million liters in 2011. Indonesian biodiesel exports could increase to 1.3 billion liters in 2012 and 1.5 billion liters in 2013.

## **Post:**

Jakarta

## **Executive Summary:**

Indonesian biodiesel production increased significantly (781 million liters) to 1.52 billion liters in 2011. Domestic users consumed 10 percent of the increased biodiesel production, with almost 90 percent of the biodiesel going to overseas markets. The Ministry of Energy and Mineral Resources' Directorate General of New and Renewable Energy and Energy Conservation (EBTKE), in conjunction with Indonesia's largest state-owned oil company, PERTAMINA, are enforcing some mandatory Indonesian biodiesel consumption. Initiatives such as these are expected to further increase consumption of biodiesel by 196 million liters to 500 million liters in 2012. Post predicts an additional increase in consumption to 700 million liters in 2013.

The EBTKE has developed a new formula to determine biofuel prices, which establishes a baseline of what Indonesian biofuel producers must achieve to be profitable. The new formula is expected to revitalize Indonesia's ethanol program, which has essentially been dormant since 2010. EBTKE also expects that the formula will create a baseline price for biodiesel, which they hope will increase production by making biodiesel more profitable. The new formula is still waiting for a final approval from Minister of Finance.

Indonesian biodiesel export increases very significantly by almost 117 percent from 563 million liters in 2010 to 1,225 million liters in 2011. Europe has become a single largest market for Indonesia, and Indonesia's market penetration in the region is trending up from 9 percent in 2008 to 39 percent of total European biodiesel import in 2011.

## **Policy and Programs:**

- EBTKE is enforcing some mandatory requirements with the objective of increasing domestic biofuel consumption in Indonesia.
  - Indonesian gas retailers, to include PERTAMINA and foreign-operated gas stations such as Shell, Total, and PETRONAS, have been required to sell non-subsidized biofuels since May 1<sup>st</sup>, 2012. EBTKE may impose punitive actions for non-compliance, to include:
    1. A written reprimand;
    2. Suspension of operating license for three months; and
    3. Revocation of operating license
  - Indonesian coal and mineral mining companies are required to consume two percent of biofuels in their total fuel consumption as of July 1, 2012.
- PERTAMINA has increased its blending rate for subsidized biodiesel from five to 7.5 percent as of February 15, 2012.
- The Indonesian Ministry of Energy and Mineral Resources (MEMR) and Parliament reached an agreement to provide biofuel subsidies at 3,000 rupiah per liter for biodiesel, and 3,500 rupiah per liter for ethanol in 2013.
- EBTKE releases new biofuel price formula that will enable Indonesian biofuel producers to maintain positive margin. The new formula is expected to provide enhanced economic incentives for Fuel Ethanol (FE) producers. Indonesian producers are not currently supplying FE to PERTAMINA as of 2010, due to their inability to make a profit. The new biofuel price formula still requires official approval from Minister of Finance (MOF)
- In exchange for receiving subsidy all biofuel companies will allow the MOF to audit the financial their statements.

The GOI expects that these initiatives will further enhance biodiesel consumption and production in Indonesia. Whether the measures will result in positive progress in Indonesian ethanol program remains questionable. If the MOF approves the new biofuel price formula by the end of this year, the industry can produce 20-30 million liters of FE in 2013. Post believes that production and consumption of FE will not increase in 2013 due to the uncertainty of the MOF's pending approval.

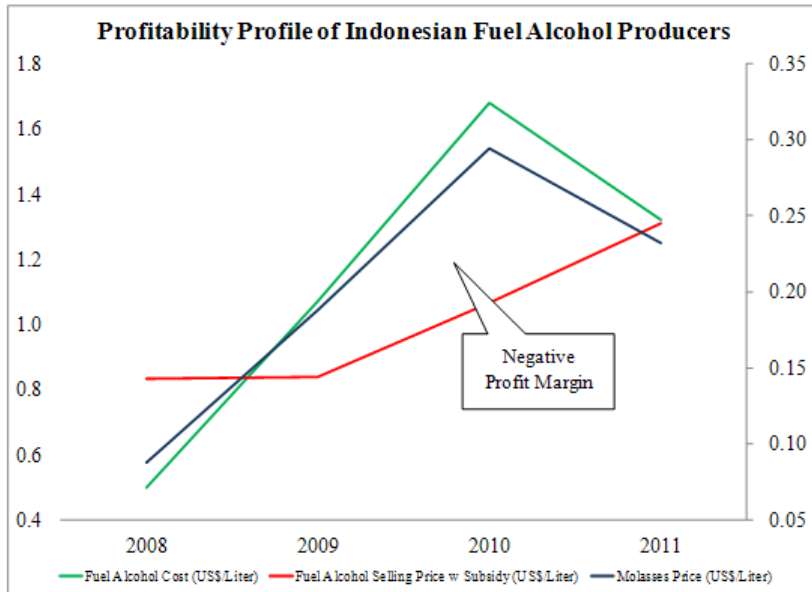
## **Ethanol and Biodiesel**

### **Production**

Indonesia has not produced FE since 2010 due to economical inefficiencies. Production costs associated with producing FE has continued to rise since 2009 due to the increasing price of molasses,

the primary Indonesian ethanol feedstock. Consequently, domestic FE producers have terminated their production since 2010. Domestic FE prices and the GOI's ethanol subsidy of IDR 2,000 per liter are not enough to keep producers' margins positive.

The new EBTKE biofuel price formula takes into account the fluctuation of feedstock price, to include palm oil and molasses. Thus, the new formula will enable Indonesian FE and Fatty Acid Methyl Ester (FAME) producers to be more profitable, as they will benefit from a price that can compensate both production cost and required profit margin.



Source: Post's estimation

In contrast with the stagnant condition of Indonesian ethanol, Indonesia's biodiesel sector exhibited strong growth in 2011. Biodiesel production increased from 740 million liters in 2010 to 1.52 billion liters in 2011. An expected increase in Indonesia's domestic processing capacity in 2012, (up to 4.28 billion liters in 2012) as well as strong demand from Europe has contributed to higher biodiesel production. Post predicts that Indonesian biodiesel production will increase to 1.8 billion liters in 2012. Post further predicts that production will continue to expand to 2.2 billion liters in 2013.

Palm oil, jatropha oil, and coconut oil are domestically available feedstocks for Indonesian biodiesel producers. Limited supplies of domestic coconut and jatropha oil make them less competitive 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.

In 2006 the Indonesian Agency for Agricultural Research and Development released high yield variety of jatropha that can produce five tons of dry seed per hectare. The Surfactant and Bioenergy Research Center at the Bogor Agriculture University has developed Jatropha glycerol as a component of Coal Dust Suppressant formula which is necessary to prevent coal dust air pollution. These products, however, are not ready for commercialization.

### *Ethanol Used as Other Industrial Chemicals:*

Industrial ethanol production is increasing organically due to growth in both domestic and overseas markets. The production-to-plant capacity ratio now stands at 90 percent and the industry requires new investment to expand its capacity.

Molindo Raya Industrial, one of Indonesian major ethanol producers, plans to start work on a 55 million liter per year ethanol plant in 2012, following the recent acquisition of land for the project. The plant will procure molasses feedstock from nearby sugar mills, and when completed in 2013, it would potentially double Molindo's ethanol production capacity and raise national production capacity to 300 million liters.

### **Consumption**

Indonesian biodiesel consumption increased from 220 million liters in 2010 to 304 million liters in 2011. Transportation has become the only sector that drives biodiesel consumption in Indonesia. The following policies of EBTKE, combined with support from PERTAMINA, are expected to increase Indonesian biodiesel consumption to 500 million liters in 2012.

- PERTAMINA's initiative of increasing biodiesel blending rate from 5 to 7.5 percent since mid February this year, and its planning to expand distribution outlets of biodiesel in West Kalimantan province by August 2012 will raise biodiesel consumption in transportation sector by approximately 165 million liters in 2012.
- The obligation of coal and mineral mining companies to achieve 2 percent of biofuel in the sector's fuel mix would increase Indonesian biodiesel consumption by 25 million liters this year.
- The blending of biodiesel has been limited to subsidized Automotive Diesel Oil (ADO). EBTKE, however, has made the blending of biodiesel with non-subsidized ADO mandatory since May 1<sup>st</sup>, 2012. This policy will potentially raise Indonesian biodiesel consumption by 6 million liters this year.

Biodiesel consumption will further increase to 700 million liters in 2013 as EBTKE will continue to expand biodiesel consumption to non-transportation sectors. PERTAMINA is also expected to escalate its biodiesel distribution outlets in other provinces of Kalimantan and Sulawesi.

### **Trade**

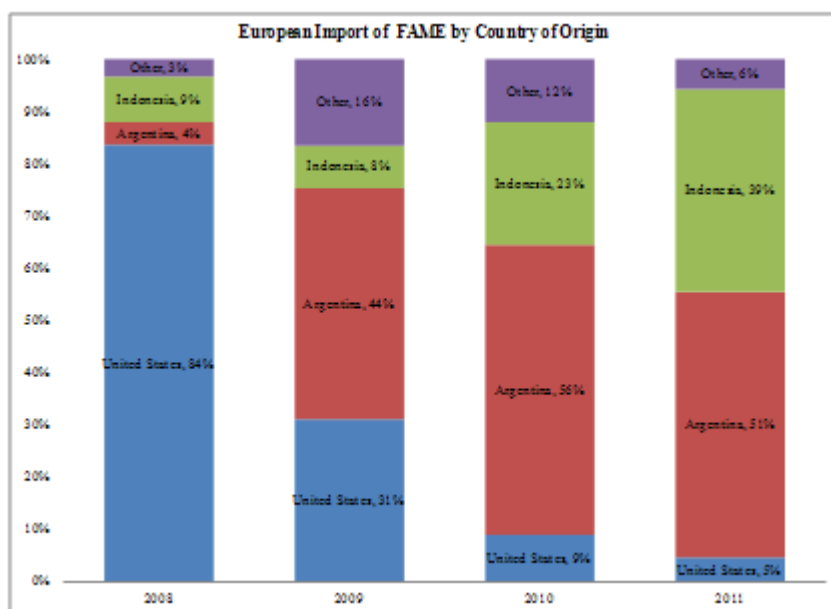
Current growth of domestic biodiesel consumption is slow and therefore, Indonesia's biodiesel producers have a strong incentive to export. A certainty to earn positive margin from overseas market is the other factor that make biofuel producers more export-oriented. Post's simple calculation shows that in the absence of subsidy, domestic biodiesel price is unable to provide positive margin to producers. Biodiesel subsidy policies plays important role to keep the producers supplying biodiesel to PERTAMINA at profitable price. The existence of subsidy, however, is uncertain as it depends on whether the parliament has strong political will to maintain the supports to biofuel program.

*An Estimated Profit Margin Profile of Indonesia FAME Producers*

	2010 (US\$/Liter)	2011 (US\$/Liter)
Production Cost	1.07	1.31
Domestic Purchase Price ( <i>based on Indonesian Biofuel Price Index Formula</i> )	0.88	1.16
Profit Margin w/o Subsidy	-0.19	-0.15
Profit Margin w/ Subsidy	0.03	0.07
Export Price	1.08	1.38
Profit Margin from Export	0.01	0.07

Source: Post's estimation

On the other hand, better price in international market provide a guarantee for Indonesian biodiesel producers to keep enjoying positive margin. Consequently, the producers pay more efforts to expand their biodiesel's overseas market.



Source: Eurostat (recalculated)

Indonesian biodiesel export increases very significantly by almost 117 percent from 563 million liters in 2010 to 1,225 million liters in 2011. Europe has become a single largest market for Indonesia, and Indonesia's market penetration in the region is trending up from 9 percent in 2008 to 39 percent of total European biodiesel import in 2011. There were several factors contributing to sound performance of Indonesian biodiesel export to Europe in 2010 and 2011.

- A poor European rapeseed crop results in lower supply of rapeseed oil-based biodiesel. The USDA predicts that European rapeseed production will decline from 20.76 million metric tons (MMT) in MY 2010/2011 to 19.13 MMT in MY 2011/2012. USDA also predicts a further decrease in production to 18 MMT in MY 2012/2013.
- Abundant Indonesian palm oil supply and Differential Export Tax policy on palm oil products make prices for palm oil-based biodiesel more attractive.

- Big major producers, control nearly 85 percent of total installed capacity, play a dominant role in the exportation of Indonesian biodiesel. Those producers are able to arrange long-term business contract with European biodiesel blenders as they have been able to qualify International Sustainability & Carbon Certification (ISCC), one out of seven voluntary sustainable schemes in Europe.
- The implementation of countervailing and anti-dumping duties by the European Union (EU) on U.S.-origin biodiesel, or re-exports from the U.S. to the EU may provide opportunities for Indonesia and Argentina, the only two producers with large exportable supplies, to increase biodiesel export to Europe.
- The Indonesian palm oil export tax structure gives Indonesian biodiesel refiners access to a large supply of palm oil feedstock at cheaper price over Malaysian biodiesel producers. Consequently, Indonesia is taking over Malaysia's palm oil-based biodiesel market share in Europe, due to more competitive prices.

Provided the same factors continue through the near term, Indonesian biodiesel exports could increase to 1.3 billion liters in 2012 and 1.5 billion liters in 2013. Indonesian biodiesel export may experience less impressive performance due to the following possible obstacles.

- The imposition of non-preferential import duty on biodiesel. The European Biodiesel Board (EBB) has been actively encouraging European Commission (EC) to impose non-preferential import duty on biodiesel products from the countries that adopt differential export tax policy to include Argentina and Indonesia.
- The Government of Malaysia is considering a plan to reform their palm oil tax structure, along the lines of Indonesia's. They may also increase the export tax for CPO to a sufficient level such that the cost of FAME manufacture in Malaysia becomes competitive with Indonesian FAME.

## **Ending Stock**

Post predicts a constant annual ending stock of biodiesel at approximately 29 million liters. Predictable domestic consumption growth and identifiable future export development will allow Indonesian biodiesel producers to run better production planning that result in stable inventory level.

Domestic consumption is relatively predictable as it is policy-driven growth. Future export development is identifiable as it depends on producers' efforts to qualify European's biofuel sustainability criteria, European rapeseed production situation, the success of EBB to have EC impose import duty on Indonesian biodiesel, and the progress of both Malaysian palm oil export tax reform and US-EU trade negotiation with regard to countervailing and anti dumping duties on US biodiesel.

## **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](http://eprints.usm.my/13217/1/palm_oil_as_feedstocks.pdf).

- Molasses is the major feedstock to produce fuel ethanol in Indonesia. One metric ton of molasses yields 246 liters of fuel ethanol. Annual molasses production in Indonesia tends to fluctuate, depending on sugarcane production and cane sugar content (recovery rate).

Year	Sugarcane for Centrifugal	Recovery Rate	Cane sugar	Molasses
2006	29,167	7.2	2,100	1,313
2007	25,676	7.4	1,900	1,155
2008	28,571	7.0	2,000	1,286
2009	25,346	8.1	2,053	1,141
2010	25,132	7.6	1,910	1,131
2011	27,231	6.5	1,770	1,225
2012	26,143	7.0	1,830	1,176

Note: in 1,000 MT but Recovery Rate in Percentage

<b>Ethanol Used as Other Industrial Chemicals (Mil. Liters)</b>								
Calendar Year	2006	2007	2008	2009	2010	2011	2012	2013
Production	163	165	168	170	175	200	220	230
Imports	0	2.60	0.11	0.11	0.23	0.62	0.8	1
Exports	33	35	47	34	50	81	85	90
Consumption	114	128	124	128	132	134	135	138
Ending Stocks	16	21	18	27	20	6	7	10
<b>Production Capacity</b>								
Capacity (Mil. Liters)	209	222	222	222	245	245	245	300
Capacity Use (%)	78%	74%	76%	77%	71%	82%	90%	77%

Source: Trade data (GTIS); Production, Consumption and Ending Stock (Post's estimation based on interview with Indonesian leading ethanol producers and relevant literatures)



<b>Fuel Ethanol - Conventional &amp; Advanced Fuels (Mil. Liters)</b>								
Calendar Year	2006	2007	2008	2009	2010	2011	2012	2013
<b>Production, Total</b>	0.30	1.00	1.20	1.72	0	0	0	0
Advanced Only								
<b>Imports</b>	0	0	0	0	0	0	0	0
<b>Exports</b>	0	0	0	0	0	0	0	0
<b>Consumption</b>	0.05	0.66	1.81	1.26	0	0	0	0
<b>Ending Stocks</b>	0.25	0.59	0.07	0.61	0	0	0	0
<b>Production Capacity - Conventional</b>								
No. of Biorefineries	1	1	4	5	5	5	5	5
Capacity (Mil. Liters)	10	13	243	273	273	273	273	273
Capacity Use (%)	3%	8%	0%	1%	0%	0%	0%	0%
<b>Production Capacity - Advanced</b>								
No. of Biorefineries								
Capacity (Mil. Liters)								
Capacity Use (%)	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
<b>Co-product Production - Conventional only (1,000 MT)</b>								
Product Y								
Product Z								
<b>Feedstock Use - Conventional (1,000 MT)</b>								
Feedstock A (Molasses)	1	4	5	7	0	0	0	0
Feedstock B								
Feedstock C								
Feedstock D								
<b>Feedstock Use - Advanced (1,000 MT)</b>								
Feedstock A								
Feedstock B								
Feedstock C								
Feedstock D								

Source: Indonesian Biofuel Producers Association (APROBI) and State-owned Oil Company (PERTAMINA)

<b>Biodiesel - Conventional &amp; Advanced Fuels (Mil. Liters)</b>								
Calendar Year	2006	2007	2008	2009	2010	2011	2012	2013
<b>Production, Total</b>	65	270	630	330	740	1,520	1,800	2,200
Advanced Only	0	0	0	0	0	0	0	0
<b>Imports</b>	0	0	0	0	0	0	0	0
<b>Exports</b>	33	257	610	204	563	1,225	1,300	1,500
<b>Consumption</b>	5	22	23	60	220	304	500	700
<b>Ending Stocks</b>	27	18	15	81	38	29	29	29
<b>Production Capacity - Conventional</b>								
No. of Biorefineries	2	7	14	20	22	22	26	26
Capacity (Mil. Liters)	215	1,709	3,138	3,528	3,936	3,936	4,280	4,280
Capacity Use (%)	30%	16%	20%	9%	19%	39%	42%	51%
<b>Production Capacity - Advanced</b>								
No. of Biorefineries								
Capacity (Mil. Liters)								
Capacity Use (%)	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
<b>Feedstock Use - Conventional (1,000 MT)</b>								
Feedstock A (CPO)	64	265	619	324	727	1,494	1,769	2,162
Feedstock B								
Feedstock C								
Feedstock D								
<b>Feedstock Use - Advanced (1,000 MT)</b>								
Feedstock A								
Feedstock B								
Feedstock C								
Feedstock D								

Source: Trade data (USDA and EU Statistic); Consumption (APROBI and PERTAMINA); Production and Ending Stock (APROBI and Post's Estimation)