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# Indonesia

# Biofuels Annual

# 2011

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**Report Highlights:**

- Indonesian bioethanol program has been terminated since 2010 due to disagreement in market price index formulation between Ministry of Energy and Mineral Resources and FE producers.
- Indonesian biodiesel production is predicted to significantly increase from 455 million liters in 2010 to 650 million liters in 2011.
- Indonesian Jatropha biodiesel is still in research stage, although some limited pilot projects have occurred.

**Post:**
Jakarta

**Policy and Program:**

- The Indonesian Ministry of Energy and Mineral Resources (MEMR) and Parliament reached an agreement to increase biofuel subsidies in fiscal year 2012. The subsidy will be raised from 2,000 Indonesian rupiah (IDR) per liter to 2,500 – 3,000 IDR per liter for biodiesel and 3,000 – 3,500 IDR per liter for ethanol.

- The Directorate General of New & Renewable Energy & Energy Conservation (EBTKE) of MEMR is planning to implement the following new policies and action plans to boost Indonesian biofuel growth:

    1. Reformulation of biofuel price index to include (1) transportation costs from producers to blending plants; and (2) new ethanol price benchmarks that better reflects domestic costs of producing ethanol.

    2. Provide Incentives for feedstock (palm oil, cassava, and molasses) suppliers who prioritize raw material supplies to domestic biofuel producers.

    3. The authority to issue export recommendation letters for biofuel producers will be shifted from Directorate General of Oil and Gas to EBTKE.

    4. EBTKE, in coordination with Indonesia's state owned oil company, Pertamina, will expedite a mandatory biofuel schedule outside Java and Bali. Pertamina will allocate 58.5 billion IDR to establish biofuel infrastructure (storage tanks, pumps, pipelines, and flow meters) in Sumatra, Kalimantan, and Sulawesi.

    5. Encourage foreign-operated gas stations (Shell, Petronas, and Total) to actively participate in biofuel distribution. While this may help spur higher consumption and sectoral growth within Indonesia, the implementation is complicated by two major issues:

        - Biofuels are considered low return and risky, due to relatively low national demand. The situation discourages foreign oil companies to invest in biofuel business.

        - Disbursing biofuel subsidies to foreign oil companies is not socially and politically acceptable to Parliament and other opponents.

**Ethanol & Biodiesel:**

**Production**

Indonesia's Fuel Ethanol (FE) production is registering at zero level since 2010 due to disagreement in market price index formulation between MEMR and FE producers. Producers prefer leaving production facilities idle or producing industrial ethanol to selling FE to Pertamina at uneconomical prices. Consequently, since last year, Pertamina has not distributed any ethanol. MEMR formulates the FE market price index based on Thailand's monthly average ethanol prices, which are released by Argus Media. Indonesian ethanol producers are pushing the MEMR to revise the formula by adopting domestic FE price as a benchmark, rather than relying on Thai prices. Indonesian producers believe that the new formula would be one of the key factors to sustain Indonesia's ethanol program as it will produce more economically-accepted price index.

In contrast to ethanol, the Indonesian Biofuel Producers Association (APROBI) estimates that production of biodiesel will significantly increase from 455 million liters in 2010 to 650 million liters in 2011. The average utilization rate of subsidies over the last two years, however, conservatively suggests that the 2011 production may stand at 530 million liters. Post predicts that biodiesel production could reach as high as 700 million liters in 2012 thanks to possible stronger sales in outside Java-Bali area (Sumatra and Kalimantan) and higher subsidy budget in fiscal year 2012.

*Market for Ethanol Used as Other Industrial Chemicals:*

There are currently 13 companies producing industrial ethanol in Indonesia. The total capacity is registered at 244 million liters in 2010, and it is expected to stay constant within 2011-2012 periods. The four largest producers (Molindo, Medco, Indo Acidatama, and Sugar Group) control 75 percent of the total capacity.

Production of industrial ethanol has annually grown by three percent during the 2006 – 2010 timeframe. By assuming annual growth will stays consistent at three percent, production of industrial ethanol will reach 194 million liters in 2011 and 200 million liters in 2012. Domestic industrial users consume more than 70 percent of total industrial ethanol produced in Indonesia. Exports of industrial ethanol have grown annually by almost nine percent within 2006 – 2010 periods. Exports are predicted to reach 43 million liters in 2011 and 48 million liters in 2012 respectively.

The demand growth for industrial ethanol from domestic and export markets, in combination with stagnant fuel oriented ethanol programs, may provide economic incentives for FE producers to produce industrial ethanol. The industry, therefore, may have additional capacity of 272 million liters due to conversion from fuel to industrial ethanol plant.

*Jatropha Biodiesel:*

Indonesian Jatropha biodiesel is still in research stage, although some limited pilot projects have

occurred. Plant up-scaling and product commercialization of Jatropha-based biodiesel is still constrained by the following inhibiting factors:

- Low productivity of Jatropha crops:

  Farmers can only produce 300 kilogram dry jatropha beans per Ha. Jatropha, so far, is considered as a marginal crop in Indonesia. Consequently, there are no certified or good quality Jatropha seeds that can provide better yields and higher oil extraction rates. Also, current varieties are susceptible to pests and plant diseases.

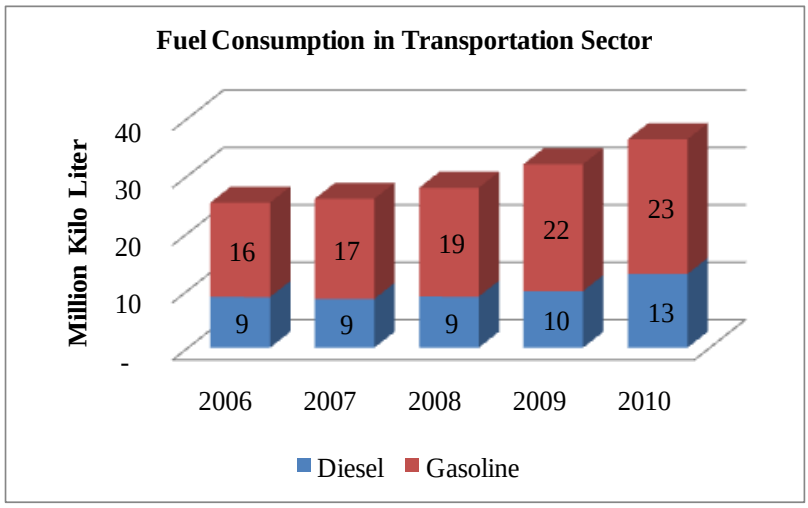
- Higher feedstock costs:

  Feedstock costs associated with producing jatropha oil are relatively higher than that of palm oil due to low productivity and low oil extraction rate of jatropha crops.

  Producers need to procure four kilograms of dry jatropha beans to produce one liter of jatropha oil. One kilogram of dry jatropha beans is priced at 2,000 IDR. The feedstock cost therefore is roughly 8,000 IDR per liter of jatropha oil. Conversely one liter of palm oil is extracted from 4.55 kilogram of palm's fresh fruit bunch which is priced at 1,100 IDR/Kg. The number suggests that feedstock costs associated with palm-oil based biodiesel at 5,000 IDR per liter are significantly cheaper than that of jatropha biodiesel.

**Consumption**

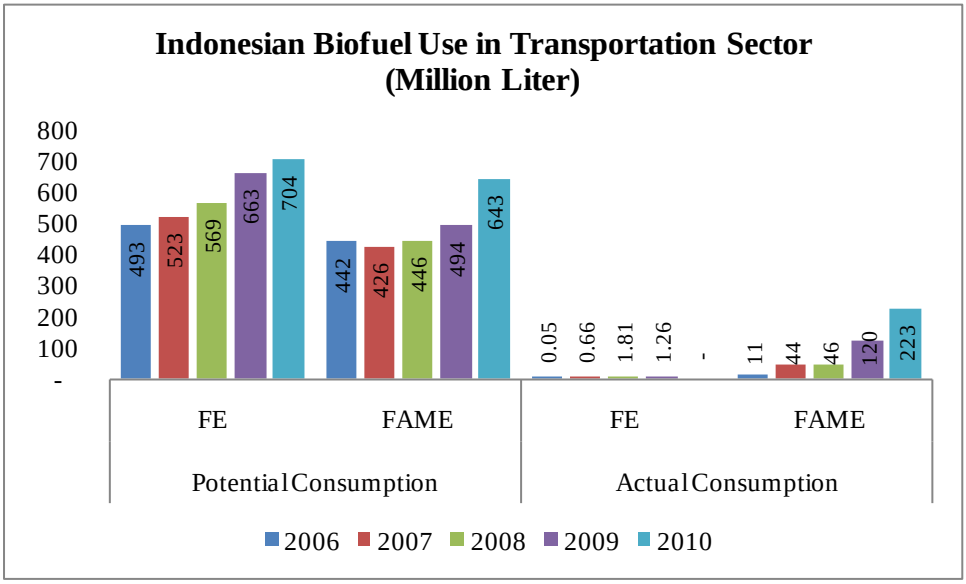
Biofuel consumption figures in Indonesia are derived from total biopremium, biopertamax, and biosolar that have been distributed by Pertamina as a sole biofuel distributor. Pertamina blends diesel oil with five percent Fatty Acid Methyl Ester (FAME) to produce biodiesel. Ethanol is produced by blending 1-3 percent of FE with gasoline.




*Source: Handbook of Energy of Indonesia 2010*

The Indonesian transportation sector consumed 36 million kiloliters of fuels in 2010. Gasoline took the largest share at 65 percent. The remaining 35 percent was taken by diesel oil. Fuels consumption data in the transportation sector suggests that Pertamina can potentially procure 704 million liters of FE (at

three percent blending rate) and 643 million liters of FAME (at five percent blending rate) in 2010.




*Source: Handbook of Energy 2010*
*Notes: potential consumption is equal to blending rate multiplied by gasoline/diesel oil consumption.*

Historical consumption data, while trending up for FAME, illustrates that actual FAME consumption level is still low at 35 percent of its potential level in 2010. Potential FE consumption is even untapped since 2010 due to interruption in national ethanol program.

**Trade**

MEMR restricts exportation of FE and FAME to secure supplies to Pertamina. Biofuel producers, however, are temporarily permitted to export their products due to limited domestic market absorption. Indonesia's current export capacity of FAME stands at about three billion liters.

Indonesia registered higher FAME exports in 2010 at 235 million liters compared to that of 200 million liters in 2009. Netherland, Italy, and Spain account for more than 80 percent of the Indonesian FAME exports. Although palm oil-based biodiesel cannot meet the European Union's minimum carbon saving rate at 39 percent, as is currently required under the Renewable Energy Directive (RED), the European market for Indonesian FAME market remains steady. From the beginning of 2011, the European Commission has faced the challenge of getting all country members in the same page with regard to RED. As the consolidation process may take some years, APROBI believe that FAME exports to Europe will have room to grow to 250 million liters in 2011 and 300 million liters in 2012 respectively.

Indonesia is currently trying to explore potential for expanded growth in the U.S biodiesel market. These efforts are currently constrained by the absence of palm oil pathway, although the U.S. Environmental Protection Agency (EPA) has been actively working on a palm oil pathway as part of a supplemental analysis to the final rule of Renewable Fuel Standard 2 (RFS2). The EPA, however, has not yet determined the time frame for the completion of palm oil pathway.

The EPA's proposed pathway will be derived from the calculation of palm oil's lifecycle Green House Gases (GHG) emissions. Lifecycle GHG emissions are the aggregate quantity of GHGs related to the full fuel cycle, including all stages of fuel and feedstock production and distribution, from feedstock generation and extraction through distribution and delivery and use of the finished fuel.

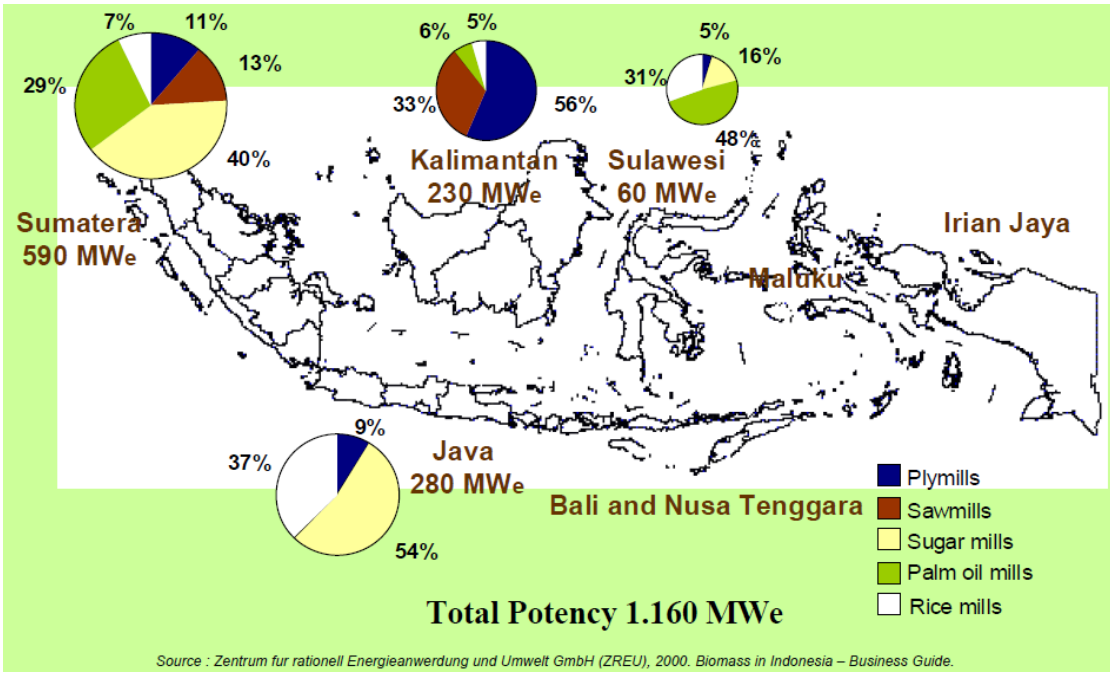
The lifecycle GHG emissions of palm oil biodiesel will be compared to the lifecycle GHG emissions for diesel oil sold and distributed as transportation fuel in 2005. Energy Independence and Security Act required a 20 percent reduction in lifecycle GHG emissions for any renewable fuel produced at new facilities (those constructed after enactment), a 50 percent reduction in order to be classified as biomass-based diesel or advanced biofuel, and a 60 percent reduction in order to be classified as cellulosic biofuel.

**Ending Stock**

Ending stock is predicted to be on the uptrend for the next two years due to possible slow growth of biofuel domestic consumption and export.

**Biomass for Heat & Power**

Indonesia can potentially generate 1,160 megawatts of electricity (MWe) by using biomass. Supplies of biomass come from plywood mills, sawmills, sugar mills, rice mills, and palm oil mills. Biomass supply from sugar and rice mills is dominant in Java as the island is major rice and sugar cane planting area. Sumatra Island can source 69 percent of its biomass supply from rice and palm oil mills. Kalimantan Island is well known for its large forestry resources. The island can potentially procure 89 percent of biomass supply from saw and plywood mills.




The actual utilization of biomass in the Indonesian electricity sector is still very limited. Any initiatives

to establish biomass power plants usually come from state owned plantation companies or national oil companies like Medco. They build biomass power plants at pilot plant scale to supply electricity for their own facilities, which are usually located in remote areas.

Data released by MEMR shows that biomass accounted for 22 percent of total Indonesian primary energy supply in 2009 at more than 279 million barrel oil equivalent. The utilization of biomass, however, is largely centralized in households for cooking and heating. It consumed nearly 84 percent of country's biomass supply in 2009.

| Biodiesel - Conventional & Advanced Fuels (Mil. Liters) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Calendar Year** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** |
| **Production, Total** | 24 | 35 | 110 | 350 | 455 | 650 | 700 |
| Advanced Only | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Imports** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Exports** | 42 | 0 | 0 | 200 | 235 | 250 | 300 |
| **Consumption** | 11 | 44 | 46 | 120 | 223 | 355 | 425 |
| **Ending Stocks** | 15 | 6 | 70 | 100 | 97 | 142 | 117 |
| **Production Capacity - Conventional** | | | | | | | |
| No. of Biorefineries | 2 | 7 | 14 | 20 | 22 | 22 | 22 |
| Capacity (Mil. Liters) | 215 | 1,709 | 3,138 | 3,528 | 3,936 | 3,936 | 3,936 |
| Capacity Use (%) | 11% | 2% | 4% | 10% | 12% | 17% | 18% |
| **Production Capacity - Advanced** | | | | | | | |
| No. of Biorefineries | | | | | | | |
| Capacity (Mil. Liters) | | | | | | | |
| Capacity Use (%) | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| **Feedstock Use - Conventional (1,000 MT)** | | | | | | | |
| Feedstock A (CPO) | 26 | 39 | 121 | 385 | 501 | 715 | 770 |
| Feedstock B | | | | | | | |
| Feedstock C | | | | | | | |
| Feedstock D | | | | | | | |
| **Feedstock Use - Advanced (1,000 MT)** | | | | | | | |
| Feedstock A | | | | | | | |
| Feedstock B | | | | | | | |
| Feedstock C | | | | | | | |
| Feedstock D | | | | | | | |

| Ethanol - Conventional & Advanced Fuels (Mil. Liters) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Calendar Year** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** |
| **Production, Total** | 0.30 | 1.00 | 1.20 | 1.72 | 0 | 0 | 0 |
| Advanced Only | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Imports** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Exports** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Consumption** | 0.05 | 0.66 | 1.81 | 1.26 | 0 | 0 | 0 |
| **Ending Stocks** | 0.25 | 0.59 | 0.07 | 0.61 | 0.00 | 0.00 | 0.00 |
| **Production Capacity - Conventional** | | | | | | | |
| No. of Biorefineries | 1 | 1 | 4 | 5 | 5 | 5 | 5 |
| Capacity (Mil. Liters) | 10 | 13 | 243 | 273 | 273 | 273 | 273 |
| Capacity Use (%) | 3% | 8% | 0% | 1% | 0% | 0% | 0% |
| **Production Capacity - Advanced** | | | | | | | |
| No. of Biorefineries | | | | | | | |
| Capacity (Mil. Liters) | | | | | | | |
| Capacity Use (%) | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| **Co-product Production - Conventional only (1,000 MT)** | | | | | | | |
| Product Y | | | | | | | |
| Product Z | | | | | | | |
| **Feedstock Use - Conventional (1,000 MT)** | | | | | | | |
| Feedstock A (Molasses) | 1.07 | 3.55 | 4.26 | 6.12 | 0 | 0 | 0 |
| Feedstock B | | | | | | | |
| Feedstock C | | | | | | | |
| Feedstock D | | | | | | | |
| **Feedstock Use - Advanced (1,000 MT)** | | | | | | | |
| Feedstock A | | | | | | | |
| Feedstock B | | | | | | | |
| Feedstock C | | | | | | | |
| Feedstock D | | | | | | | |

| Ethanol Used as Other Industrial Chemicals (Mil. Liters) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Calendar Year** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** |
| Production | 163 | 172 | 177 | 183 | 188 | 194 | 200 |
| Imports | 0.04 | 1.98 | 0.08 | 0.09 | 0.18 | 0.12 | 0.15 |
| Exports | 25 | 27 | 36 | 26 | 38 | 43 | 48 |
| Consumption | 114 | 120 | 124 | 128 | 132 | 136 | 140 |
| Ending Stocks | 24 | 27 | 17 | 29 | 19 | 15 | 12 |
| **Production Capacity** | | | | | | | |
| Capacity (Mil. Liters) | 209 | 222 | 222 | 222 | 244 | 244 | 244 |
| Capacity Use (%) | 78% | 78% | 80% | 82% | 77% | 79% | 82% |