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Thailand

Biofuels Annual

2014

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Report Highlights:
Production of both ethanol and biodiesel continues to grow in line with consumption. There have been some developments in Thailand's ethanol and biodiesel industries, including new ethanol plants using cassava roots as feedstock.

Post:
Bangkok

Executive Summary:
Despite the military coup, Thai officials indicate that they will continue to pursue its goal of increasing ethanol and B100 consumption (at 9 million liters and 5.97 million liters, respectively) by 2021 as set by its 10-year Alternative Energy Development Plan (2012 – 2021).

Daily ethanol consumption is expected to trend upward to 3 million liters in 2014 and 3.5 million liters in 2015 due to growing demand for E20 and E85 gasohol. The higher demand is being fueled by the government's price subsidies and the expansion of E20 and E85 gasohol stations. Ethanol producers are using cassava as feedstock due to tight supplies of molasses. Cassava-based ethanol is likely to account for 30 to 40 percent of total fuel ethanol production by 2015 compared to 27 percent in 2013. The demand for cassava is expected to increase to around 3 million metric tons in 2015. Meanwhile, molasses-based ethanol is likely to account for 50 to 60 percent of total ethanol production. Supplies of molasses for ethanol production will likely be tighter in 2015.

B100 or blended biodiesel production is estimated to further grow to 1.2 billion liters in 2014 as a result of government policies and growing diesel consumption. 840 million liters of B100 is expected to be derived from refined, bleached and deodorized palm oil (RBDPO) or crude palm oil (CPO), 240 million liters from palm stearin, and 60 million liters from free fatty acid distilled (FFA). B100 production is expected to increase to 1.25 billion liters in 2015.

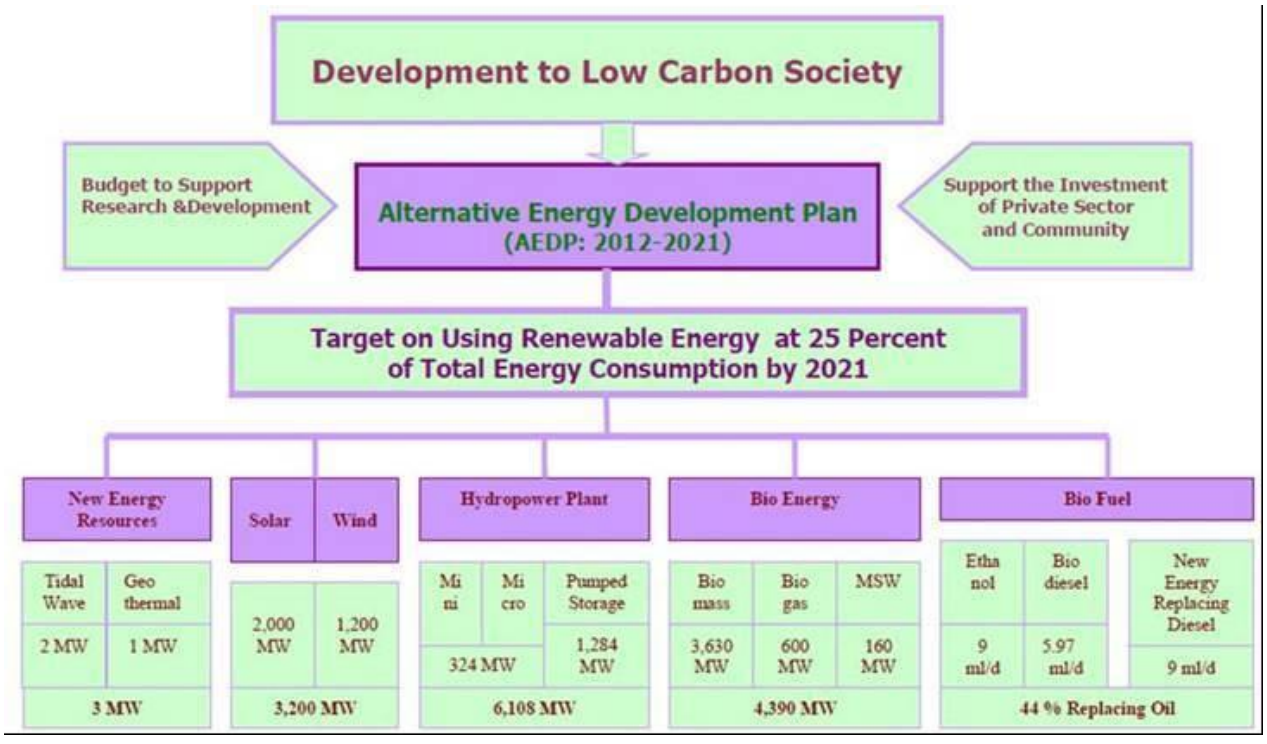
B100 consumption is estimated to grow by 12 percent in 2014 to 1.18 billion liters from 1.05 million liters in 2013. Consumption is forecast to grow slightly by 3 percent to 1.22 billion liters as the government expects to maintain its mandatory use of B7 fuel. Industry sources expect the diesel market to grow marginally.

Due to fierce competition between Thailand's B100 processors, newcomers have been reluctant to enter the market since 2010. Some establishments have already suspended their operations. As a result, only 10 producers currently have active operations with an estimated total production capacity of 4.84 million liters per day or 1.45 billion liters per annum.

1. Policy and Program

Fuel Use Projections (Million Liters)									
Calendar Year	2015	2016	2017	2018	2019	2020	2021	2022	2023
Gasoline Total	8,760	9,020	9,290	9,570	9,860	10,160	10,470	10,780	11,100
Diesel Total	21,500	21,800	22,200	22,600	23,100	23,600	24,100	24,600	25,100
On-road	12,696	12,873	13,109	13,345	13,641	13,936	14,231	14,526	14,822
Agriculture	4,581	4,645	4,730	4,816	4,922	5,029	5,135	5,242	5,348
Construction/mining	154	157	159	162	166	170	173	177	180
Shipping/rail	279	283	288	293	300	306	313	319	326
Industry	3,790	3,843	3,913	3,984	4,072	4,160	4,248	4,336	4,424
Heating	0	0	0	0	0	0	0	0	0
Jet Fuel Total	5,730	5,900	6,080	6,260	6,450	6,640	6,840	7,040	7,250
Total Fuel Markets	35,990	36,720	37,570	38,430	39,410	40,400	41,409	42,420	43,450
Source: FAS/Bangkok Forecast									

The 10-year Alternative Energy Development Plan (2012 – 2021), which was approved by the Thai Cabinet in 2011, remains unchanged. The objective of the plan is to increase the share of renewable and alternative energy from the existing 9.4 percent of total energy consumption to 25 percent by 2021. The objective is mainly to reduce the country's dependency on fossil fuels. The plan also aims to strengthen domestic energy security, promote integrated green energy utilization in communities, enhance the development of alternative energy industries, and increase research and develop renewable energy technology for competitiveness in the global market.



1.1 Ethanol

Despite the military coup, Thai officials indicated that the 10-year Alternative Energy Development Plan (2012 – 2021) for ethanol remains in place. The plan still sets to increase ethanol consumption to 9 million liters per day by 2021. Ethanol consumption increased to 3.18 million liters per day in April 2014, up from an average of 2.6 million liters per day in 2013 when the government terminated the sales of Octane 91 regular gasoline. The military government is still promoting the use of E20 and E85 gasohol consumption through price incentives. The subsidies make ethanol blends 12 to 40 percent cheaper than E10 Octane 95 gasoline. The price subsidies are paid by the State Oil Fund. The government still provides gasoline stations marketing subsidies totaling 1-2 baht/liter (12-23 US cent/gallon) and 5-6 baht/liter (58-70 US cent/gallon) to entice them to expand sales of E20 and E85 gasohol. In addition, the government continues to support the manufacturing of E20 vehicles which are compatible with E20 gasohol and flex-fuel vehicles (FFV). The excise tax rate for the manufacturing of the Eco-cars (less than 1,300 cc engines with fuel consumption rate of 5 liters per 100 km.) is at 17 percent compared to 30 percent for E10 vehicles. As for feedstocks, the plan focuses on improving existing feedstock supplies of molasses and cassava. The target is to increase average sugarcane yields to more than 15 metric tons per rai (94 tons/hectare) compared to the current average yield of 12 metric tons per rai (75 tons/hectare). The plan also aims to increase the average cassava yield to more than 5 tons per rai (31 tons/hectare) with total production of 35 million metric tons per year.

1.2 Biodiesel

The Thai Government's Biodiesel Development Plan remains unchanged from last year's report. The government has maintained its B100 consumption target at 5.97 million liters per day by 2021. The plan focuses on both supply and demand. On the supply side, the government will promote the expansion of oil palm acreage to a targeted 5.5 million rai (880,000 hectares) with a total oil palm harvested area of 5.3 million rai (848,000 hectares) by 2021. Average yields are expected to reach 3.2 MT/rai (30 MT/hectare) in 2021 while crude palm oil crushing rates should be above 18 percent. On the demand side, the government anticipates balancing its compulsory production of biodiesel with domestic palm oil supplies. The plan also introduces pilot projects for B10 or B20 blend use in fleet trucks and fishery boats.

The government also intends to support the research and development plan called the "Future New Fuel for Diesel Substitution," which encourages cultivation of new energy crops (jatropha and micro algae), diesohol (blending ethanol with diesel), and oil conversion technology (Bio Hydrofined Diesel: BHD, and Biomass to Liquid: BTL) between 2014-2017. The target for new commercial production capacity is 2 million liters per day in 2018 and up to 25 million liters per day by 2021. Thai Oleochemicals Company, a subsidiary company of PTT Global Chemical Public Company, introduced BHD product into the market on a commercial basis in 2013. Total sales of BHD are reportedly about 50,000 liters per day.

2. Ethanol

2.1 Production

Table 2.1 Ethanol Used as Fuel and Other Industrial Chemicals (Million Liters)

Calendar Year	2006	2007	2008	2009	2010	2011	2012	2013	2014 E	2015 F
Beginning Stocks	47	70	87	48	44	49	59	21	43	40
Fuel Begin Stocks	45	52	68	62	24	22	58	20	21	26
Production	165	223	384	482	521	613	790	1,048	1,115	1,295
Fuel Production	135	192	336	419	451	486	471	950	1,100	1,280
Imports	1	2	4	7	5	6	7	7	7	7
Fuel Imports	0	0	0	0	0	0	0	0	0	0
Exports	0	15	66	16	48	139	304	64	10	15
Fuel Exports	0	0	0	0	0	0	0	0	0	0
Consumption	144	193	359	477	474	471	530	969	1,115	1,290
Fuel Consumption	128	176	342	456	454	450	509	949	1,095	1,270
Ending Stocks	70	87	48	44	49	59	21	43	40	37
Fuel Ending Stocks	52	68	62	24	22	58	20	21	26	36
Production Capacity (Million Liters/Day)										
Number of Refineries	5	7	11	11	19	19	19	21	22	23
Nameplate Capacity	0.78	0.96	1.6	1.7	2.9	2.9	3.2	3.9	5.2	5.4
Capacity Use (%)	58%	64%	66%	78%	49%	58%	67%	74%	59%	66%
Co-product Production (1,000 MT)										
Co-product A	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Co-product B	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Total Feedstock Use (1,000 MT)										
Sugarcane	25	57	60	160	194	486	654	760	1,100	1,100
Molasses	565	745	1,414	1,541	1,452	1,981	2,218	2,655	2,800	3,000
Cassava	164	240	197	557	925	768	1,311	2,231	2,363	3,100
Market Penetration (Million Liters)										
Fuel Ethanol	144	193	359	477	474	471	530	969	1,115	1,290
Gasoline	7,214	7,337	7,121	7,524	7,418	7,331	7,705	8,233	8,350	8,760
Blend Rate (%)	2.0%	2.6%	5.0%	6.3%	6.4%	6.4%	6.9%	11.8%	13.4%	14.7%

Note: As of January 2014, the number of operating plants for fuel ethanol total 21 with total production capacity of 4.2 million liters per day.

Presently, the number of operating plants for fuel ethanol remained at 21 with total production capacity of 4.2 million liters per day. This is an increase of approximately 8 percent from 3.9 million liters per day in the previous year as some molasses-based ethanol manufacturers doubled its production capacity. By the end of 2014, the number of operating ethanol plants will increase to 22 with production capacity of 5.2 million liters per day. The new ethanol plants will be cassava-based plants with production capacity of approximately 1 million liters per day. In 2015, the number of ethanol plants will increase to 23 with total production capacity of 5.4 million liters per day. The new plant will also be cassava-based ethanol with production capacity of 0.2 million liters per day.

In the first four months of 2014, fuel ethanol plants operated at an average of 2.9 million liters per day, up 12 percent from an average of 2.6 million liters per day in the same period last year. Fuel ethanol production accounts for more than 90 percent of total ethanol production. Molasses-based ethanol still dominates Thailand's overall ethanol production accounting for approximately 70 to 80 percent of fuel ethanol production with production capacity of around 2 million liters per day, compared to 1.9 million liters per day in the same period last year. The sole sugarcane-based ethanol plant is operating at full capacity at around 0.2 million liters per day. Meanwhile, cassava-based ethanol plants are running at approximately 0.7 million liters per day, up significantly from 0.5 million liters per day in the same period last year.

In 2014, fuel ethanol production will likely increase to around 1,100 million liters or 3 million liters per day, up 15 percent from 2.6 million liters per day from the previous year. The higher demand for ethanol is likely to be filled primarily by cassava-based ethanol due to tight supplies of molasses. In 2014, molasses-based ethanol production is expected to increase to 670 million liters, up 5 percent from the previous year. The demand for molasses is likely increase to 2.8 million metric tons, up 5 percent from the previous year. In 2014, molasses production is expected to decline to 4.3 million metric tons, down 6.5 percent from the previous year (See TH4032, "Sugar Annual 2014" April 2014). Approximately 1.5 million metric tons of molasses are expected to be used in the domestic food, feed, and beverage industries. Meanwhile, the demand for cassava is also likely to increase to 2.2 million metric tons for anticipated 350 million liters of cassava-based ethanol, up 37 percent from the previous year due to the increase in new cassava-based ethanol facilities. Cassava-based ethanol is likely to account for around 30 percent of total fuel ethanol production, compared to 27 percent in 2013.

In 2015, fuel ethanol production is expected to increase to around 1,280 million liters or 3.5 million liters per day, up 16 percent from the previous year, in anticipation of growing demand for gasohol. The increase in ethanol demand is likely to be filled by cassava-based ethanol plants as molasses-based ethanol plants will likely be operating at full capacity at about 2 million liters per day. Molasses-based ethanol plants will be able to produce around 720 million liters of ethanol using approximately 3 million metric tons of molasses. Molasses production is expected to increase to 4.7 million metric tons in 2015 (See TH4032, Sugar Annual 2014). Meanwhile, tapioca production is forecast to increase to 30 million metric tons, up 3 percent from the previous year. The new ethanol plants using tapioca feedstock is expected to have a production capacity of 0.2 million liters per day. The demand for cassava is expected to increase to 3.1 million metric tons, of which approximately 3 million metric tons are for fuel ethanol production and the remainder will be for industrial ethanol production. Cassava-based ethanol is likely to account for 30 to 40 percent of total fuel ethanol production.

The production of non-fuel ethanol is controlled by the government. The Liquor Distillery Organization (LDO), which is under the authority of the Excise Department of the Ministry of Finance, has a monopoly on the production of industrial grade ethanol in Thailand with a production capacity of approximately 60,000 liters per day. Meanwhile, domestic demand for industrial grade ethanol, particularly for medical/pharmacy, paints, and cosmetics uses, is around 50,000 liters per day. The primary feedstock for industrial ethanol production has been shifted from molasses to cassava due to tight supplies of molasses.

2.2 Consumption

In 2013, fuel ethanol consumption which accounts for more than 95 percent of total ethanol consumption increased to 949 million liters or 2.6 million liters per day, up significantly from the previous year. The increase reflected the elimination of Octane 91 regular gasoline from the market in January 2013, which resulted in higher demand for gasohol. Gasohol consumption increased to 7,470 million liters or 20 million liters per day, up significantly from 12 million liters per day in the previous year (Table 2.2). This accounts for around 90 percent of total gasoline consumption in 2013, up significantly from around 60 percent from the previous year. Also, E20 and E85 gasohol consumption increased significantly due to the increase in number of E20 and flex-fuel vehicles fueled by the government's excise tax reduction for automobile manufacturers. In 2013, approximately half of Thailand's new vehicle sales are reportedly compatible with E20 and E85 gasohol.

In the first four month of this year, fuel ethanol consumption continued to increase to 3 million liters per day compared to 2.4 million liters per day from the previous year. Gasohol consumption increased to 21 million liters per day. Consumption of E20 and E85 gasohol continued to increase significantly accounting for nearly 20 percent of total gasoline consumption compared to approximately 10 percent in the same period last year. Meanwhile, Octane 95 premium gasoline consumption continued to decline to 1.4 million liters per day compared to an average of 1.7 million liters per day in 2013.

In 2014 fuel ethanol consumption is likely to increase to 1,095 million liters or 3 million liters per day, up 15 from the previous year, due to growing E20 and E85 consumption fueled by government price subsidies and the expansion of E20 and E85 gasohol stations. Currently, retail prices for E20 and E85 are approximately 27 percent and 50 percent below Octane 95 gasoline prices (Table 2.3). Furthermore, the number of E85 gasohol stations has tripled to 385 stations in May 2014 and are expected to increase to 500 stations by the end of 2014. In addition, E20 gasohol is available in nearly half of total gasoline stations. The number of E20 vehicles currently account for more than half of total gasoline vehicles. Gasohol consumption is likely to account for approximately 95 percent of total gasoline consumption.

Table2.2: Thailand's Gasoline and Gasohol Consumption (Unit: Million Liters)

Type of Gasoline	2008	2009	2010	2011	2012	2013	% Change 2013/2012	Jan. - Apr. 2013	Jan. - Apr. 2014	% change 2014/2013
Gasoline	**3,729**	**3,054**	**3,035**	**3,119**	**3,250**	**763**	**-76.5**	**303**	**173**	**-42.9**
Regular (octane 91)	3,388	2,877	2,958	3,077	3,208	147	-95.4	109	-	-100.0
Premium (octane 95)	341	177	77	42	42	616	1360.2	194	173	-10.8
Gasohol	**3,392**	**4,470**	**4,383**	**4,213**	**4,455**	**7,470**	**67.7**	**2,395**	**2,533**	**5.8**
- Gasohol E10 Octane 91	924	1,415	1,552	1,860	2,121	3,337	57.3	1057	1143	8.1
- Gasohol E10 Octane 95	2,439	2,972	2,692	2,122	1,932	3,030	56.9	1041	895	-14.0
- Gasohol E20	29	83	137	222	367	963	162.5	269	409	52.0
- Gasohol E85	0.02	0.25	2.11	9.10	36	141	293.7	28	86	207.1
Total	**7,120**	**7,524**	**7,418**	**7,332**	**7,705**	**8,233**	**6.9**	**2,698**	**2,706**	**0.3**

Source: Department of Energy Business, Ministry of Energy

Table 2.3: Price Structure of Petroleum Product in Bangkok (as of June 16, 2014)

	Premium gasoline (octane 95)	Gasohol			
		E10 Octane 95	E10 Octane 91	E20	E85
Ex-Refinery Factory Price	25.9842	26.2541	26.0257	26.4339	26.7116
Excise Tax	7.0000	6.3000	6.3000	5.6000	1.0500
Municipal Tax	0.7000	0.6300	0.6300	0.5600	0.1050
State Oil Fund	10.000	3.3000	1.2000	-1.0500	-11.6000
Conservation Fund	0.2500	0.2500	0.2500	0.2500	0.2500
Wholesale Price (WS)	43.9342	36.7341	34.4057	31.7939	16.5166
Value Added Tax (VAT)	3.0754	2.5714	2.4084	2.2256	1.1562
WS+VAT	47.0096	39.3065	36.8141	34.0195	17.6728
Marketing Margin	1.6265	1.3313	1.3700	1.6453	6.4553
VAT	0.1139	0.0932	0.0959	0.1152	0.4519
Retail Price	48.75	40.73	38.28	35.78	24.58

Note: Exchange rate = 32.5668 baht/$

Source: Petroleum Division, Enery Policy and Planning Office, Ministry of Energy

In 2015, fuel ethanol consumption is likely to increase to 1,270 million liters or 3.5 million liters per day, up around 15 percent from the previous year due to growing E20 and E85 consumption fueled by

the growth of E20 and E85 gasoline stations nationwide. The government is also likely to maintain its price subsidy on E20 and E85 fuels by setting prices 10 and 40 percent below E10 Octane 95 gasohol.

2.3 Trade

In 2013, ethanol exports (HS2207.10.00) declined significantly to 64 million liters due to strong domestic demand for ethanol (Table 2.4). Ethanol is primarily exported to the Philippines where domestic ethanol supplies were insufficient due to its mandatory sales of gasohol. All ethanol exports are industrial grade ethanol. Meanwhile, there were no imports of ethanol for gasohol production in 2013 due to sufficient domestic supplies. The Thai government imposes a 2.5 baht/liter (29 US cents/gallon) on ethanol imports.

In 2014 and 2015, ethanol exports will likely be marginal due to growing domestic demand for ethanol driven by E20 and E85 gasohol consumption. Ethanol exports are expected to be primarily supplied by the cassava-based ethanol plants.

Table 2.4: Thailand's Exports of Ethanol [1/]

Unit: Million Liters

	2009	2010	2011	2012	2013	Jan. - Apr.		
						2013	2014	% change
Philippines	-	5.5	61.3	142.3	45.9	45.9	-	-
Singapore	3.1	19.3	68.5	76.8	-	-	-	-
Japan	7.4	20.0	16.5	24.9	8.8	8.8	-	-
Australia	-	-	2.1	-	-	-	-	-
Taiwan	3.1	1.2	3.2	1.5	-	-	-	-
Indonesia	-	-	0.0	1.5	-	-	-	-
Europe	0.0	-	-	9.3	9.1	9.1	-	-
South Korea	-	2.1	12.8	45.5	-	-	-	-
Other	2.0	0.0	2.6	2.1	0.0	0.0	-	-
Total	**15.6**	**48.2**	**167.0**	**303.9**	**63.8**	**63.8**	-	-

Note: 1/ Based on on-line ethanol plants exporting 95% purity ethanol

Source: Department of Alternative Energy Development and Efficiency, Ministry of Energy

2.4 Stocks

In 2013, ethanol stocks increased to 43 million liters due to a reduction in ethanol exports as the government encouraged ethanol manufacturers to supply their ethanol domestically when sales of Octane 91 regular gasoline were terminated. In 2014 and 2015, ethanol stocks are expected to decline to around 35 – 40 million liters due to tighter ethanol supplies, particularly for molasses-based ethanol, and growing demand for E20 and E85 gasohol consumption.

3. Biodiesel

3.1 Production

Table 3.1 Biodiesel Production and Use in Thailand

Biodiesel (Million Liters)										
Calendar Year	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Beginning Stocks	0	0	6	7	8	22	12	22	32	52
Production	2	68	448	610	660	630	900	1,060	1,200	1,250
Imports	0	0	0	0	0	0	0	0	0	0
Exports	0	0	0	0	0	0	0	0	0	0
Consumption	2	62	447	609	646	640	890	1,050	1,180	1,220
Ending Stocks	0	6	7	8	22	12	22	32	52	82
Production Capacity										
Number of Biorefineries	3	5	9	14	13	13	10	10	10	10
Nameplate Capacity	219	475	84	1,970	1,970	1,970	1,450	1,450	1,450	1,630
Capacity Use (%)	0.9%	14.3%	533.3%	31.0%	33.5%	32.0%	62.1%	73.1%	82.8%	76.7%
Feedstock Use (1,000 MT)										
RBDPO/CPO	2	45	300	400	445	390	630	775	840	860
Stearin	0	20	125	170	180	190	200	210	240	250
FFA	0	0	0	0	0	20	20	25	60	80
Market Penetration (Liters - specify unit)										
Biodiesel, on-road use	2	62	447	609	646	640	890	1,050	1,180	1,220
Diesel, on-road use	10,980	11,200	10,580	11,080	11,100	11,510	12,340	12,500	12,600	11,696
Blend Rate (%)	0.0%	0.3%	2.5%	3.3%	3.5%	3.3%	4.3%	5.0%	5.6%	5.7%
Diesel, total use	18,312	18,677	17,634	18,465	18,480	19,192	20,565	20,892	21,200	21,500

Note:
RBDPO= Refined Bleached and Deodorized Palm Oil
CPO = Crude Palm Oil
FFA = Free Fatty Acid

B100 or unblended biodiesel in Thailand is currently produced from palm oil derived feedstock such as crude palm oil (CPO), refined bleached deodorized (RBD) palm oil, palm stearin, and free fatty acids of palm oil (FFA). B100 production is solely driven by government mandates. Thailand does not import or export B100, however, it does export CPO.

The Thai Government's biodiesel policy is mainly aimed to help palm farmers. Currently, the government has required fuel producers to blend palm oil with a target of 5.97 million liters/day of

B100 (2,179 million liters per annum0) until 2021.

B100 production is estimated to further grow to 1.2 billion liters in 2014 as a result of government policies and growing diesel consumption. 840 million liters of B100 is expected to be derived from RBDPO or CPO, 240 million liters from palm stearin, and 60 million liters from FFA. B100 production is expected to increase to 1.25 billion liters in 2015.

Feedstock for unblended diesel or crude palm oil is estimated to increase by 3 percent to 2.2 million metric tons (MMT) in 2014 compared to 2.14 MMT in 2013. Despite lower yields caused by long and dry weather conditions from late 2013 to early 2014, overall CPO production in 2014 is expected to increase. CPO production is forecast to slightly increase to 2.25 MMT in 2015.

Table 3.2 Thailand's Production, Supply and Demand for CPO

(Unit: 1,000 hectares) (Unit: 1,000 Metric Tons)

	2013 1/	2014 1/ 2/	2015 2/
Planted Area	720	736	760
Harvested Area	626	655	690
Fresh Fruit Bunch (FFB) Productior	12170	13200	13000
Beginning Stocks	360	198	208
Production	2135	2200	2250
MY Imports	0	0	0
TOTAL SUPPLY	2495	2398	2458
MY Exports	565	380	350
Food Use Dom. Consumption	960	970	980
Biodiesel Use Dom. Consumption	775	840	860
TOTAL Dom. Consumption	1735	1810	1840
Ending Stocks	195	208	268
TOTAL DISTRIBUTION	2495	2398	2458
Note: 1/ Ministry of Commerce and Ministry of Energy			
2/ FAS/Bangkok			

Due to fierce competition between Thailand's B100 processors, newcomers have been reluctant to enter the market since 2010. Some establishments have already suspended their operations because of their inability to compete. As a result, only 10 producers currently have active operations with an estimated total production capacity of 4.84 million liters per day or 1.45 billion liters per annum. Trade sources reported that the New Biodiesel Company is scheduled to expand its B100 production capacities by 600,000 liters per day (180 million liters per annum) in mid-2015.

Table 3.3 List of Operating B100 Producers in Thailand

	Company	Capacity (Liters per day)	Feedstock Type
1	Bangchak Petroleum	50,000	CPO, RBDPO
2	Pure Energy	800,000	Palm Stearin, CPO
3	Patum Vegetable Oil	1,400,000	CPO, RBDPO, Stearin
4	B. Grimm Green Power	200,000	CPO, RBDPO, Stearin
5	A.I. Energy	500,000	Palm Stearin
6	Veera Suwan	200,000	Palm Stearin, RBDPO
7	Thai Oleochemicals	685,800	CPO
8	New Biodiesel	400,000	CPO, RBDPO, Stearin, FFA
9	Absolute Power P	300,000	CPO, RBDPO, Stearin
10	Bangchak Biofuel	300,000	CPO, Stearin
	Total	4,835,800	

Source: Department of Energy Business and FAS Estimates

3.2 Consumption

B100 consumption in 2014 is estimated to grow by 12 percent mainly because new biodiesel mandates (B5 to B7) have come into force. It should be noted that a sharp decline in CPO feedstock supplies led the government to amend the mandatory B7 mandate for a short period. From February 17 to May 13, 2014, the mandatory B7 rate was temporarily reduced to B3.5. The mandatory use of B7 was eventually reinstated on May 14 after increased production of CPO entered the market following the harvest of fresh palm fruits. As a result of the government mandates, consumption of B100 is expected to grow by 3 percent.

B100 producers, especially those that are not part of integrated with CPO processors and petroleum oil refineries are struggling to survive, primarily because of higher production costs.

Below is the historical implementation of mandatory use for specific biodiesel since 2007:

- June 2007 Implement mandatory use of B2 and voluntary use of B5
- June 2010 Implement mandatory use of B3 and voluntary use of B5
- March 2011 Implement mandatory use of B2 and voluntary use of B5

- May 2011 Implement mandatory use of B3-B5
- July 2011 Implement mandatory use of B4
- January 2012 Implement mandatory use of B5
- July 19, 2012 Implement mandatory use of B3.5
- November 1, 2012 Implement mandatory use of B5
- April 2013 The Cabinet agreed to implement mandatory use of B7, commencing on January 1, 2014
- January 1, 2014 Implement mandatory use of B7
- February 17, 2014 Adjust mandatory use from B7 to B3.5
- May 14, 2014 Return implementing mandatory use of B7

Below is the composition of B5 biodiesel retail prices.

Table 3.4 Breakdown of B5 Biodiesel Retail Prices (as of June 18, 2014)

	B5 Biodiesel (Baht/liter)
Ex-Refinery Prices	25.9241
Excise Tax	0.0050
Municipal Tax	0.0005
Oil Fund Fee	0.8100
Conservation Fund Fee	0.0250
Wholesale Prices	26.9896
Value Added Tax	1.8893
Wholesale Prices + VAT	28.8789
Marketing Margin	0.9076
Value Added Tax	0.0635
Retail Prices	**29.8500**
Source: Ministry of Energy	

3.3 Trade/Policy

The Thai Government restricts the import of biodiesel to protect domestic palm growers. In addition, a lack of global demand for biodiesel has decreased Thailand's B100 exports in recent years.

3.4 Ending Stocks

B100 production is driven solely by contracts between palm growers and refineries. As a result, the country's B100 stocks, held by either B100 producers or petroleum oil refineries, are quite low somewhere around 20-30 million liters or about ten days of utilization.

4. Advance Biofuels

A molasses-based ethanol plant recently opened a second production line using cane bagasse. This second generation biofuel pilot project has been established between the Thai Roong Ruang Group, one

of the largest sugar mills in Thailand, and the Japanese and Thai governments. The pilot project remains in the experimental stage with a production capacity of 10,000 liters/day mainly because the production costs remain higher than the first-generation ethanol derived from sugar molasses or cassava roots.

The Thai Ministry of Energy has also started a pilot project using hydrogenated vegetable oil (HVO) for biodiesel production. The project is expected to take several years before it turns into a viable commercial production.