

Sustainable Biofuel Development in Indonesia

Hoping the Dream Come True

Maxensius Tri Sambodo
Pusat Penelitian Ekonomi - LIPI

Sustainable Biofuel Development Research Workshop
Progress So Far and Future Applied Research Opportunity
ASEAN Room, Sulatan Hotel, Jl. Gatot Subroto, Jakarta
February 4 – 5, 2009

1

Introduction

- Study on biofuel started academically and funded by government in 1980s
- Government cut oil subsidy on 1 October 2005
- President Regulation No 5/2006 on National Energy Policy, share of biofuel in primary energy mix in 2025 will be more than 5%.
- President Instruction No 1/ 2006 on Supply and Utilization of Biofuel as Part of Others Energy Sources

2

Cont..

- Six reasons why Indonesia can promote biofuel namely: land and resource abundant, creating million jobs, technologically achievable, huge potential market, environment friendly, and many channels to finance the program
- Cons: forest degradation, lost in biodiversity, lost in cultural heritage (human rights), negative energy return, trade off between food security and energy, biofuel is the last option
- This article discusses economic and social impacts from biofuel and give recommendations for promoting biofuel in the future.

3

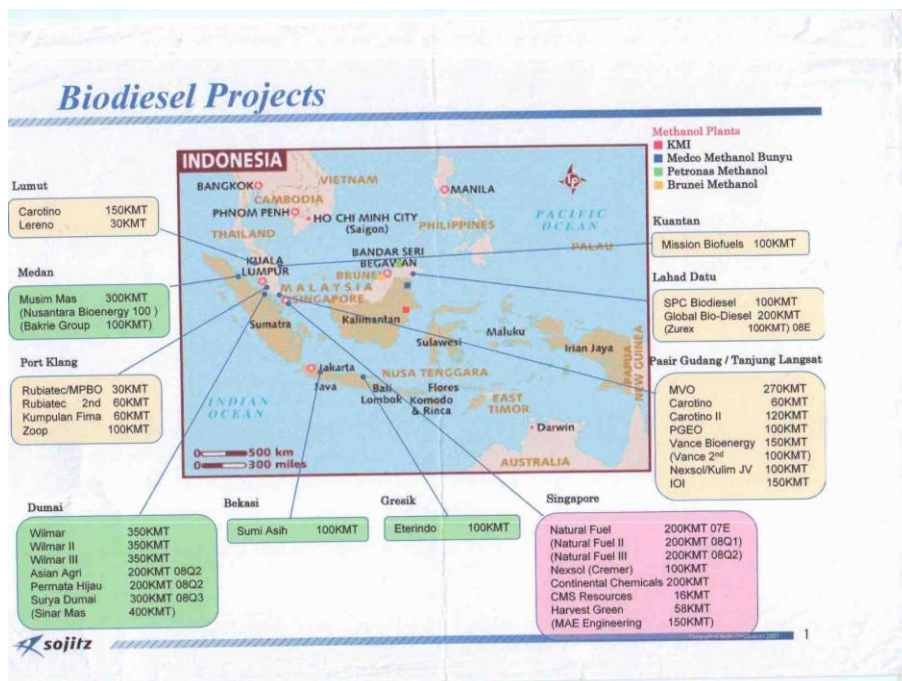


Table 1 Biofuel Balance Sheet Approach

Benefits	Rough assessment	Costs	Rough assessment
Lower import	Yes, total import (crude oil and oil refinery) January – October 2008 was US\$29,154 million (CIF) or it was about 24% of total import	Higher food price	Yes, government allocate less than 30% land for non edible product (jatropha) and the rest for palm oil, cassava, and sugar cane
Greater energy security	Yes, import dependency ratio increased from 0.16 in 1990 to about 0.40 in 2004	Deforestation and other ecological impacts	Yes and no, government can utilize the critical land or government can develop local specific plant (Indonesia has more than 50 plant that can be used for biofuel)
Less greenhouse gases	Yes and no, it depends on farming practice	Water shortage	Yes and no, I have visited palm oil plantation in Sumatera and Kalimantan, but I have not heard any complain on water shortage, on the other hand flood usually come in wet season (need further study)
Less vehicle emissions	Yes and no, it depends on number of vehicle and traffic jam	Bad working conditions	Yes and no, it depends on government regulation on minimum wage
More jobs	Yes, biofuel in labor intensive sector		
Disposal of waste	Yes, all part of biofuel plant is useful		

5

Table 2 Projection on Biofuel Development up to 2010

Parameter	Unit	Biofuel Material				Total
		Palm Oil	Jatropha Curcas	Sugar cane	Cassava	
Direct Employment	Worker	750,000	500,000	1,500,000	750,000	3,500,000
Revenue/worker (sugar cane @ 0.5ha, cassava and palm oil @ 2 ha, and jatropha @ 3 ha)	Rp/year/worker	20,000,000	13,500,000	9,140,625	12,000,000	54,640,625
Bioethanol or biodisel	Ton oil	6,000,000	2,250,000	3,750,000	4,615,385	16,615,385
Production	Ton seed, trunk, bulb	30,000,000	7,500,000	60,000,000	30,000,000	127,500,000
Industry	Unit	167	22,727	125	288	23,307
Land	ha	1,500,000	1,500,000	750,000	1,500,000	5,250,000
Indirect worker	worker	1,167	68,182	6,250	11,538	87,137
Seed	Ton trunk	202,500,000	3,750,000	6,000,000	12,000,000	224,250,000
Investment on farm	Million Rp	45,000,000	4,500,000	11,250,000	5,250,000	66,000,000
Investment off farm	Million Rp	10,000,000	2,272,727	43,750,000	43,269,231	99,291,958

Source: Tim Nasional Pengembangan BBN (2008)

Existing capacity 1, million MT/year

6

Table 2. Major Biodiesel Producers in Indonesia

Company	Location	Existing Capacity MT/Year	Plant Development/New Plant		Methanol Consumption (MT/Year)	
			Capacity (MT/Year)	Est. Start Operations	Current condition	Additional
PT Eterindo Wahanatama	Tangerang	100,000			10,000	
	Gresik		10,000	Q3-2008		10,000
PT Indo Biofuels Energy	Merak	20,000	-		2,000	-
PT Sumi Asih Oleochemical Industry	Bekasi	100,000			10,000	
	Lampung		100,000	Q1-2009		10,000
PT Musim Mas	Medan	200,000			20,000	
	Batam		350,000	Q1-2009		35,000
PT Wilmar Bioenergy Indonesia	Pelintung - Riau	1,000,000	350,000		100,000	35,000
	Gresik		350,000	Q1-2010		35,000
Permata Hijau Group	Duri - Riau	200,000			20,000	
Others			750,000			75,000
Total		1,620,000	2,100,000		162,000	210,000

7

Table 3 Comparative Price between Biopertamax and Gasoline (in Rupiah)

Type of Fuel	2007	2008	Percentage change
Biopertamax (bio-gasoline)	6,445.47	8,398.67	30.3
Gasoline (subsidy)	4,500	5,166.67	14.8

Source: Author's calculation

Type of fuel	Subsidy Price (Rp)	Economic Price (Rp)	Subsidy/liter (Rp)	Strategy
Kerosene	2,500	5,113	2,613	Intensification biokerosine or optimizing gas utilization (3 Kg)
Diesel/Biodiesel	4,500	4,936	436	Optimizing biodisel
Gasoline	4,500	4,434	-66	Market price (upper limit)

Note: calculating based on price in 15 January 2009

8

Formula for biofuel pricing base on palm oil:

Biofuel Price = (95% x MOPS) + (5% x [CPO + processing cost])

Biofuel subsidy:

In fiscal year 2009, government propose subsidies on fossil fuel is about Rp 1,000/litre. This amount comes from a simple calculation that biofuel subsidy is the average of biofuel price index in Southeast Asia and biofuel price index in domestic market.

Government needs to combine this policy by promoting mandatory obligation on biofuel (improve economic of scale refinery capacity), domestic market obligation on CPO, tariff mechanism, tax incentive)

9

Critical Issues (Micro Findings)

- There is always a labor shortage during planting and harvest seasons
- Farmers become difficult to obtain fertilizer
- Seed viability especially for palm oil is also hard to find in the market (seed and fertilizer falsification)
- Cut and burn practice before planting
- People empowering toward energy security is still based on fossil fuel

10

Cont..

- Land ownership and inequality in land distribution
- It is about 7.628 cases of land conflict in BPN
- Third, rate of land conversion from forest to other purposes is high
- There is land fragmentation that more than 13 million households just has small area of land
- Conflict of land is not only happened intra sector, but also with different sectors
- The local regulation bias to mining
- Many protected forests become grassland and to develop this area for plantation needs agreement from Minister of Forestry and parliament and this will take times
- Biofuel is part of specific fuel and government give limited subsidies compare to fossil fuel

11

Picking the winner

- Economic Development Objective: Pro Growth – Job – Poor
- Step 1. Econometric exercise → village base model → cross section analysis across 28 province → the objective of this exercise is to find out the impact of several variables to poverty.

Basic Model

Poor people = f (land condition, access to PLN, type of work)

- Investigating determinant factors affecting the poor such as land condition (critical land), access to basic infrastructure (lighting), and type of work (formal/informal) → the hypothetical assumption is poverty will decrease if the percentage of critical land decrease, percentage of people have access on electricity increase and percentage of worker work in formal sector increase.

12

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.524 ^a	.275	.184	8.62438	1.631

a. Predictors: (Constant), INFORMAL, LAND, PLN

b. Dependent Variable: POOR

Variability of percentage of poor people 27.5% is explained by the model

13

Indicative result

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.961	18.440		-.215	.832
	LAND	.156	.155	.177	1.006	.324
	PLN	-.063	.093	-.143	-.676	.505
	INFORMAL	.372	.203	.384	1.833	.079

The sign is expected but level of significance is higher than 10 percent

Step 2. Evaluating poverty, land, infrastructure, and labor condition with biofuel's plants

14

Province	Suitable land for jatropaha (ha)	Percentage of poor people in rural area	Percentage of village critical land	PLN Lighting	Informal Sector	Biofuel Plant
1 Kalimantan Timur	4,323,527	18.06	16.49	67.13	53.39	Kelapa sawit, tebu, kelapa
2 Papua	1,691,487	50.16	23.05	19.28	79.92	Kelapa sawit, tebu, kelapa
3 Jawa Timur	1,534,716	24.19	14.98	96.05	65.68	Tebu, Singkong, kelapa, jagung, sorgum, aren (Arenga pinnata)
4 Nusa Tenggara Timur	1,428,714	30.46	46.73	25.85	85.58	Tebu, Singkong, kelapa, sorgum
5 Sulawesi Tenggara	1,103,015	25.56	20.44	52.86	77.01	Kelapa, aren (Arenga pinnata)
6 Kalimantan Barat	1,051,803	14.35	22.26	61.44	71.78	Kelapa sawit, kelapa, aren (arenga pinnata)
7 Maluku	929,870	38.89	25.84	56.38	73.93	Kelapa, sorgum (sagu)
Total	12,063,132					

Conclusions

- Promoting biofuel need to be address both in macro and micro levels
- In the macro level three are more than 10 players now, they are growing and building steps. Good business environment is important for improving market penetration, market development, product development
- In the micro level, biokerosine development should be a target. Green cluster or biofuel cluster needs to develop. Focus on two regions Papua and Nusa Tenggara Timur can have huge impact on promoting 3P (pro job, poor, growth), but we need one more P (pro environment) by implementing neutral and broad agricultural policy on utilizing local endowment (biofuel plant, farming practice, and access on land, seed, and fertilizer)