



Biofuels in the ASEAN

Biofuel Policy Group
Asian Institute of Technology

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Outline of the Presentation

1. Objectives of this Presentation
2. Background
3. Status of Biofuel Development in ASEAN
4. Lessons Learned
5. The Way Forward

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1. Objectives of this Presentation

- To provide background information on AIT's study on the 'Review of Biofuel Policies in ASEAN'
- Countries studied include major biofuel producing nations of ASEAN- Malaysia, Indonesia, Thailand, Philippines
- Review study based on secondary data and online statistics

**Study funded by the
Global Network on Energy for Sustainable
Development (GNESD)**

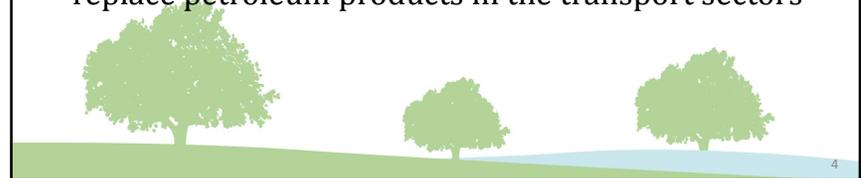
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2. Background

2.1 The term 'Biofuel'

- Biofuels refer to fuels in a solid (bio-char), liquid (ethanol & biodiesel) or gaseous state (biogas) produced predominantly from biomass resources.
- The most commonly understood liquid biofuels are ethanol and biodiesel, used as an alternative or replace petroleum products in the transport sectors

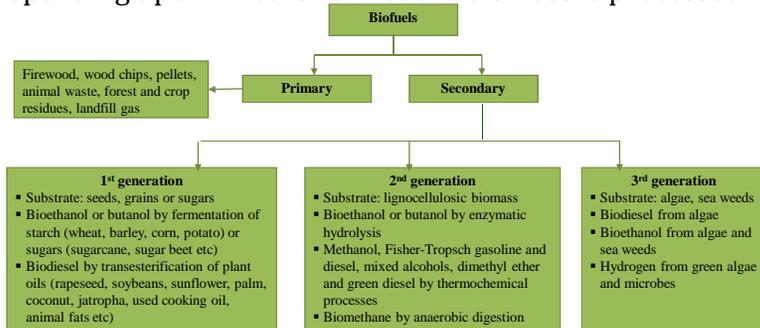


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2. Background

2.2 Biofuels classification

- Broadly classified as primary & secondary biofuels depending upon whether or not the biomass is processed



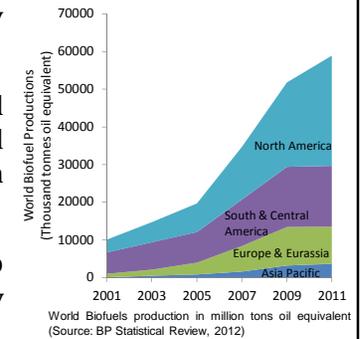
(Source: Nigam and Singh, 2011)

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2. Background

2.3 Biofuels Production

- Several Asian countries are actively promoting biofuel development
- Malaysia, Indonesia, Thailand and Philippines have established themselves as potential leaders in world's biofuel market
- E.g. Malaysia & Indonesia - two largest palm oil producers - jointly produce 85% of world's palm oil



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3. Status of Biofuel Development in ASEAN

3.1 Malaysia

Policies

- National Biofuel Policy (2006)
- The Ninth Malaysian Plan (2006-2010)
- Malaysian Biofuel Act (2007) enforced in Nov. 2008

Government Incentives

- Tax exemption
- Low interest loan & federal grants
- No export duties on processed palm oil or biodiesel

Blending Mandates

- Launched B5 with National Biofuel Policy, 2006
- Originally set 1 January 2010 as the deadline to sell B5 biodiesel at all petrol station nationwide, but the implementation delayed until June 2011.

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3. Status of Biofuel Development in ASEAN

3.2 Indonesia

Policies

- National Energy Policy , 2006
- Indonesian roadmap for biofuel development

Government Incentives

- No clear tax incentives for biofuel manufacturers but government subsidizes the fuel prices (the state-owned oil company sell B5 at the same price as subsidized fossil fuel

Blending Mandates

- Original Plan (Losari concept, 2006) intended to replace 10% of transport fuel in 2010 by biofuels
- Lowered the mandate in 2008 → 2.5% Biodiesel and 3% (E3) Ethanol for transport by 2010
- Since May 2012, mandated blending of B2 in Transport

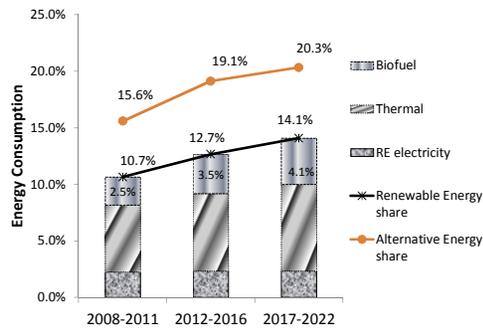
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3. Status of Biofuel Development in ASEAN

3.3 Thailand

- Policies**
- National Alternative Energy Development Plan 2004-2011 & 2008-2022
 - The Ethanol and Biodiesel Plan (2008-2022)



Renewable Energy potential and target based on Alternative Energy Development Plan (2008-2022)

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3. Status of Biofuel Development in ASEAN

3.3 Thailand

Government Incentives

Ethanol

- To ethanol producers → excise tax exemption
- To refineries → subsidy
- To automobile manufacturers → reduction on import duties

Biodiesel

- Soft loans
- Price subsidies from the state oil fund

Blending Mandates

Ethanol

- Introduction of E10 since 2007
- Introduction of E20 (20% blend of ethanol with gasoline) since 2008 together with designing of Flexible Fuel Vehicles (FFVs)

Biodiesel

- B2 became mandatory since Feb. 2008 with B5 as target mandate
- On and off mandatory B3 since June 2010
- Mandatory B5 since Jan. 2012



3. Status of Biofuel Development in ASEAN

3.4 Philippines

Policies

- Biofuel Act, 2006 (Republic Act 9367)
- The National Biofuel Program (established under the Biofuel Act)

Government Incentives

- Reduction in specific and value added tax
- exemption from water effluent charges
- Financial assistance

Blending Mandates

- Biodiesel**
- Mandatory B1 in 2007
 - Mandatory B2 since 2009
- Ethanol**
- Mandatory E5 in 2009
 - Mandatory E10 since August 2011

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4. Lessons Learned

- Through the pronouncement of biofuel policies & economic measures, the ASEAN countries have demonstrated their support for expansion of biofuel industry

Summary- [Annex](#)

- These biofuel policies were developed mainly to address
 - ✓ Energy Security Concern (for security of energy supply)
 - ✓ Socio-Economic Concern (income generation for farmers)
 - ✓ Environmental Concern (reducing GHG emissions for climate change)



4. Lessons Learned

- Biofuel policies have been crucial in dealing with these concern to some extent. For e.g.
 - ✓ The oil import dependency has decreased for Thailand and Philippines while increased for Malaysia and Indonesia ([Annex](#))
 - ✓ The share of non-conventional energy resources has increased in the primary supply energy mix
 - ✓ Income generation based on jobs created from biofuel production has increased ([Annex](#))
- Although the policies & measures support rapid expansion, it could also exacerbate pressure on prevailing resources.

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4. Lessons Learned

- Biofuel development creates incentive to convert forests into biofuel crops thereby affecting landuse and biodiversity.
 - ✓ Around 7 million ha of oil palm expansion in Malaysia & Indonesia have occurred at the expense of forests (USAID, 2009)
 - ✓ GHG emission increase from 1 to 10 times if the ethanol produced in Thailand includes changes of tropical forest land/or grass land to cropland (Silalertruksa and Gheewala, 2011)
- The prices of food could increase affecting poor and vulnerable
 - ✓ The export and domestic price of tapioca starch (necessary for cassava products) in Thailand rose by 45% when China implemented its policy for biofuel production (USAID, 2009)

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5. The Way Forward

- Biofuel development must take into account the full spectrum of market & societal values such as forgone food & agricultural output, impacts on environmental services and overall improvement in the well being of rural poor
- Therefore, the challenge to the governments is to continue the expansion and development of biofuel sectors and also abide by sustainable production requirement
- The way forward is to pursue biofuel development and reconcile with wider sustainability agenda.

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Biofuel policy group

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Thank You

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ANNEXES

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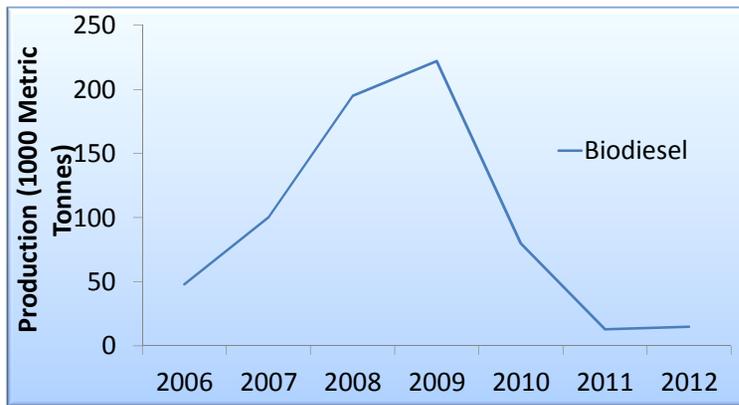
3. Status of Biofuel Development in ASEAN

3.1 Malaysia - Biofuel Industries

Year	No. of approved/ registered biodiesel plants	Combined production capacity
2006	1 (First commercial scale biodiesel plant in operation)	55,000 tons
2007	6	300,000 tons
2008	12 (not all were operational)	~ 1million tons
2009	12	~ 1.5 million tons
2010	20 (not all were operational)	~ 2 million tons
2011	28	~ 3 million tons

3. Status of Biofuel Development in ASEAN

3.1 Malaysia - Biofuel Production



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3. Status of Biofuel Development in ASEAN

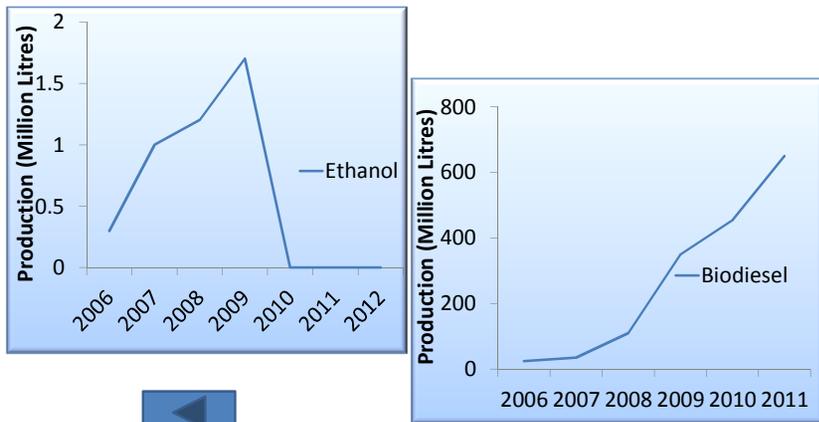
3.2 Indonesia - Biofuel Industries

Year	ethanol plants			biodiesel plants		
	No. of biorefineries	Combined production capacity (Million Liters)	Capacity in use	No. of biorefineries	Combined production capacity (Million Liters)	Capacity in use
2006	1	10	3%	2	215	30%
2007	1	13	8%	7	1709	16%
2008	4	243	0%	14	3138	20%
2009	5	273	1%	20	3528	9%
2010	5	273	0%	22	3936	19%
2011	5	273	0%	22	3936	39%

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3. Status of Biofuel Development in ASEAN

3.2 Indonesia - Production



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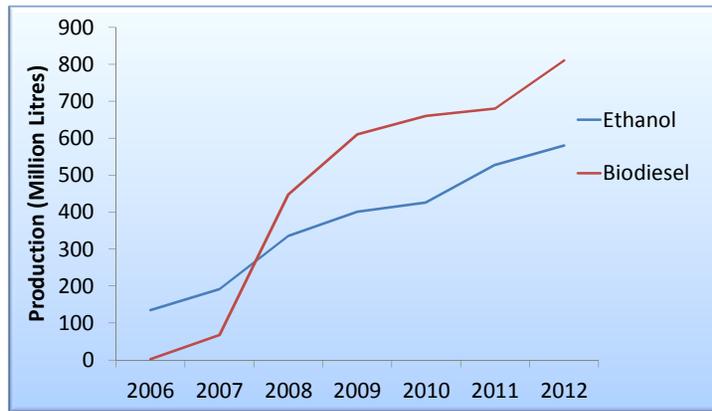
3. Status of Biofuel Development in ASEAN

3.3 Thailand- Biofuel Industries

Year	No. of approved/registered ethanol plants			No. of approved/registered biodiesel plants		
	No. of biorefineries	Combined production capacity (ML)	Capacity in use	No. of biorefineries	Combined production capacity (ML)	Capacity in use
2006	5	284.7	48 %	3	219	1%
2007	7	350.4	54%	5	474.5	14%
2008	11	584	58%	9	839.5	53%
2009	11	620.5	65%	14	1971	31%
2010	19	1058.5	40%	13	1971	34%
2011	19	1058.5	50%	13	1971	32%

3. Status of Biofuel Development in ASEAN

3.3 Thailand- Production



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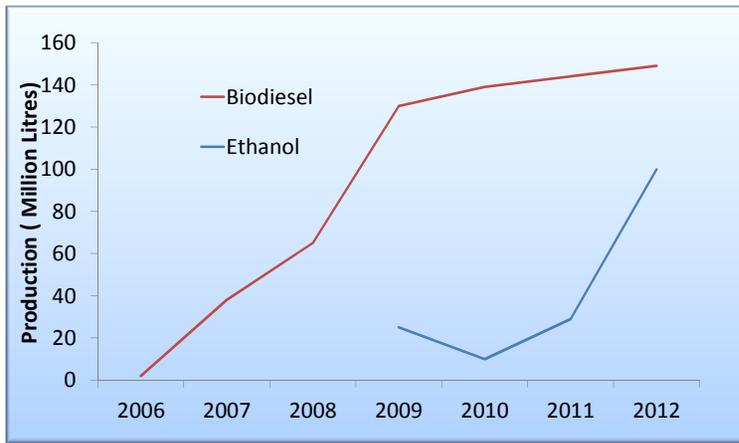
3. Status of Biofuel Development in ASEAN

3.4 Philippines - Biofuel Industries

Year	No. of approved/registered ethanol plants			No. of approved/registered biodiesel plants		
	No. of biorefineries	Combined production capacity (Million Liters)	Capacity in use	No. of biorefineries	Combined production capacity (Million Liters)	Capacity in use
2006				10	150	1 %
2007				12	325	12 %
2008				12	325	20 %
2009	2	63	40%	12	395	33 %
2010	3	13	79%	12	395	35%
2011	3	37	79%	12	395	36%

3. Status of Biofuel Development in ASEAN

3.4 Philippines



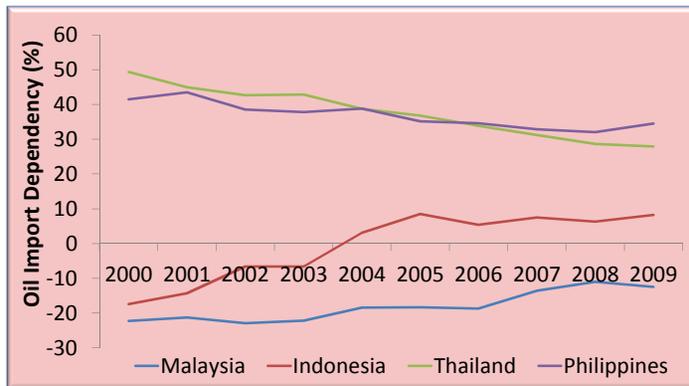
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4. Lessons Learned

Summary

Country	Policy target	Major feedstock	Current blending Mandate	Economic measures
Malaysia	No specific policy target	Diesel: Palm oil	Diesel: B5	Tax incentive to manufacturers, no export duties, low interest loans, federal grants for R&D and demonstration projects
Indonesia	Target biofuel mix of 2%, 3% and 5% in total energy mix by 2010, 2015 and 2025 respectively	Diesel: Palm oil	Diesel: B5	Diesel subsidized to same price as fossil fuel
Thailand	Targeted biofuel share to be 4.1% in the 20% alternative energy mix of country's total demand in 2022	Diesel: Palm oil Ethanol: Cassava	Diesel: B5 Ethanol: E10	Diesel: soft loans, subsidies to lower the price of B5 than B2 blends Ethanol: tax exemption for producers; subsidies to refineries; reduction on import duties for compatible automobile manufacturers
Philippines	No specific policy target	Diesel: Coconut oil Ethanol: Sugarcane	Diesel: B2 Ethanol: E10	Tax exemptions, financing schemes to encourage domestic production

4. Lessons Learned

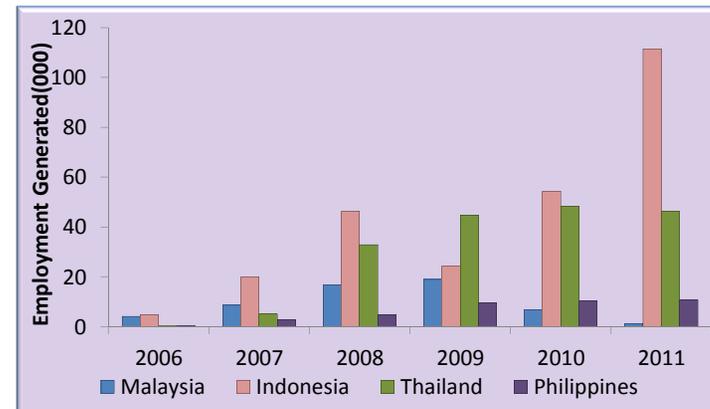


Energy security under oil (crude oil & petroleum products) import dependency



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4. Lessons Learned



Estimated employment generation based on jobs created through biodiesel production



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4. Lessons Learned

Hypothetical Employment from First-Generation Biofuel Production in APEC
(Source: APEC, 2010)

Member Economy	Ethanol Potential (MLy)	jpMLy	Potential Employment	Biodiesel Potential (MLy)	jpMLy	Potential Employment
Australia	3,110	5.1	16,000	412	3.5	1,000
Bruner Darussalam						
Canada	2,180	1.1	2,000	598	3.5	2,000
Chile	200	1.1	300	59	3.5	200
China	32,000	1.1	35,000	5,880	3.5	20,000
Hong Kong, China				10	3.5	35
Indonesia	6,730	5.1	34,000	3,670	73.3	269,000
Japan	750	1.1	800	853	3.5	3,000
Korea	330	1.1	400	284	3.5	1,000
Malaysia	100	5.1	500	3,478	73.3	255,000
Mexico	3,020	1.1	3,000	250	3.5	900
New Zealand	15	1.1	17	143	3.5	500
Papua, New Guinea	60	5.1	300	89	73.3	7,000
Peru	900	5.1	5,000	329	73.3	24,000
The Philippines	330	5.1	2,000	337	73.3	25,000
Russia	4,870	1.1	5,000	550	3.5	2,000
Singapore						
Chinese Taipei	80	5.1	400	289	3.5	1,000
Thailand	2,700	5.1	14,000	236	73.3	17,000
United States	30,000	1.1	33,000	6,213	3.5	22,000
Viet Nam	4,570	5.1	23,000	178	3.5	600
APEC Total	92,000		175,000	24,000		651,000

Tables assume 1.1 jpMLy for corn ethanol, 5.1 jpMLy for sugar cane ethanol, 3.5 jpMLy for soy biodiesel, and 73.3 jpMLy for palm biodiesel.