APEC Biofuels Task Force and Asia-Pacific Context for Biofuels Standards Work

ANSI Biofuels Standards Panel (ANSI-BSP)
Inaugural Meeting

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Presented by
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APEC Biofuels Context

- The 21 APEC economies account for roughly half the world's energy use and environmental emissions.
- Indonesia and Malaysia have major biodiesel potential with planned expansion of palm and jatropha.
- Substantial potential for both diesel and ethanol in countries like Thailand, and Vietnam.
- Lots of land in Australia and China as well.
- And of course the U.S. has overtaken Brazil as the world's leading producer of ethanol.

APEC Biofuels Task Force Was Set Up after APEC Energy Ministers in 2005:

- "agreed that effective responses to high and increasingly volatile oil prices require a broad range of supply and demand-side measures…including vehicle fuel efficiency and alternative transport fuels"
- directed APEC's Energy Working Group to "develop practical measures to enhance cooperation supporting the development of alternative transport fuels, including the establishment of a Biofuels Task Force."

APEC Biofuels Task Force Has Developed Consensus Messages on

- Biofuel Economics (cost of ethanol vs. petrol and biodiesel vs. diesel)
- Biofuel Trade Opportunities (created by production cost differentials
- Biofuel Infrastructure (cost and time to build biofuel filling station network)
- Fuel-Flexible Vehicles (practical path of uptake into the automobile market)
- Biofuel Resources (current and potential availability of biofuel feedstocks)

Biodiesel from Palm in Malaysia

- In Malaysia, we have learned that biodiesel from palm oil can be produced for about US$0.38 per liter:
  - 26 cents in feedstock cost,
  - 6 cents in capital plant cost, and
  - 6 cents for labor and O&M, with a
  - <0.5 cent credit for glycerine co-product.
- Competes with $42/barrel crude.
- Some 16.3 billion liters or 13.9 million tons of diesel potential could displace 70% of 2002 petroleum demand or 27% of oil demand projected for 2030.

Biodiesel from Jatropha in Indonesia

- Indonesia can produce biodiesel from jatropha for around US$0.44 to US$0.48 per liter:
  - 37 cents for feedstock
  - 8 cents for capital plant cost assuming 10% cost of capital,10-year plant life (or 4 cents assuming a 5% capital cost and 20-year plant life for mature plants)
  - 3 cents in labor and operating costs
  - No credits for byproducts
- Competes with crude at $52 to $58 per barrel
- Biodiesel from palm oil is cheaper, around 39-41 cents per liter, competitive with crude at $44 to $47 per barrel.

2007 APEC Project on Guidelines for Development of Biodiesel Standards

- By establishing guidelines for development of biodiesel standards in the APEC region, the project aims to enhance the potential for biodiesel trade among APEC member economies.
- Project is being led by Thailand while Australia, Chinese Taipei, New Zealand and US co-sponsor.
- Project was developed through APEC Expert Group on New and Renewable Energy Technologies, in cooperation with the APEC Biofuels Task Force.

Introductory Points on Asian Biodiesel

- The quality of biodiesel produced depends on the natural characteristics of feedstocks, which include a variety of animal fats and vegetable oils.
- EN 14214:2003 and ASTM D 6751:2003 are the standards currently used
- The feedstocks used in EU and US are different from those used in much of the APEC region, so standards need to take them into account.

Fatty acids in Thailand Biodiesel

Fatty acid	BDF from						
	Crude palm oil	Crude coconut oil	Jatropha oil	Palm stearin	Palm olein	Soybean oil	Sunflower oil
Caproic acid, C8:0	-	7.42	-	-	-	-	-
Capric acid, C10:0	-	5.78	-	-	-	-	-
Lauric acid, C12:0	0.35	49.75	-	0.25	0.37	0.1	-
Myristic acid, C14:0	0.92	18.75	-	1.27	0.91	0.2	0.1
Palmitic acid, C16:0	44.11	8.60	14.85	59.19	38.53	10.7	6.0
Stearic acid, C18:0	4.36	2.65	7.43	4.43	0.08	3.9	4.0
Arachidic acid, C20:0	0.09	0.18	0.08	0.31	0.13	Other = 0.2	Other = 1.1
Sum of Saturated FA	49.83	93.13	22.36	65.45	40.02	15.1	11.2
Palmitoleic acid, C16:1	-	-	-	0.08	-	0.3	<1.0
Oleic acid, C18:1	38.97	5.53	47.65	28.61	58.13	22.8	16.5
Linoleic acid, C18:2	11.21	1.26	29.80	5.86	1.78	50.8	72.4
Linolenic acid, C18:3	-	0.07	0.19	-	0.07	Other = 6.8	Other = 0.6
Sum of Unsaturated FA	50.18	6.86	77.64	34.55	59.98	80.7	90.5

Biodiesel Standards in Thailand - FAME

Item	Fuel properties	Unit	Standard limit	
1.	Methyl Ester	% wt.	min	96.5
2.	Density at 15° C	kg/m³	min	860
			max	900
3.	Viscosity at 40°C	CSt	min	3.5
			max	5.0
4.	Flash Point	°C	min	120
5.	Sulphur	% wt.	max	0.0010
6.	Carbon Residue, on 10% distillation residue	% wt.	min	0.30
7.	Cetane Number		min	51
8.	Sulfated Ash	% wt.	max	0.02
9.	Water	% wt.	max	0.050
10.	Total Contaminate	% wt.	max	0.0024
11.	Copper Strip Corrosion		max	No. 1
12.	Oxidation Stability at 110°C	hours	min	6

Biodiesel Standards in Thailand - FAME

Item	Fuel properties	Unit	Standard limit	
13.	Acid Value	mg KOH/g	min	0.50
14.	Iodine Value	g Iodine/100 g	min	120
15.	Linolenic Acid Methyl Ester	% wt.	min	12.0
16.	Methanol	% wt.	min	0.20
17.	Monoglyceride	% wt.	min	0.80
18.	Diglyceride	% wt.	min	0.20
19.	Triglyceride	% wt.	min	0.20
20.	Free glycerin	% wt.	min	0.02
21.	Total glycerin	% wt.	min	0.25
22.	Group I metals (Na+K)	mg/kg	min	5.0
	Group II metals (Ca+Mg)	mg/kg	min	5.0
23.	Phosphorus	% wt.	min	0.0010
24.	Additive		Approved by DG of DOEB	

APEC Biofuel Standards – Work Plan

Phase 1:	**Review the current biodiesel standards applied in both APEC economies and non-APEC economies.** **Review the potential feedstocks and evaluate how their natural characteristics may affect the quality of biodiesel.**	**3 month**
Phase 2:	**Review the applicability of lessons learnt on the affect of biodiesel on the diesel engines and vehicles including their emissions.** **Review the opportunities, gaps, barriers and lessons learn from using biodiesel as fuels with engine and automobile manufacturers in order to adopt biodiesel specification and its blends.** **Investigate the additives and antioxidizers necessary for biodiesel.** **Organize the first workshop in Thailand**	**7 month**

APEC Biofuel Standards – Work Plan B

Phase 3:	**Integrate and synthesize the information obtained from phase 1 and 2.**	**10 months**
Phase 4:	**Organize the second workshop in Chinese Taipei with representatives from energy sector among APEC economies.** **The recommendation and the lessons learned from stakeholders will be shared for future practice.**	**13 months**

APEC Biofuel Standards – Work Plan C

Phase 5:	**Integrate and synthesize the information for final report.**	**17 months**
Phase 6:	**Develop the draft final report on the guidelines**	**20 months**

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