DIRECTORATE GENERAL OF NEW RENEWABLE ENERGY AND ENERGY CONSERVATION
MINISTRY OF ENERGY AND MINERAL RESOURCES

UPDATES ON
INDONESIAN BIOFUEL DEVELOPMENT PROGRAM

by :

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BANGKOK, 3 JUNE 2011

OUTLINE

I. Biofuel Policy Updates

II. Implementation Progress

1) Commercial Approach

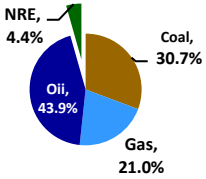
2) Rural Development Approach

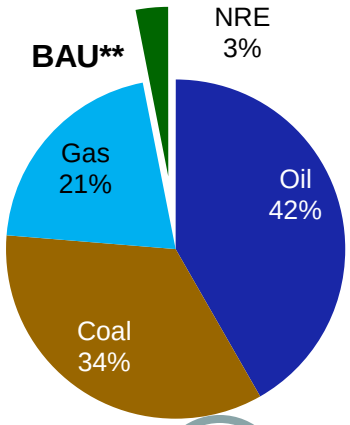
III. Current Research and Development Activities

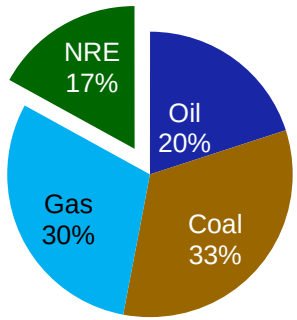
IV. Concluding Remarks

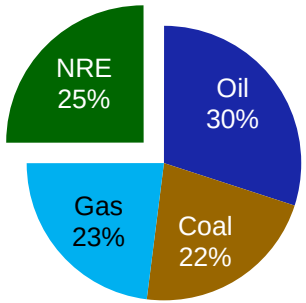
Ministry of Energy and Mineral Resources
Directorate General of New Renewable Energy and Energy Conservation

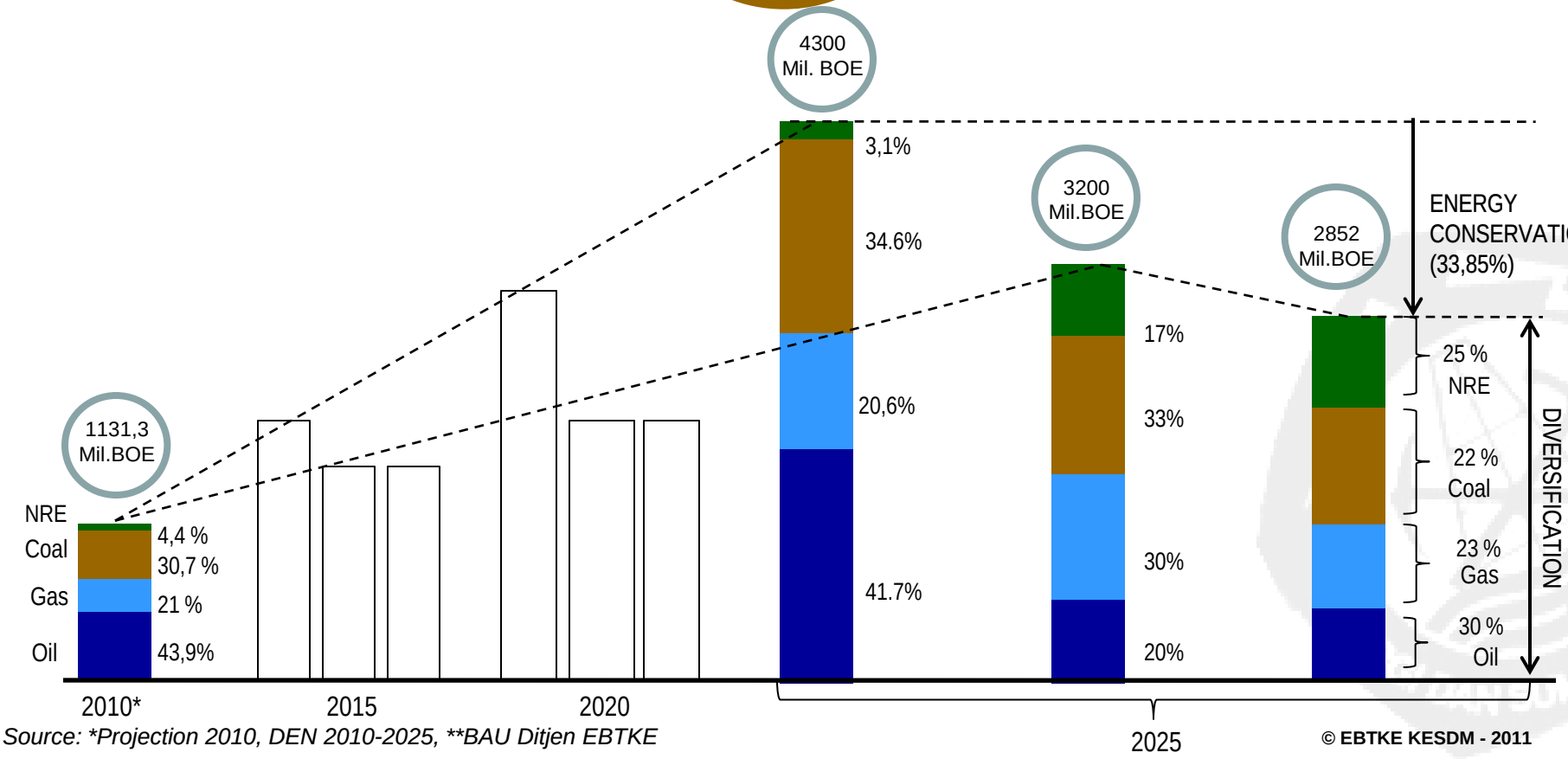
POLICY DIRECTION











*Source: *Projection 2010, DEN 2010-2025, **BAU Ditjen EBTKE*

REFF-Burn : Reducing Emissions from Fossil Fuel Burning*

1. **Pre-Fossil Combustion** to **avoid** fossil energy utilization, such as:
   - Efficient Energy Technology
   - Renewable Energy Technology
   - Fugitive Emission Reduction
2. **During Fossil Combustion** to **reduce** GHGs emissions :
   - Clean Coal Technology
   - Clean Fuel Technology
   - Flared Gas Reduction Technology
   - Clean Energy Utilization (Household, Commercial, Transportation, Industry)
3. **Post Fossil Combustion** to **mitigate** existing GHGs emission:
   - Carbon Capture and Storage (CCS)
   - Algae
   - Post-Mining Reclamation
   - Utilization of CO2

*) Presented at IEA meeting on 29 April in Paris

Biofuel Incentives

- Staging of mandatory biofuel utilization
- Tax exemption on VAT
- Investment tax incentives
- Direct subsidy on retail price for transportation sector
- Interest rate subsidy for biofuel feedstock plantation
- Simplifying the license procedure on biofuel business

Incentives for commercial on grid implementation

1. Giving priority for locally available renewable energy resources (no need for tender)
2. Mandatory for electric utility to purchase electricity generated from renewable energy
3. Regulated Purchasing Price
4. Tax investment credit for electricity generated from renewable energy (currently applies for geothermal)
5. Reduced or exempted custom tax for renewable energy technologies
6. Simple permit procedure
7. Support from the government for selected FS

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BIOFUEL IMPLEMENTATION APPROACHES

Independent Producers (Independent Fuel Producers or Independent Power Producer) Approach (On-Grid Like)

- Aimed to develop the national bioenergy industries and markets
- The independent fuel producers can sell their products to the companies which hold the commercial license on fuel (such as PT Pertamina Persero)
- The independent fuel producers can sell their products to the companies which hold the license to generate and sell the electricity for public needs (such as PT PLN Persero).

Conversion and Distribution Approach (Off-grid like)

- Aimed to fulfill the need of local energy demand
- The bioenergy entrepreneur convert the raw material into the bioenergy and can sell the energy in their own business areas.

Social/Pilot Project

- Aimed to increase the access of electricity and increase the welfare of society
- The project is fully financed by the Government/Local Government/Stated Owned Enterprise.
- The asset of the project is then bestowed to the business entity with a legal license.

BIOFUEL MANDATORY

AS ENERGY AND MINERAL RESOURCES MINISTER REGULATION NO 32, 2008

BIOETHANOL (Minimum)						
Sector	**2008**	**2009**	**2010**	**2015**	**2020**	**2025**
Transportation, PSO	3% (Existing)	1%	3%	5%	10%	15%
Transportation, Non PSO	5% (Existing)	5%	7%	10%	12%	15%
Industry		5%	7%	10%	12%	15%

BIODIESEL (Minimum)						
Sector	**2008**	**2009**	**2010**	**2015**	**2020**	**2025**
Transportation, PSO	1% (Existing)	1%	2.5%	5%	10%	20%
Transportation, Non PSO		1%	3%	7%	10%	20%
Industry	2.5%	2.5%	5%	10%	15%	20%
Electricity	0.1%	0.25%	1%	10%	15%	20%

NATIONAL BIOFUEL INDUSTRY

I. BIOFUEL PRODUCTION CAPACITY

Biofuel	2006	2007	2008	2009	2010
Biodiesel (kL)	214,943	1,709,195	3,137,931	4,277,440	3,900,000
Bioetanol (kL)	10,000	12,500	102,000	153,000	153,000
Total (kL)	224,943	1,721,695	3,239,931	4,431,440	4,053,000

II. BIOFUEL PRODUCTION

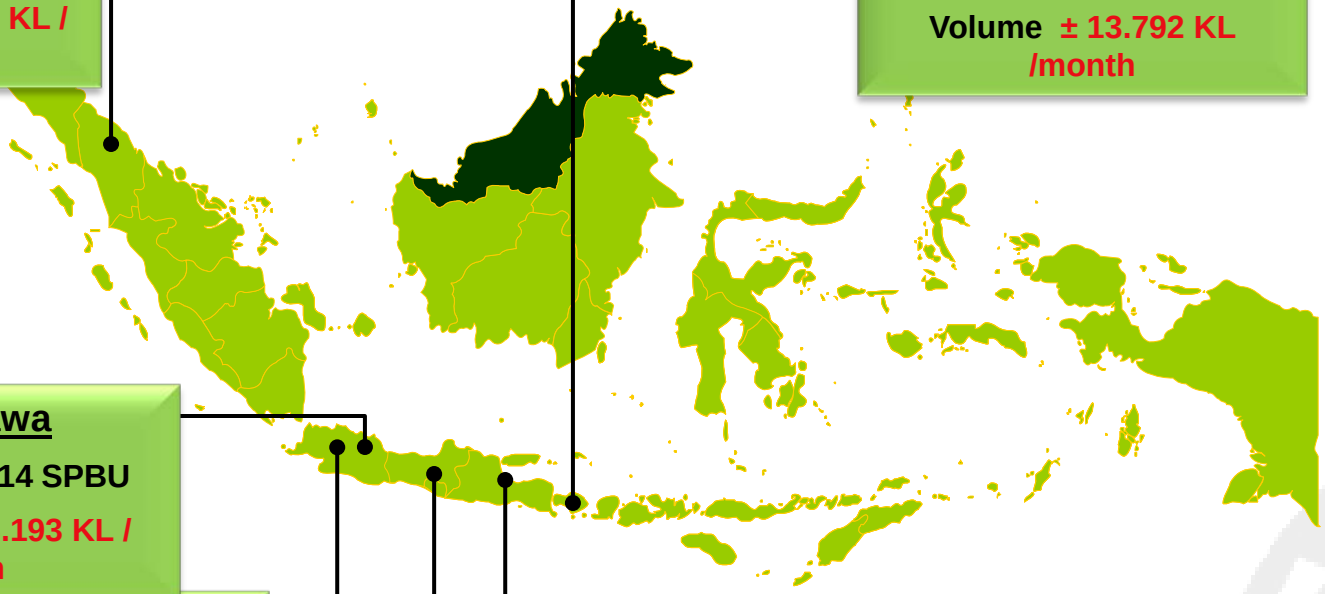
Biofuel	2006	2007	2008	2009	2010		
					Prod.	Exported	Local Consumption
Biodiesel (kL)	24,000	35,000	119,348	350,000	455,000	235,000	220,000
Bioetanol (kL)	300	1,000	1,058	1,722	-	-	-
Total (kL)	24,300	36,000	111,200	351,722	455,000	235,000	220,000

Ministry of Energy and Mineral Resources
Directorate General of New Renewable Energy and Energy Conservation

Selling of BIOSOLAR by Pertamina (State Oil Co.) (up to. October 19, 2010)

North Sumatera
Biodiesel : 154 SPBU
Volume ± 4.636 KL / month

Bali
Biodiesel : 203 SPBU
Volume ± 13.792 KL /month



West Jawa
Biodiesel : 714 SPBU
Volume ± 93.193 KL / month

Jabodetabek & Banten
Biodiesel : 727 SPBU
Volume ± 73.088 KL / months

East Jawa
Biodiesel : 739 SPBU
Volume ± 78.178 KL / month

Central Jawa & DIY
Biodiesel: 656 SPBU
Volume ± 63.795 KL / month

SPBU : Fuel Stand

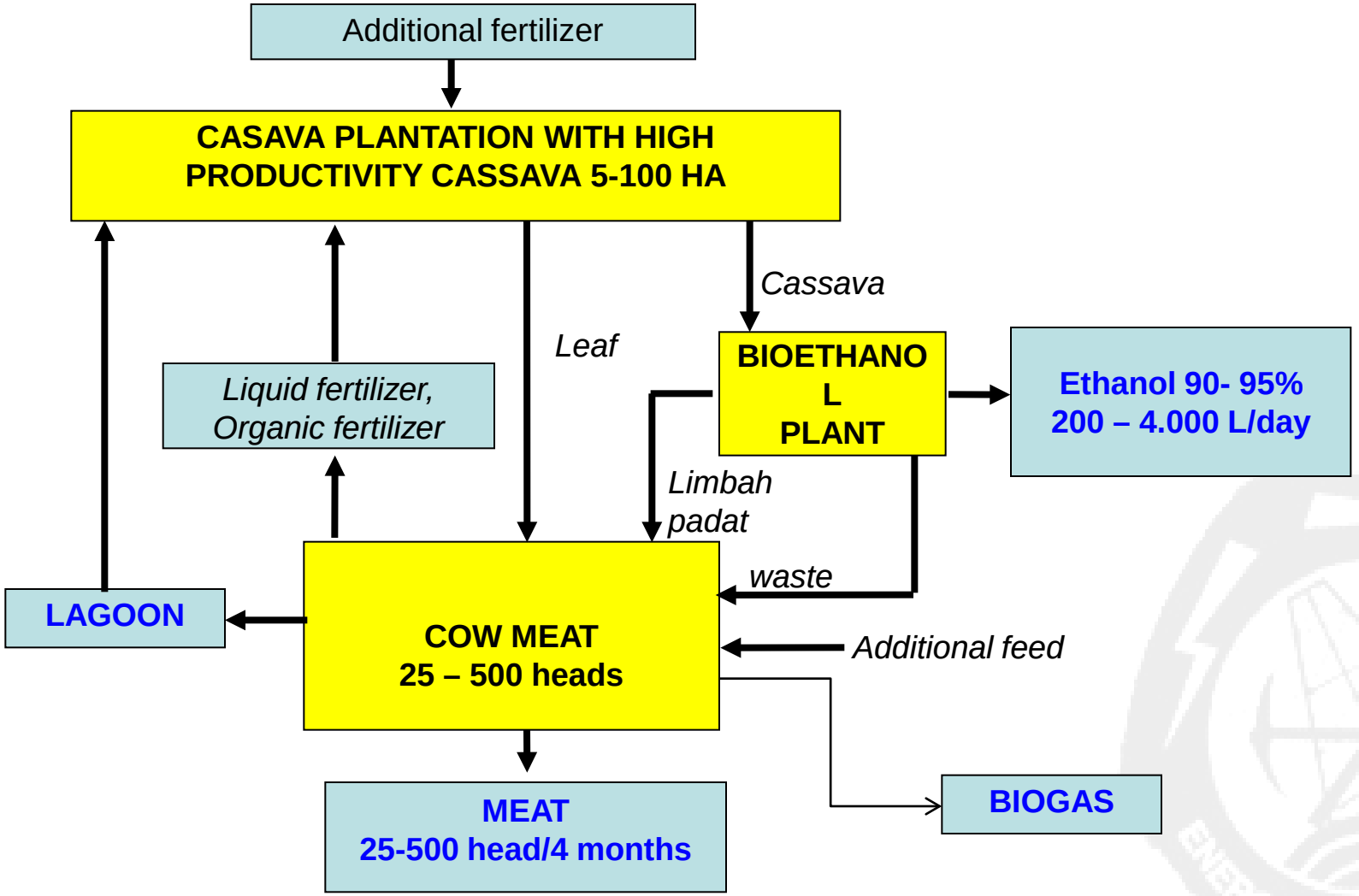
Total Selling:

Biodiesel : 2893 SPBU
Volume : ± 324.534 KL/Month

Source : Pertamina

Indonesia : 33 Provinces

Integrated Small Scale Bioethanol Plant



Ministry of Energy and Min
Directorate General of New

Integrated sweet sorghum based bioethanol plant
Cap. 400-720 Liter / Day

100 hektar

Leaf

Organic fertilizer

MEAT
250 heads/period
750 heads/year

Stalks
12.5 ton/day

Grain, 2 tons/day

Feed comp.
1 ton/day

Wastewater
as drink
5 m^3/day

SORGHUM FLOUR
1 ton/day

BIOETHANOL
50-99,5 %

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R & D on Bioenergy in Indonesia

FEEDSTOCK

- Agronomic researches on *Jatropha curcas* L has been carried carried out since 2005 by the Pakuwon Jatropha Nursery and Experimental Plantation, Indonesian Center for Estate-crops Research and Development (ICERD), Ministry of Agriculture. The activities include developing Jatropha breed with higher seed productivity, simultaneously maturing fruits for efficient harvesting, genetic, pest , and disease controls, certification of distributed seed and inter-crop selection.
- Among others, they have succeded to develop the third improved population (IP-3) of Jatropha curcas, expected to yield 8 – 9 ton/ha/yr seeds (on the 4^{th} year and afterward).
- Agronomic researches on *Pongamia pinnata*, a fast growing tree that yields non edible oil as well as potentially high value-added chemicals, are being carried out by the R & D Center of the Ministry of Forestry (Bogor, West Java) and the Department of Agronomy, University of Sebelas Maret (Surakarta, Central Java).
- Agronomic researches on *Calophyllum inophyllum*, a tree that is useful for coastal area conservation and productively yield oil containing potential medicinal chemicals, is being carried out by the R & D Center of the Ministry of Forestry (Bogor, West Java).

PROCESS

- Research on the extraction and further processing of crude oils from *Pongamia pinnata* and *Calophyllum inophyllum* is being carried out at the Department of Chemical Engineering, Institut Teknologi Bandung (West Java).
- The Agency for Assessment and Application of Technology and Institut Teknologi Bandung are collaborating in the R & D of processes based on nonacidic catalysts for biodiesel production from high-acid oils.
- Varios pretreatment methods for enhancing hydrolytic-enzymes access to the carbohydrates of oilpalm empty fruit bunches (an abundantly available lignocellulosic residue) are being investigated by various research institutions.
- The application of manure-based biogas for household cooking and electricity generation in the rural areas is growing and technology to enhance biogas production from crop residues are beng investigated by various research institutions.

- The technology of biomass gasification for small and medium scale electricity generation are being demostrated in several locations.
- The technical feasibility of biomass-based organic Rankine cycle technology for electricity generation in the remote areas is being envisaged/assessed.

Fruits and seeds of
Pongamia pinnata

Fruit and seed of
Calophyllum inophyllum

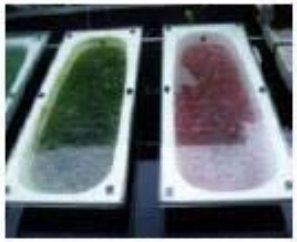
Microalgae Research Status

RESEARCH ROADMAP 2006–2011

Product and Processing

Science and Technology Development

Idea and Concept



Microalgae Harvesting experiment using filtration system

Raceway pond design

Microalgae Sampling, Identification and Isolation from Indonesian waters Indonesia

Microalgae Cultivation outdoor open system

Fotoperiod in laboratory scale microalgae cultivation system

Nutrient deppreviation in laboratory scale microalgae cultivation system

Microalgae cultivation using heterotrophic system

Microalgae cultivation using pure CO2 injection

Microalgae Species Collection from Indonesian waters

Microalgae Cultivation for producing biofuel

Photobioreactor design and prototype

Microalgae quality and quantity cultivation development

Microalgae cultivation in Industrial wastewater from PT Batamindo

2006

2007

2008

2009

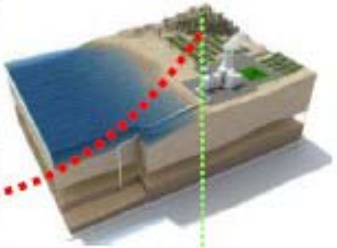
RESEARCH ROADMAP 2006–2011

Market and Commercialization

Production Process and Product Technology

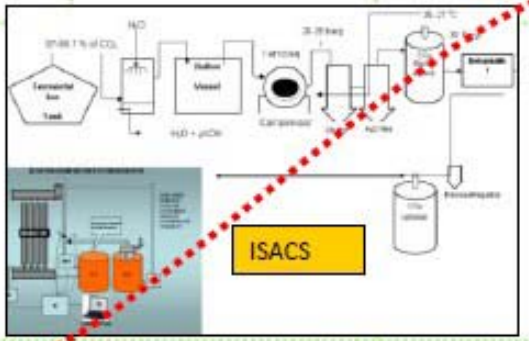
Experiment and Product Completion

Activities of Research Incentive RISTEK 2010



CO2 scrubber system design and prototype

Microalgae cultivation in ISACS (*Integrated System for Algae Cultivations*) with computerized system



ISACS

Pilot plant build-up in microalgae biofuel industry location

Microalgae cultivation in industrial wastewater from PT Kota Bukit Indah

Competitive Research Grants Under the National Priorities

Optimizing the Selection of Microalgae Potential Species of Oil Producing For Supporting Economic Feasibility of Biodiesel Production

Product experiment in microalgae biofuel industry

Programs Continuity to support microalgae biofuel

2009

2010

2011

Current Research on Biofuel

Topic
BTL process improvement
Gasification process & catalysts for BTL fuels
Light oil production by hydrocracking of vegetable oil and FT wax over NiMo catalysts
Bioethanol production from Empty Fruit Bunch
Production of bioethanol & carbon fibers from palm derived biomass
Partial hydrogenation of BDF using various catalysts for improving oxidation stability
Hydrotreating reactor systems for upgrading BDF
Design of continuous catalytic reactor for upgrading BDF
High-quality biodiesel from low-grade and fatty acid rich triglycerides

Future sustainable biofuel development

- Not to cut tropical rain forest, but to optimize currently not utilized land (5.066 million ha available of non utilized arable land).
- Development of non-edible feedstock and dedicated feedstock for biofuel;
- Improving productivity of main feedstocks such as palm oil, jatropha, cassava and sugar cane;
- Development of second generation of biofuel that will create sustainable and low cost biofuel industry;
- To seek cooperation on R&D on lignocellulosic based or woody-biomass bioethanol.

Concluding Remarks

- Indonesia Biofuel Program is directed to support national sustainable development and energy security
- Sustainability aspect of biofuel/bioenergy is still a big issue and need more collaboration and cooperation among countries/regional/multilateral organization for development of criteria and indicator for sustainability of biofuel is necessary

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