



Bioenergy:
**Opportunity, challenge, and way
forward in Indonesia**

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Republic of Indonesia

Why bioenergy ...

CURRENT PROBLEMS ON OIL ECONOMY

SUPPLY SIDE

Problem on oil supply
and price

EMISSION SIDE

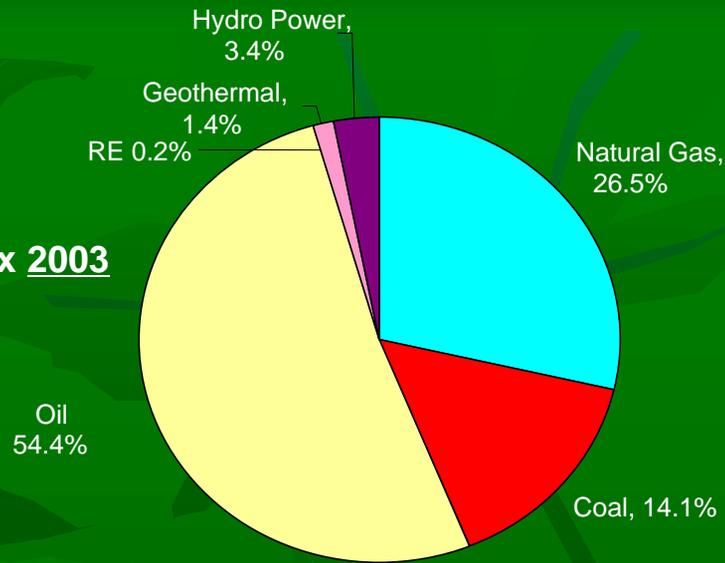
Problem on fossil fuel
emission (global warming)

SEARCHING FOR NEW KIND OF
SUSTAINABLE ENERGY SOURCES

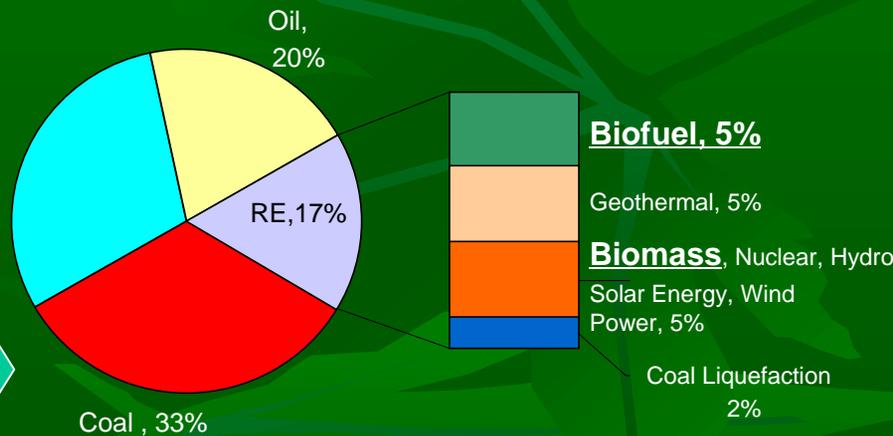
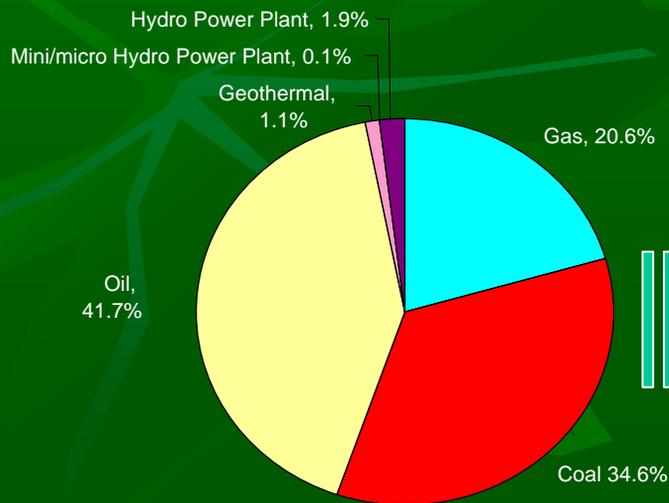
RENEWABLE ENERGY: SOLAR, HYDRO,
WIND, BIOMASS, GEOTHERMAL, ETC.

Composition of Indonesia Energy Supply

National (Primary) Energy Mix 2003



National (Primary) Energy Mix of 2025 (BaU Scenario)

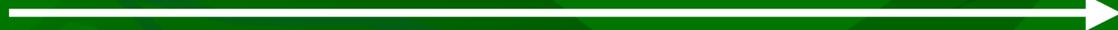


Energy Mix Year 2025 (President Regulation Number 5/2006)

Bioenergy is energy produced by using biomass products



Direct burning



Termo-chemical



Gasification, pyrolysis,
transesterification

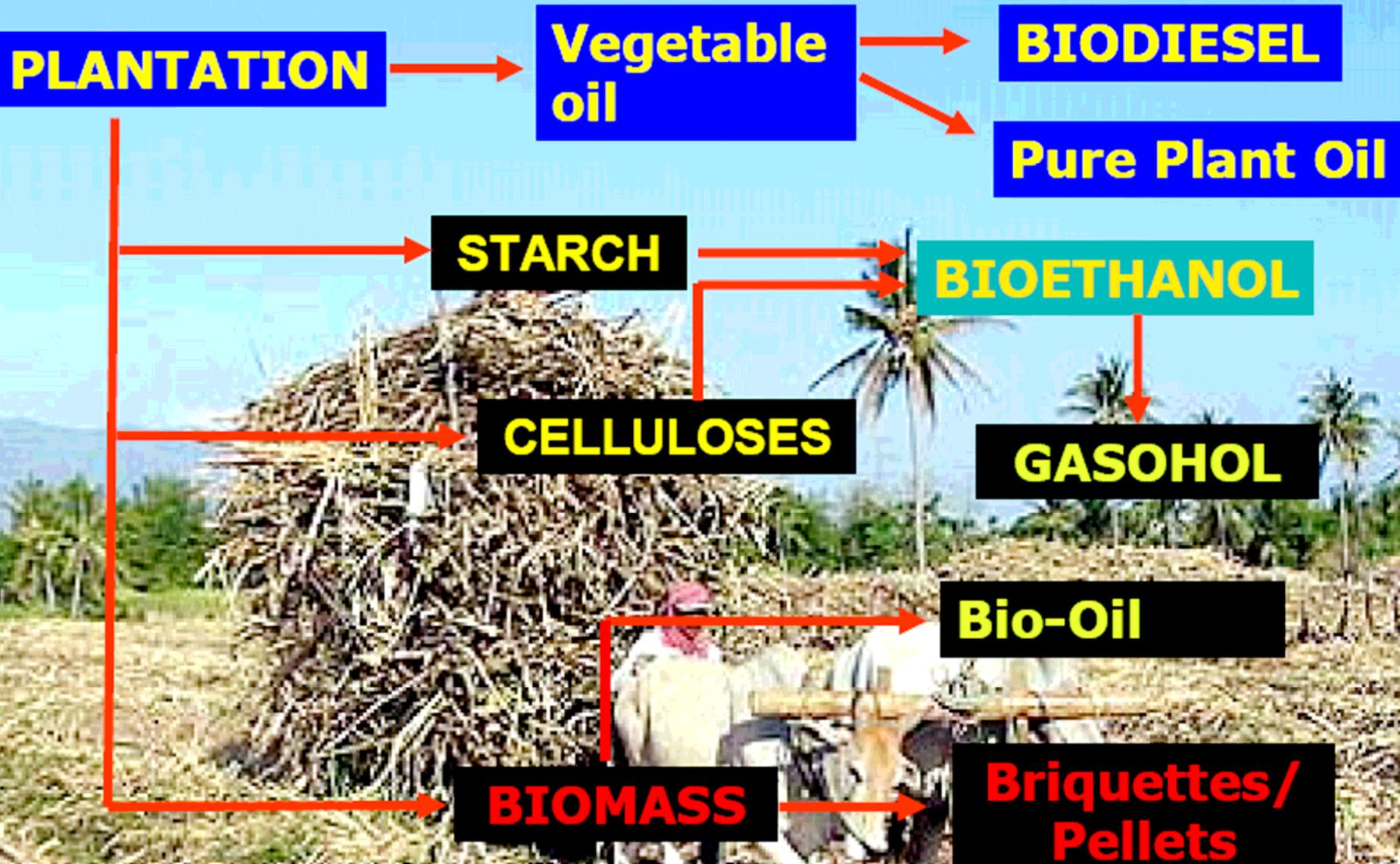
Bio-chemical



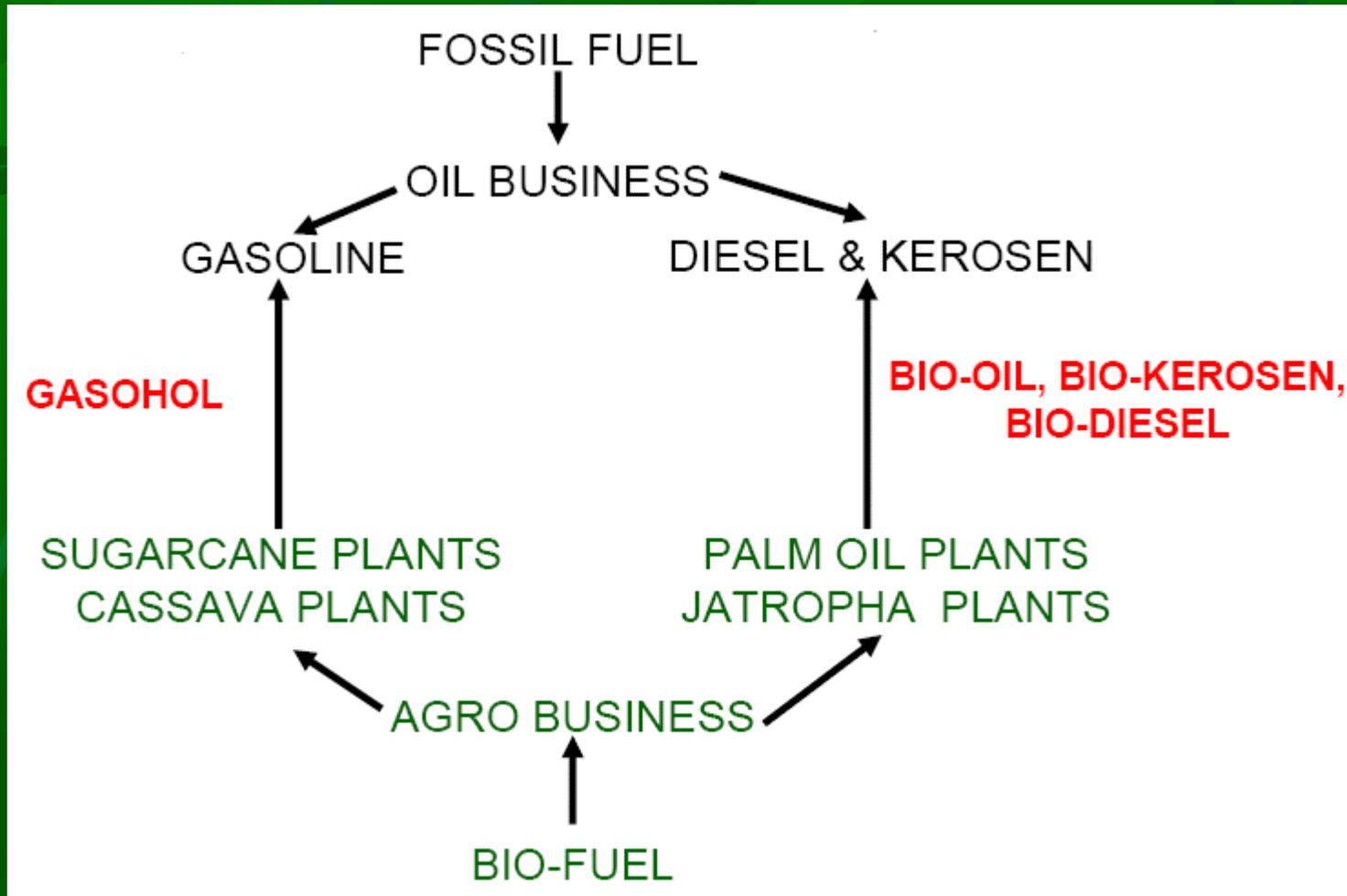
Anaerobic digestion,
hydro-fermentation

ENERGY
Fuel (gas and liquid)

Biofuel is fuel produced by using biomass products



Biofuel is promising candidate to replace fossil fuel



BIOFUEL COMMODITIES IN INDONESIA

✓ **Palm**

✓ **Jatropha Curcas**

Biodiesel, Pure
Plant Oil

✓ **Sugarcane**

✓ **Cassava**

Bioethanol

BIOFUEL UTILIZATION

Type	Usage	User Side	Raw Material
Bioethanol	Gasoline substitute	Transportation 10%	Sugar cane and cassava
Bio-oil			
– Biokerosin	– Kerosene Substitute	Household 10%	Palm and Jatropha curcas
– Bio-oil	– ADO substitute	Transportation 10%	
		Power Plant 10–50%	
	– IDO substitute	Sea Transportation and Train 10%	
– Bio-oil	– Fuel oil substitute	Industry 50%	
Biodiesel	Diesel Fuel substitute	Transportation 10% Power Plant 50%	Palm and Jatropha curcas

CURRENT CONDITION INFLUENCES BIOFUEL DEVELOPMENT

1. Oil consumption still dominates national energy mix (52%)
2. High number of unemployment and poverty
3. High subsidy for fossil fuel, and 43% of domestic fossil fuel is still imported
4. High potential for biofuel feedstock supply and land availability that suitable for biofuel plantation
5. Proven biofuel technology by local potential (Engineering, Research and Development)

CURRENT CONDITION INFLUENCES BIOFUEL DEVELOPMENT (cont.)

6. Biofuel industry allows community participations, including farmer
7. Opportunity in exporting Biofuel products
8. The development of biofuel needs cross-sectoral coordination and program
9. Local Government has an opportunity in increasing its economic development through biofuel program

REGULATIONS related to BIOFUEL DEVELOPMENT

1. Presidential Regulation No. 5/2006 on National Energy Policy
2. Presidential Instruction No. 1/2006 on Supply and Utilization of Biofuel as Alternative Fuel
3. Presidential Decree No. 10/2006 on The Establishment of National Team for Biofuel Development
4. Estate Crop Law No. 18/2004
5. Government Regulation No. 1/2007 on Income Tax Facilities for Investment Activities in Specific Industries and/or Particular Region
6. Government Regulation No. 8/2007 on The Government Investment
7. Law No. 22/2001 on Oil and Natural Gas
8. Presidential Regulation No. 36/2004 on Oil and Natural Gas Downstream Activities

REGULATIONS related to BIOFUEL DEVELOPMENT

9. Minister of Energy and Mineral Resources Decree No. 051/2006 on Guideline and Procedure for Biofuel Businesses
10. Minister of Finance Decree No. 117/PMK.06/2006 on Credit for the Development of Biofuel Energy and Plantation Revitalization
11. National Standard (SNI) for Biodiesel No. 04 – 7182 – 2006
12. National Standard (SNI) for Bioethanol No. DT27 – 0001 – 2006
13. Director General for Oil and Gas Decree No. 3674K/24/DJM/2006 on Gasoline Specification for Domestic Market
14. Director General for Oil and Gas Decree No. 3675K/24/DJM/2006 on Diesel Fuel Specification for Domestic Market
15. Director General for Oil and Gas Decree No. 13483K/24/DJM/2006 Biodiesel Specification for Domestic Market

STRATEGY OF BIOFUEL IMPLEMENTATION

1. Developing investment and finance scheme to support biofuel program
2. Developing price mechanism, starting from feedstock up to biofuel product.
3. Increasing local potential
4. Increasing availability of feedstock and production needs
5. Stipulating biofuel trading system
6. Accelerate land availability
7. Developing Special Biofuel Zone and Self Sufficient Energy Village
8. Improving local Government and community participation in Biofuel business
9. Biofuel security of supply

ROADMAP FOR BIOFUEL DEVELOPMENT

Year	2005-2010	2011-2015	2016-2025
Biodiesel	<p>Biodiesel Utilization 10% of Diesel Fuel Consumption 2.41 million kL</p>	<p>Biodiesel Utilization 15% of Diesel Fuel Consumption 4.52 million kL</p>	<p>Biodiesel Utilization 20% of Diesel Fuel Consumption 10.22 million kL</p>
Bioethanol	<p>Bioethanol Utilization 5% Gasoline Consumption 1.48 million kL</p>	<p>Bioethanol Utilization 10% Gasoline Consumption 2.78 million kL</p>	<p>Bioethanol Utilization 15% Gasoline Consumption 6.28 million kL</p>
Bio-oil - Biokerosene - Pure Plantation Oil for Power Plant	<p>Biokerosene Utilization 1 million kL</p> <p>PPO Utilization 0.4 million kL</p>	<p>Biokerosene Utilization 1.8 million kL</p> <p>PPO Utilization 0.74 million kL</p>	<p>Biokerosene Utilization 4.07 million kL</p> <p>PPO Utilization 1.69 million kL</p>
Biofuel	<p>Biofuel Utilization 2% of energy mix 5.29 million kL</p>	<p>Biofuel Utilization 3% of energy mix 9.84 million kL</p>	<p>Biofuel Utilization 5% of energy mix 22.26 million kL</p>

The background of the slide is a dark green color with a pattern of lighter green, stylized leaves and branches. The leaves are scattered across the frame, some overlapping, creating a natural, organic feel. The text is centered in the upper half of the slide.

Progress of Biofuel Development in Indonesia

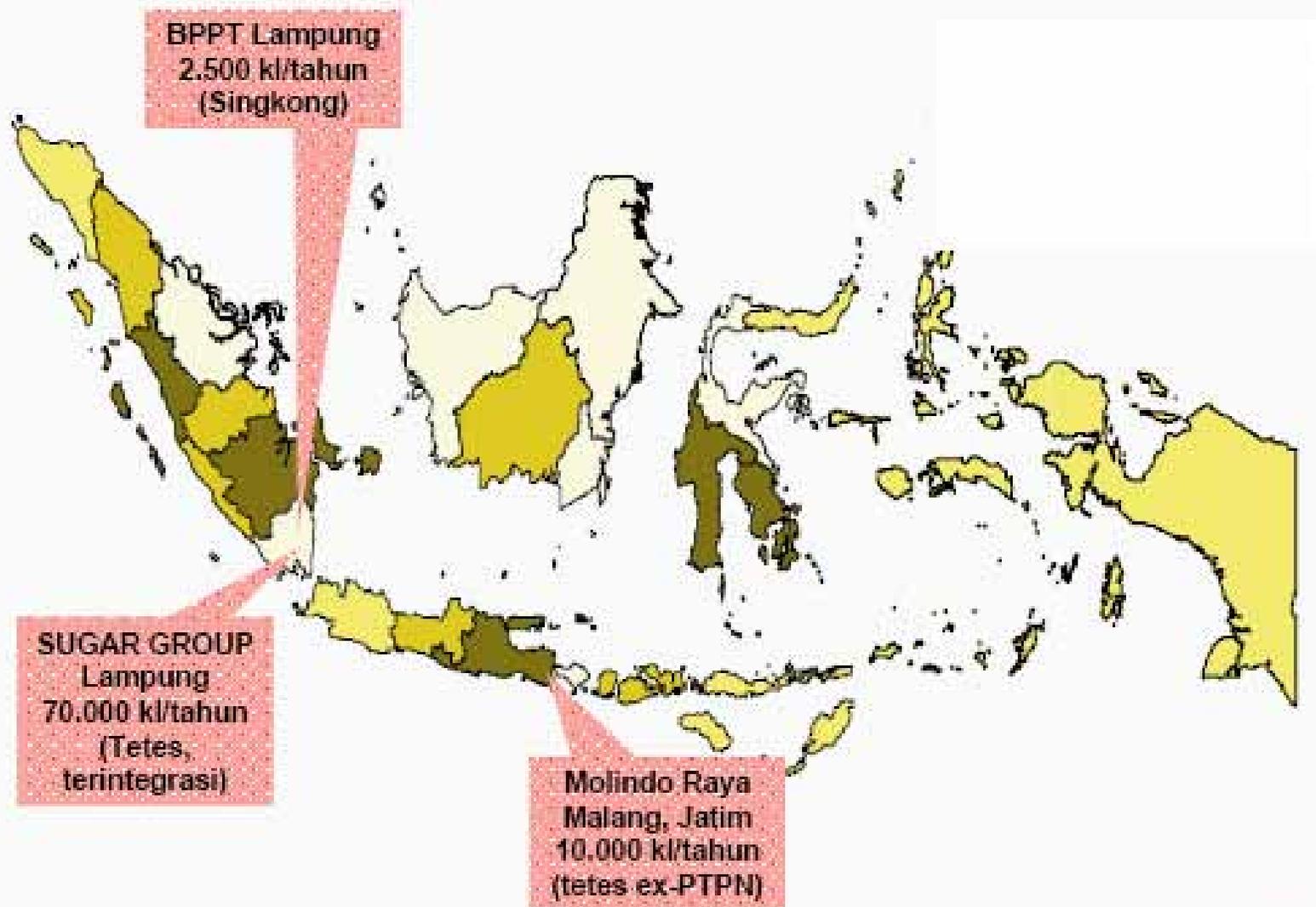
Technology Status

- Technology to produce fuel-grade bioethanol, biodiesel, and bio-oil plant are readily available
- Technology to produce superior variety of Jatropha and Cassava are still being examined
- Further testing needed: biofuel performance at various blends and its exhaust gas, complete and through test on automotive engine, effect on engine components

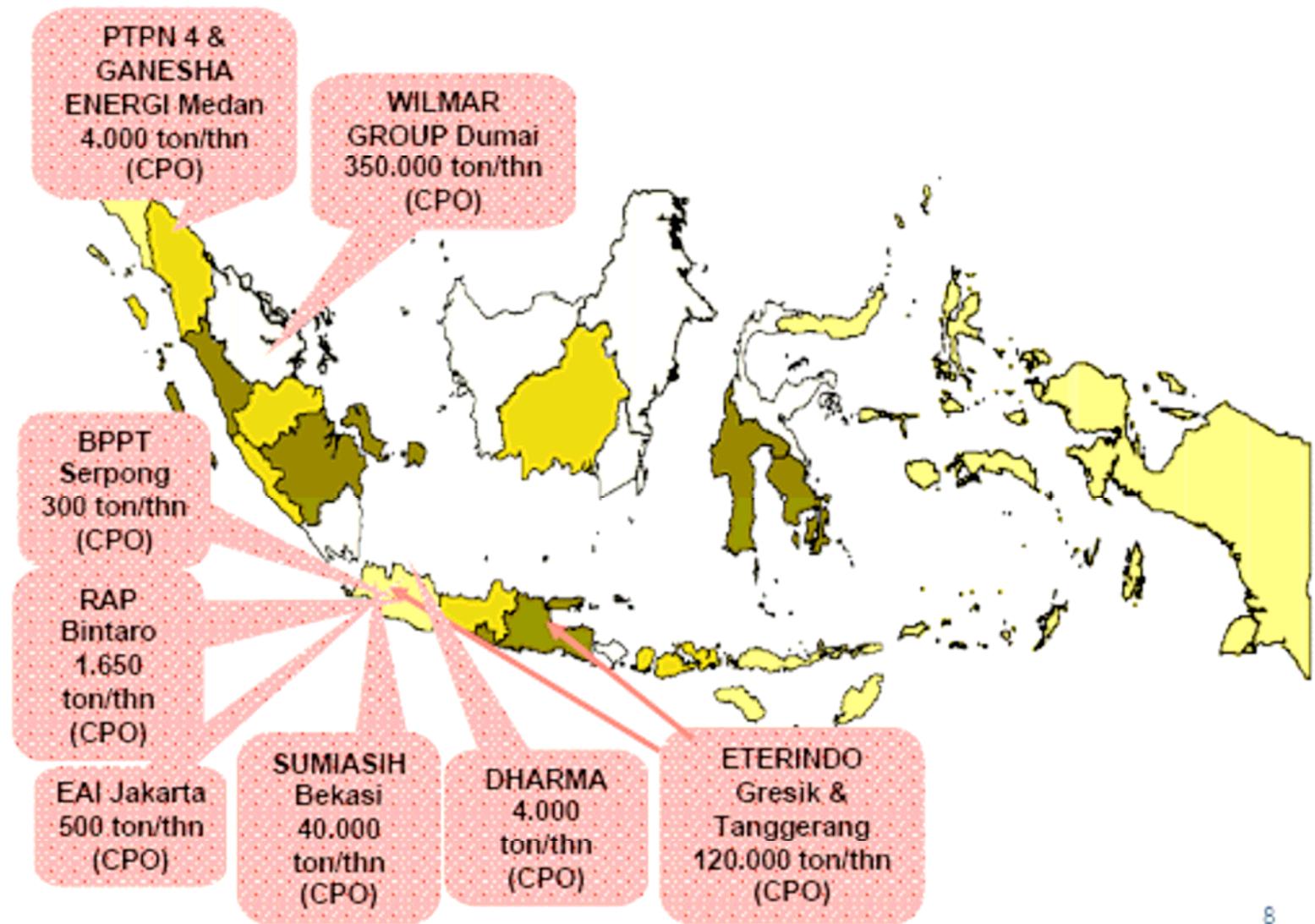
BIOFUEL DEVELOPMENT PROGRESS

- ❑ Availability of Biofuel Development Blue Print
- ❑ Availability of Biofuel Development Regulations
- ❑ Biodiesel (B-5), has been sold in 201 gas stations in Jakarta and 15 gas stations in Surabaya
- ❑ Bioethanol (E-5), which is known as Bio-Premium has been sold in Malang and Jakarta. Started December 2006 Bio-Pertamax has been sold in 5 gas station in Jakarta
- ❑ Started of Energy Self Sufficient Village using Biofuel
- ❑ Commitments of Investor to develop Biofuel
- ❑ Biofuel Producers, among others :
 - PT. Eterindo Jawa Timur
 - PT. Molindo Raya
 - PT. Energi Alternatif Indonesia
 - PT. Sumi Asih
 - PT. Platinum
 - PT. Lampung Destileri

2. Produksi Fuel-grade BIOETHANOL – April 2007: 82.500 KL



3. Produksi BIODIESEL – April 2007: 520.000 KL



BIOFUEL POWER GENERATOR 2007

No	Power Plant	Location	Capacity (kW)
1	PLTD Muara Teweh – Kuala Kapuas	South Kalimantan	4.250
2	PLTD Pangkalan Bun (lama)	South Kalimantan	3.000
3	PLTD Buntok – Kuala Kapuas	South Kalimantan	4.000
4	PLTD Kotabaru - Kotabaru	South Kalimantan	4.000
5	PLTD Pagatan - Kotabaru	South Kalimantan	4.500
6	PLTD Petung	East kalimantan	10.000
7	PLTD Long Ikis	East kalimantan	2.500
8	PLTD – Melak	East kalimantan	1.250
9	PLTD Kota Bangun	East kalimantan	2.000
10	PLTD Nunukan	East kalimantan	5.000
11	PLTD Tanjung Selor	East kalimantan	4.250
12	PLTD Malinau	East kalimantan	1.000

BIOFUEL POWER GENERATOR 2007 (cont.)

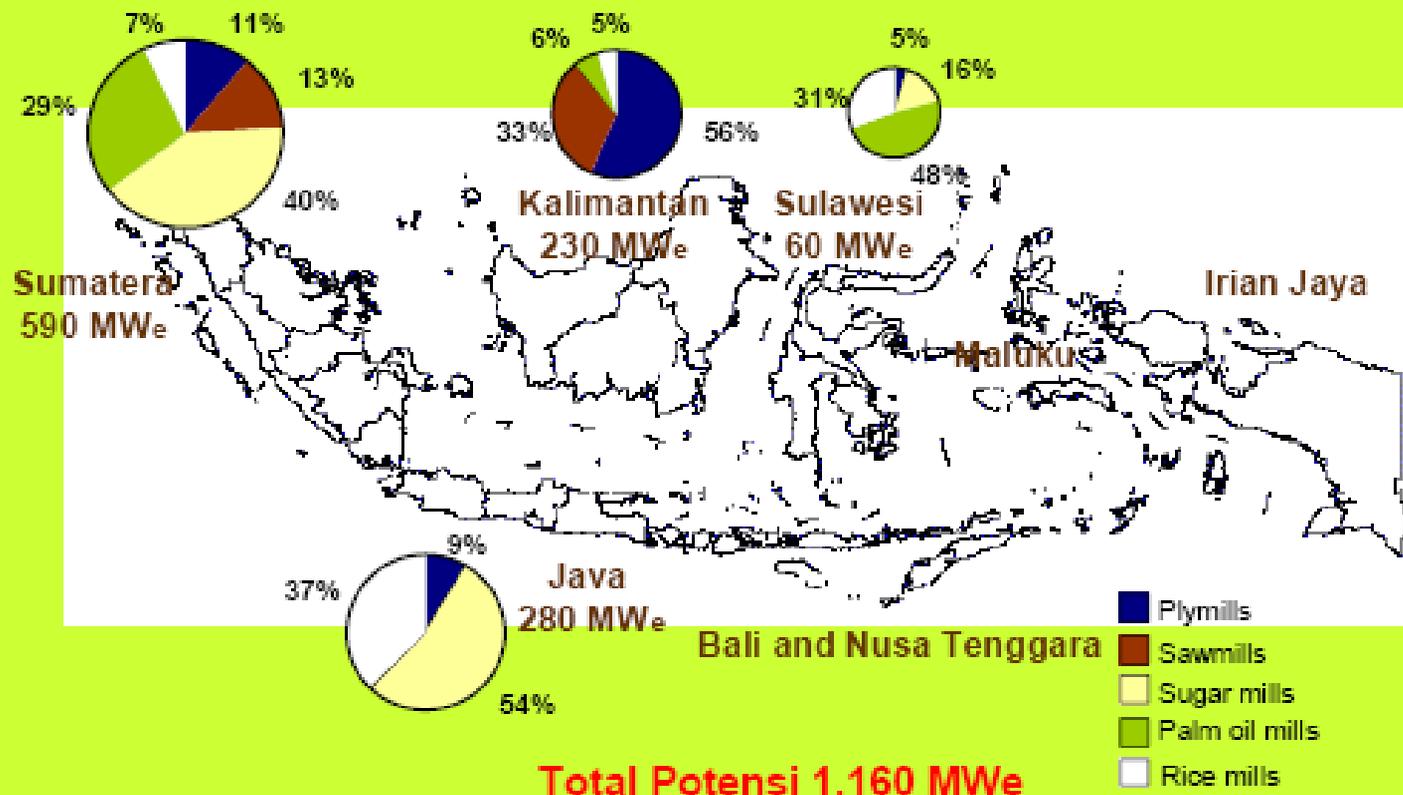
No	Power Plant	Location	Capacity (kW)
13	PLTD Gunung Sitoli - Nias	North Sumatra	4.500
14	PLTD Piru - Ambon	Maluku	750
15	PLTD Bula	Maluku	375
16	PLTD Sofifi	Maluku	750
17	PLTD Malifut	Maluku	550
18	PLTD Maffa	Maluku	150
19	PLTD Kairatu	Maluku	700
20	PLTD Masohi	Maluku	700
21	PLTD TB Karimun	Riau & The Islands of Riau	13.000
22	PLTD Teluk Kuantan	Riau & The Islands of Riau	1.100
23	PLTD Lampung	Lampung	11.000
24	PLTD Nusa Penida	Bali	1.500

Potency of energy generated by using other biomass products in Indonesia

BIOMASS	PRODUCTION (mill t/year)	ENERGY POT (GJ/year)
Rubber wood	41	120
Logging residues	4.5	19
Sawn timber residues	1.3	13
Wood residues	1.5	16
Sugar residues	Bagasse:10, cane top:4, cane leaves: 9.6	78
Rice residues	Husk:12, bran:2.5, stalk:2, straw:49	150
Coconut residues	Shell:0.4, husk:0.7	7
Palm oil residues	Empty bunches 3.4, fibre:3.6, shell:1.2	67

Source: Regional Seminar on Commercialization of Biomass Technology, China, 2001

Potency of energy generated by using other biomass products



Sumber : Zentrum für rationell Energieanwendung und Umwelt GmbH (ZREU), 2000. Biomass In Indonesia – Business Guide.

PICTURE: BIOMASS POTENTIAL MARKET FOR POWER PLANT IN INDONESIA

Obstacle on bioenergy development in Indonesia

- Oil subsidy → reduce competitiveness of bioenergy compared with fossil fuel
- High investment cost
- Lack of financial institution interested in bioenergy development
- Lack of strong and clear action from related institutions (policy, finance, and technology)
- Conflict between bioenergy development and food security

Way forward on bioenergy development in Indonesia

- Reduce/eliminate oil subsidy
- Shift the oil subsidy (or carbon tax) to support bioenergy development
- Encourage (by using clear policy) financial institution to support bioenergy development
- Launch strong and clear action (from related institutions in national and local level) on biofuel development
- Plantation of the bioenergy should be cultivated on non-agricultural area (if it is possible on degraded forest, about 53.9 millions hectare)

Thank you

