



PROSPECTIVE BUSINESS COOPERATION IN INDONESIA'S RENEWABLE ENERGY

Workshop “ Remarkable Indonesia”
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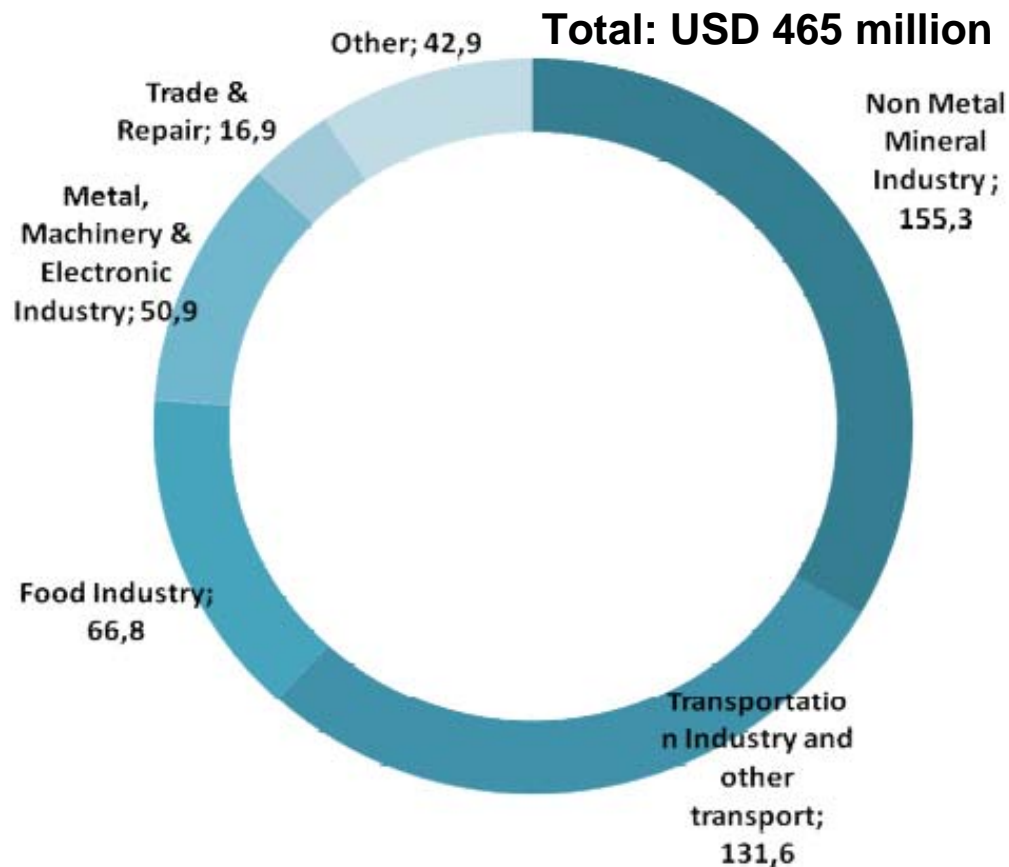
COUNTRY'S SNAPSHOT & ECONOMIC UPDATES

- Geographical area : 1.9 million sq km (*as large as Europe or USA*)
- Population: 240 million people
- Major Cities' population:
 - Jakarta: 9.5 million, Surabaya: 5 million, Bandung: 3 million, Medan: 2.1 million
- Demographic
 - 4th most populous nation in the world, after China, India and USA
 - Of the 240 million people, 60% is under 39 years of age, contributing a dynamic workforce
- GDP of more than \$700 Billion in 2010, the 3rd fastest growing economy in Asia and the largest economy in SE Asia.
- In 2010, the economy grew at 6.1% and is forecasted to climb to 6.3% by 2012.
- In need of Infrastructure for manufacturing: modernization of machineries, energy supply, roads, and ports

GERMAN INVESTMENT IN INDONESIA

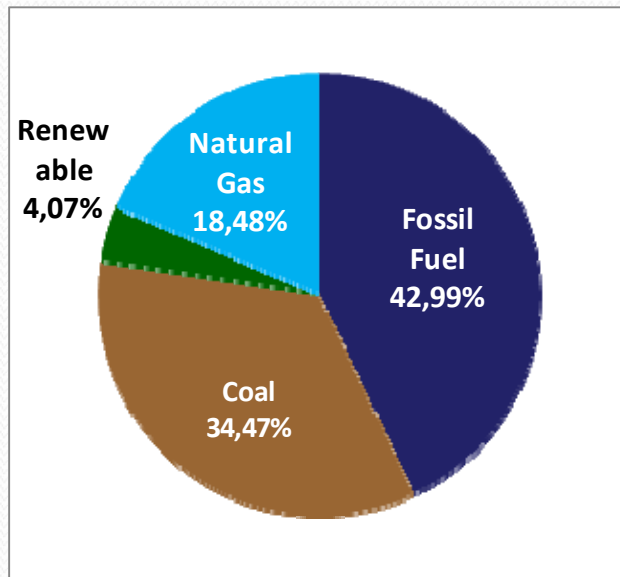
Germany Investment : realization by Sector, 2005-2010

(US\$. Mn)



INDONESIA ENERGY CONDITION 2009

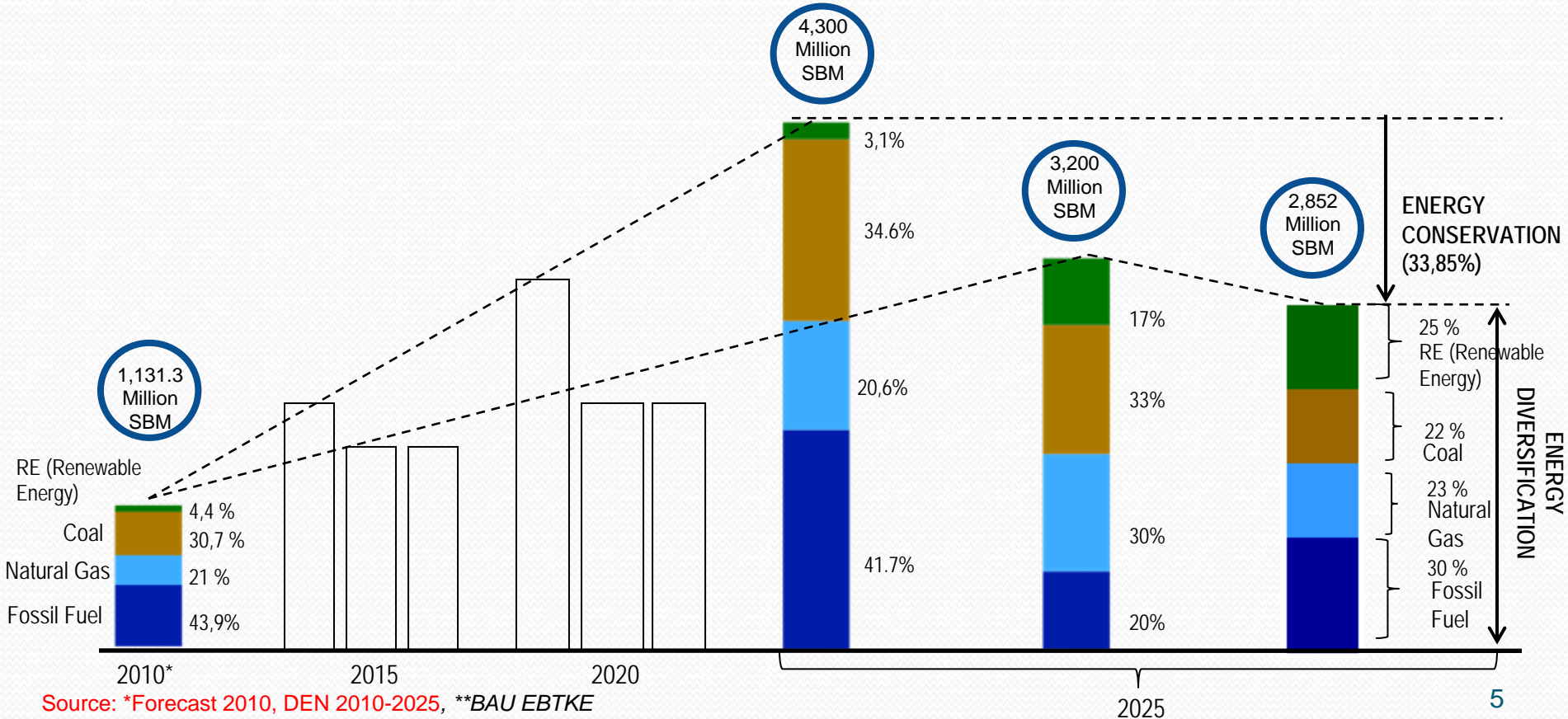
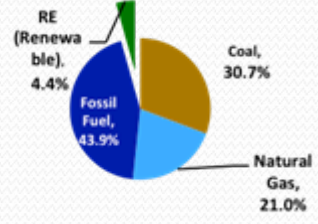
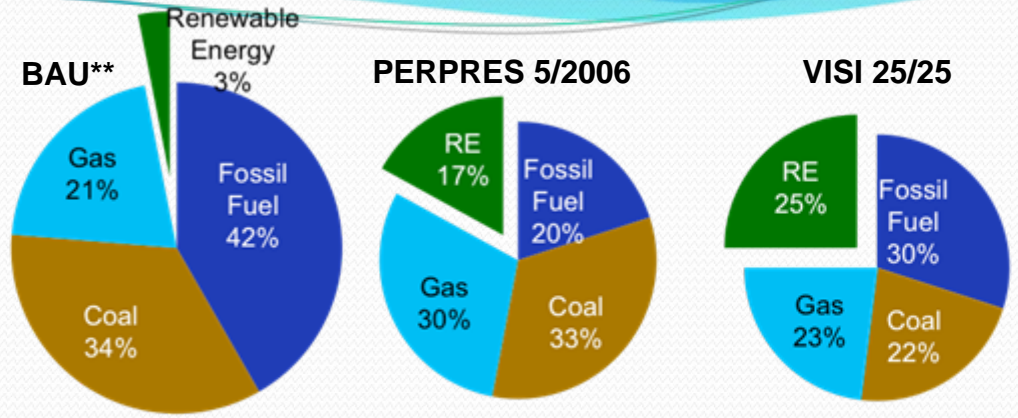
National Primary Energy mix 2009, 1,065 Million SBM



1. Access to energy is still limited:
 - a. Electricity ratio in 2008 is 66% (34% of households are still without electricity)
 - b. Infrastructure development in energy (remote area, villages and remote island are still deprived of energy)
2. The annual increase in energy demand is at 7%, and by far not being matched with adequate energy supply
3. Dependency on fossil fuel is still very high and fossil fuel reserve is diminishing
4. Very limited implementation of renewable energy and lack of energy conservation awareness
5. Financing for the development of renewable energy is very inadequate



ENERGY POLICY DIRECTION



Source: *Forecast 2010, DEN 2010-2025, **BAU EBTKE



ENERGY RESOURCES AND PRODUCTION

KADIN INDONESIA

NO	RENEWABLE ENERGY	RESOURCES (R)	INSTALLED CAPACITY(IC)	RATIO IC/R (%)
1	2	3	4	5 = 4/3
1	Large Hydro Power	75,670 MW	5,705.29 MW	7.54
2	Geothermal	29,038 MW	1,189 MW	4.00
3	Mini/Micro Hydro Power	769.69 MW	217.89 MW	28.31
4	Biomass	49,810 MW	1,618.40 MW	3.25
5	Solar Cell	4.80 kWh/m ² /day	13.5 MW	-
6	Wind	3 – 6 m/s	1.87 MW	-
7	Uranium	3.000 MW (e.q. 24,112 ton) for 11 years*)	30 MW	1.00

*) Only in Kalan – West Kalimantan

No	NON RENEWABLE ENERGY	RESOURCES (R)	RESERVE (R')	RATIO R'/R (%)	PRODUCTION (PROD)	RATIO R'/PROD (ANNUAL)*)
1	2	3	4	5 = 4/3	6	7 = 4/6
1	Fossil Fuel (<i>billion barrel</i>)	56.6	7.99 **)	14	0.346	23
2	Natural Gas (<i>TSCF</i>)	334.5	159.64	51	2.9	55
3	Coal (<i>billion ton</i>)	104.8	20.98	18	0.254	83
4	Coal Bed Methane/CBM (<i>TSCF</i>)	453	-	-	-	-

*) Assumption: no additional new reserve find

***) Including Cepu Block

Source: Directorate General for Renewable Energy, 2011

PRIME POLICY ON RENEWABLE ENERGY

1. Energy conservation in order to improve efficiency of energy consumption from the supply side and demand side, such as in industry, transportation, households and commerce.
2. Energy diversification to increase the segment of new form of renewable energy within national energy mix (supply side), such as:

New Energy

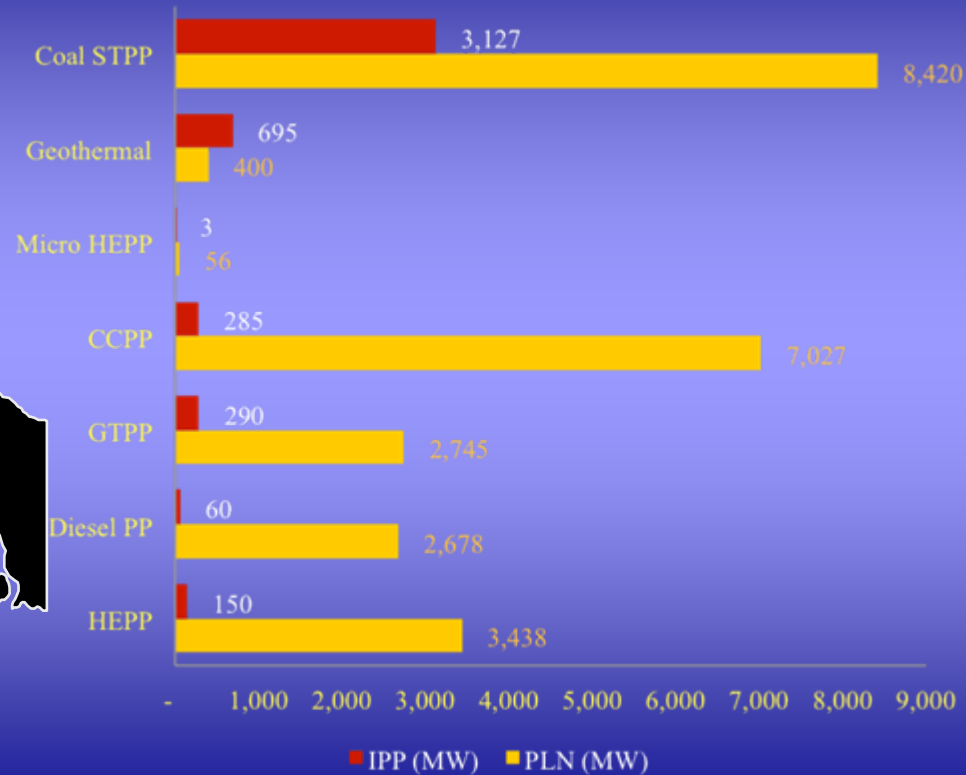
- a. Liquefied Coal
- b. Coal Bed Methane
- c. Gasified Coal
- d. Nuclear Energy
- e. Hydrogen
- f. Methane

Renewable Energy

- a. Geothermal, (high capital investment, high complexity)
- b. Run of River (Hydro),
- c. Bioenergy,
- d. Solar (problem of storage and feed-in tariff)
- e. Wind (Cortez factor: not viable within 5 degree from equator and feed-in tariff)
- f. Ocean Current. (high capital investment)

Power Generation Capacity (type and ownership)

Existing Total Capacity 29,373 MW



CCPP: combine cycle Power Plant;
GTPP: Gas Turbine PP;
HEPP: Hydroelectric PP

GENERATION AND DEVELOPMENT PLAN OF POWER CAPACITY

(INCL. GREEN & NEW ENERGY DEVELOPMENT)

- **Total Capacity of Green & New Energy PP to be built in the period is 11,540 MW** (total capacity of Geothermal PPs, Hydro Electric PPs-HEPP, Mini HEPPs, and Small-scale Green & New Energy PP)
- **57% of the total capacity of Green Energy PP will be expected from IPPs**

Tahun	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
PLN											
Coal STPP	3,291	4,090	834	1,479	2,203	110	1,200	200	7	3,007	16,421
Comb. Cy. PP	194	820	393	350	240	-	700	1,500	2,250	-	6,447
Gas TPP	105	-	225	50	-	65	235	800	1,065	1,280	3,825
Diesel PP	11	14	12	48	44	42	34	16	33	50	303
Geo. PP	10	55	78	143	203	20	23	3	20	20	575
Mini HEPP	14	6	6	14	8	4	5	8	1	-	66
HEPP	-	-	10	300	1,000	65	103	715	1,311	818	4,321
Total PLN	3,625	4,985	1,558	2,384	3,698	306	2,299	3,242	4,686	5,175	31,958
IPP											
Coal STPP	26	891	2,649	1,703	2,212	2,160	2,550	1,930	1,410	745	16,276
Comb. Cy. PP	290	110	30	-	120	-	-	-	-	-	550
Gas TPP	10	10	80	-	-	-	-	-	-	-	100
Diesel PP	-	22	-	-	-	-	-	-	-	-	22
Geo. PP	-	3	178	857	2,450	50	330	392	510	645	5,415
Mini HEPP	25	31	91	42	6	2	1	1	1	-	201
HEPP	180	195	-	-	157	90	310	30	-	-	962
Total IPP	531	1,262	3,028	2,601	4,945	2,302	3,191	2,353	1,921	1,390	23,525
PLN+IPP											
Coal STPP	3,317	4,981	3,483	3,182	4,415	2,270	3,750	2,130	1,417	3,752	32,697
Comb. Cy. PP	484	930	423	350	360	-	700	1,500	2,250	-	6,997
Gas TPP	115	10	305	50	-	65	235	800	1,065	1,280	3,925
Diesel PP	11	36	12	48	44	42	34	16	33	50	325
Geo. PP	10	58	256	1,000	2,653	70	353	395	530	665	5,990
Mini-Hydro PP	39	38	98	56	13	6	6	9	2	-	267
Hydro Electric PP	180	195	10	300	1,157	155	413	745	1,311	818	5,283
Total PLN+IPP	4,156	6,248	4,586	4,985	8,643	2,608	5,490	5,596	6,607	6,565	55,484
SMALL SCALE GREEN & NEW ENERGY PP	58	57	90	155	191	208	217	222	242	263	1,703

Source: PLN, 2011

HYDRO POWER POTENTIALS

- Significant resource potentials, 75,000 MW
- Only 4,000 MW has been exploited (around 6%)
- Minihydro Power Plants (between 1-10 MW capacity) amounted around 100 MW
- Relatively low market barrier (mature technology, low renewable energy investment)
- Market competition is not high
- Long term PPA with PLN (15 years, extendable)
- Good Feed-In Tariff and Regulation (Energy Ministerial Decree No.31, 2009), US\$ 8.9 cent per kWh
- Government Guarantee to PLN (Finance Ministerial Decree No.77, 2011), safeguarding Investors

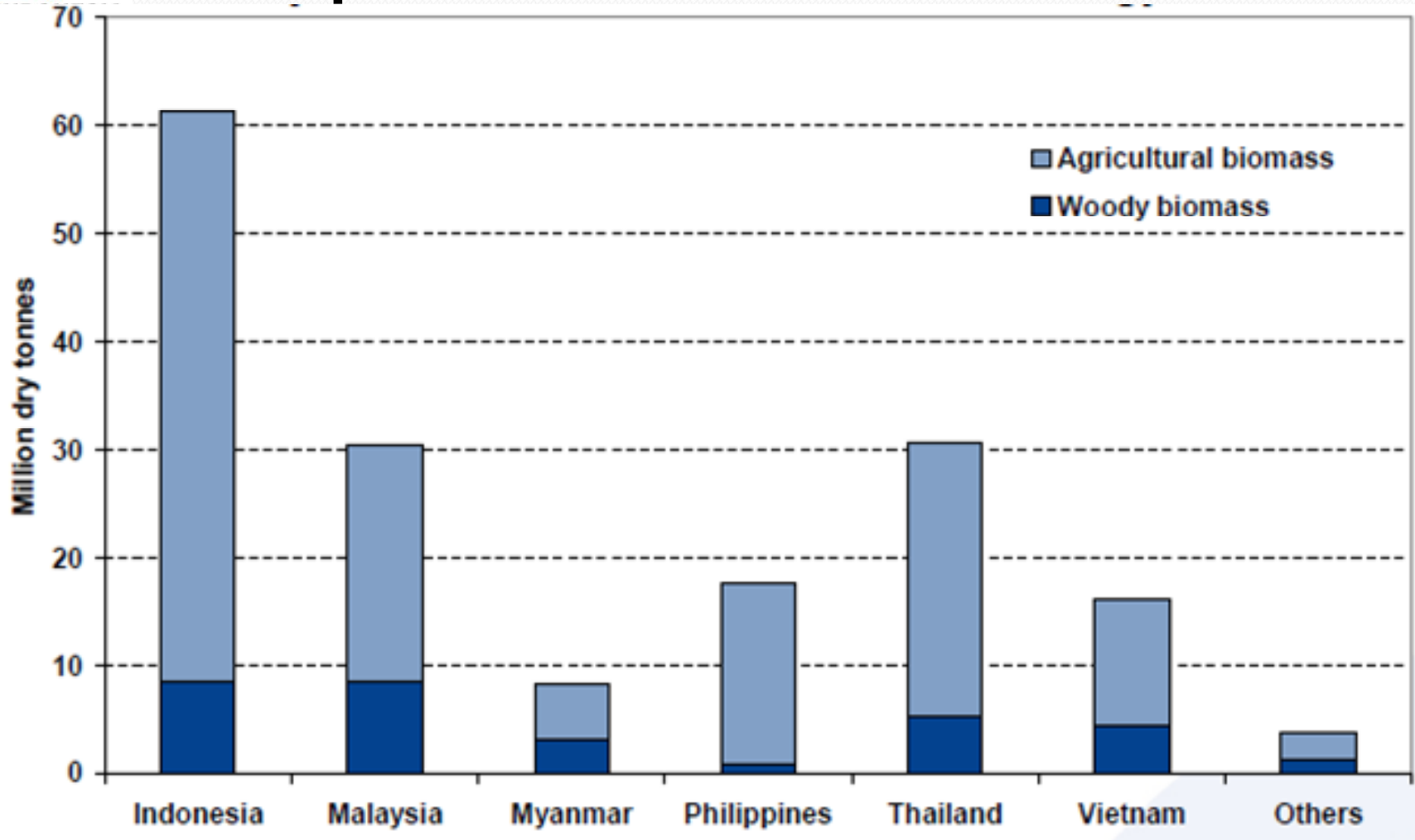
HYDRO POWER POTENTIAL

NO.	REGION	TOTAL OF SCHEMES	CAPACITY (MW)	YEARLY PRODUCTION (GWH)	%
1	SUMATERA	447	15,587.00	84,110	20.9
2	JAWA	120	4,200.00	18,042	4.5
3	KALIMANTAN	160	21,581.00	107,202	26.7
4	SULAWESI	105	10,183.00	52,952	13.2
5	PAPUA	205	22,371.00	133,759	33.3
6	NUSATENGGARA	120	624.00	3,287	0.8
7	MALUKU	53	430.00	2,292	0.6
	TOTAL	1,210	74,976.00	401,644	100

Source: Dinas Survey PT. PLN (Persero) 1995



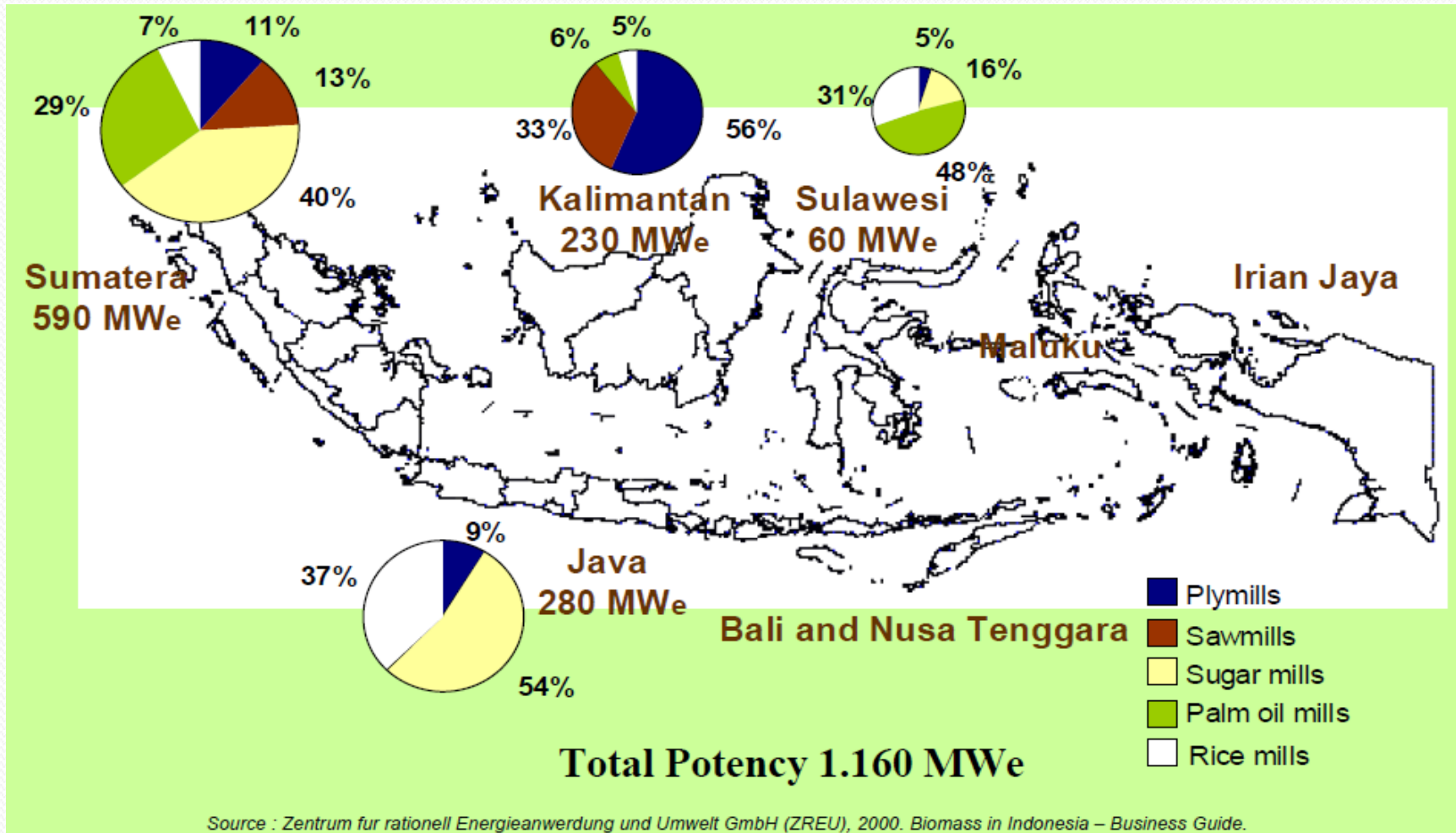
In ASEAN, Indonesia is potentially the largest producer of biomass



Available biomass for power generation in ASEAN countries

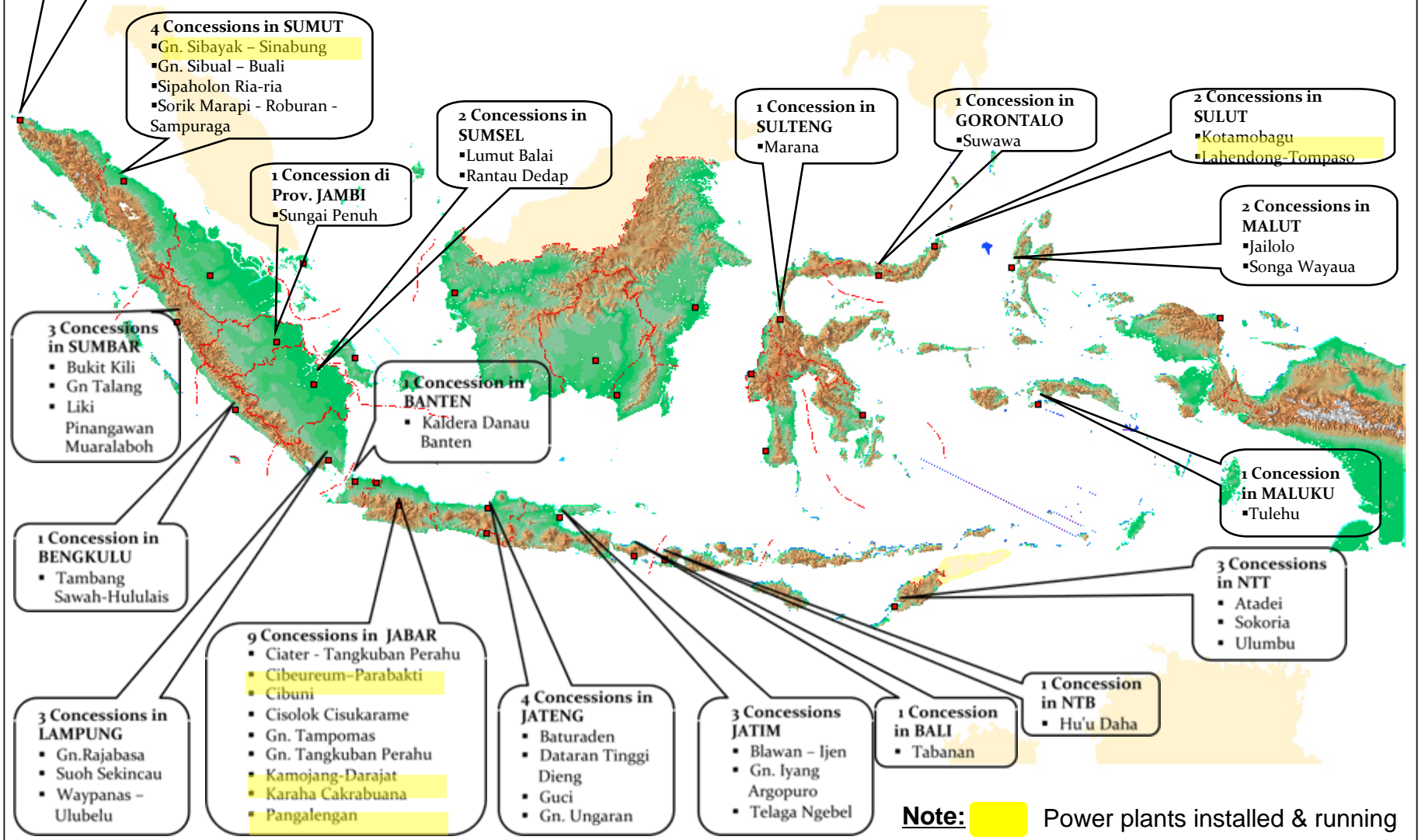
Source: Saku Rantanen (Pöyry), 2009

BIOMASS WASTE POTENTIAL FOR POWER GENERATION



Source : Zentrum fur rationell Energieanwendung und Umwelt GmbH (ZREU), 2000. Biomass in Indonesia – Business Guide.

45 GEOTHERMAL WORKING AREA (CONCESSION)



GOV. FEED-IN TARIFF FOR RENEWABLE

- ❑ **Presidential Decree 4/2010** Instruction to PT PLN to accelerate the development of powerplants utilizing renewable energy, coal and natural gas.

- ❑ **Ministerial Decree ESDM 31/2009:**
 - PLN obliges to purchase electricity produced by small scale and medium powerplants up to 10 MW or their excess capacity utilizing renewable energy;
 - Feed in Tariff: 8.7 cent USD/ kWh

- ❑ **Ministerial Decree ESDM 02/2011** Instruction to PT PLN to purchase electricity from geothermal power plants and in regard to electricity purchase tariff.
 - Maximum feed in tariff of 9,70 sen USD/ kWh



We invite you to invest and to take part in the business of renewable energy in Indonesia