



Policy and R&D on biofuels and biomass in Indonesia

Wahono Sumaryono

Deputy Chairman for Agroindustry and Biotechnology
Agency for the Assessment and Application of Technology
(BPPT)

2nd Biomass-Asia Workshop
Bangkok, 13-15 December 2005

Rationale



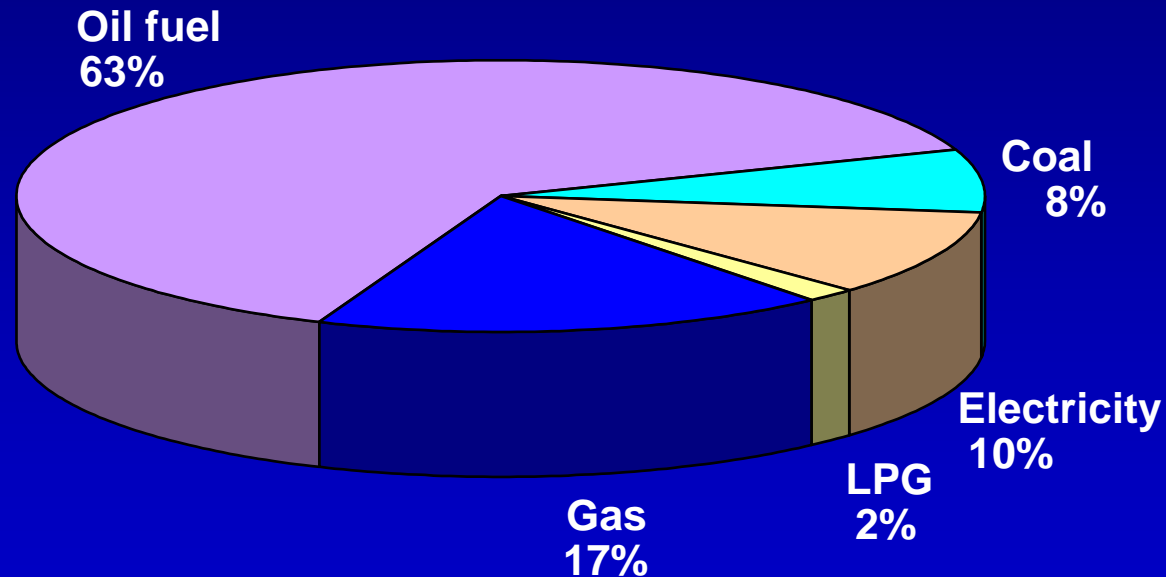
- Energy will be one of the significant issues of this century. Oil is a global commodity that has enduring economic and geopolitical dimensions.
- Energy consumption in many developing countries has risen rapidly with increasing economical growth in the last decades.
- Rapid development without significant measures of relevant control has resulted in deterioration of the environment such as deforestation in ecology and health risk due to air pollution.
- Renewable resources based-energy will be appropriate solution in attempt to meet energy security.



Energy security can be achieved by :

- Development and exploration of new energy sources and supplies
- Diversification of the energy mix and promotion of alternative fuel sources
- Facilitating energy efficiency and conservation
- Promotion of renewable energy
- Enhancing emergency response coordination and preparedness in the event of energy supply disruptions

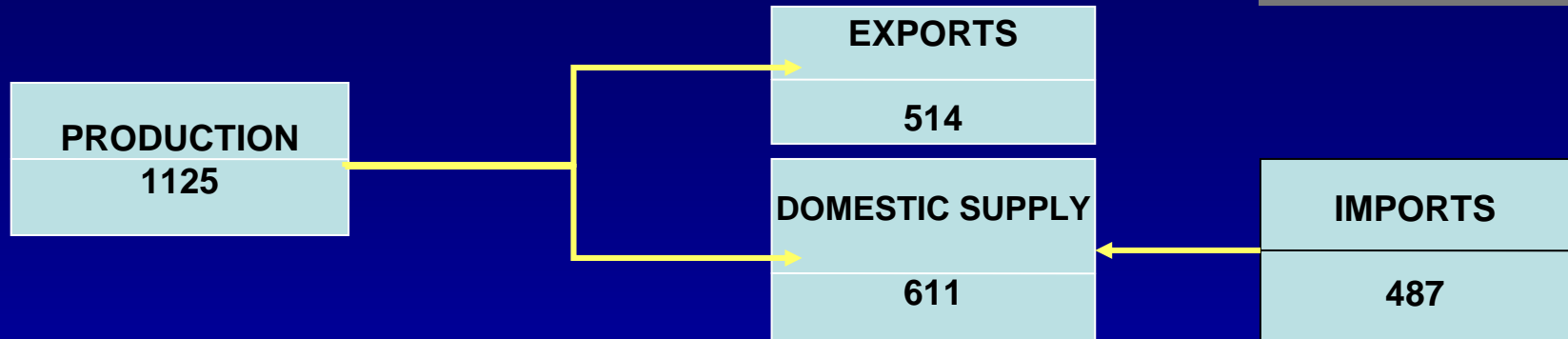
OIL FUEL STILL ACCOUNTS FOR 63 % OF TOTAL NATIONAL ENERGY CONSUMPTION - 2003



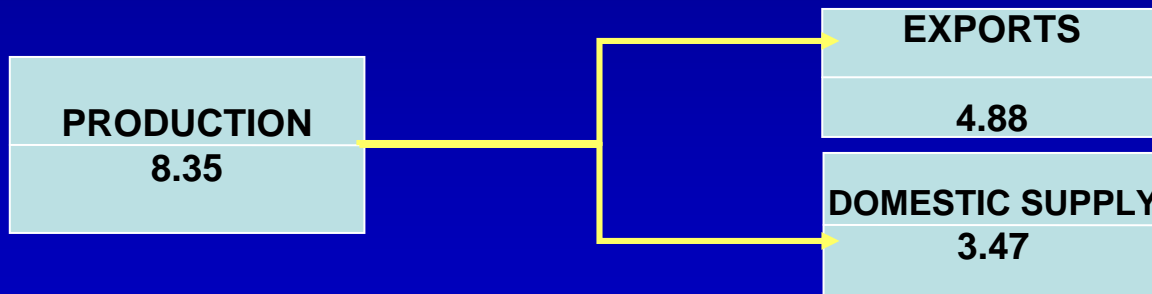
ENERGY BALANCE



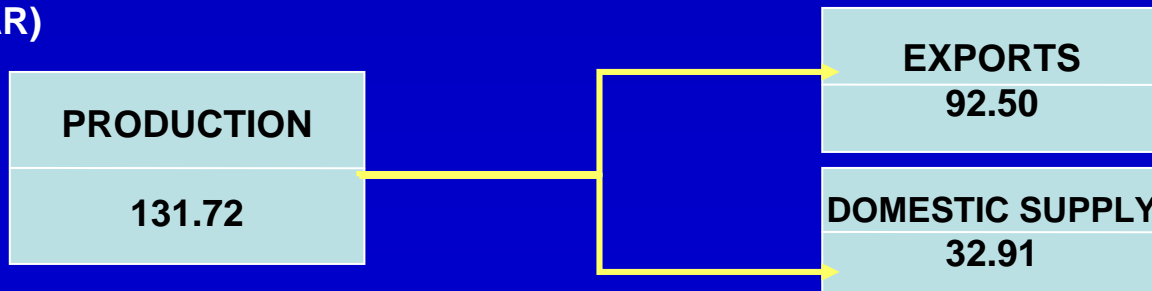
OIL IN THE YEAR 2004 (IN THOUSAND BARRELS PER DAY)



NATURAL GAS IN THE YEAR 2004 (IN BSCF PER DAY)



COAL IN THE YEAR 2004 (IN MILLION TONS PER YEAR)



Source:
*Dept. Energy &
Mineral Resources*



Potential Alternative Energy In Indonesia



Alternative Energy	Potential	Installed Capacity
Hydro Power	75.67 GW	4200 MW
Geothermal	27 GW	807 MW
Mini/Micro hydro	500 MW	84 MW
Biomass	49.81 GW	445 MW
Solar Energy	4.8 kWh/m²/day	8 MW
Win Energy	3-6 m/sec	0.6 MW

Source: Dept. Energy & Mineral Resources



The body responsible for National Energy Security :
**Agency for Coordination of National Energy
(BAKOREN)**

Members:

1. Ministry of Energy and Mineral Resources (ESDM) as Chairman
2. State Ministry for Research and Technology (SMRT)
3. State Ministry for National Development Planning (BAPPENAS)
4. State Ministry for Environment
5. Ministry of Industry
6. Other Ministries



National Energy Policy
Green Energy Initiative-2020.



National Energy Policy

- Energy diversification and conservation;
- Increasing the production capacity of oil and gas,
- Setting up a proper pricing policy of oil, especially on fuels for domestic consumption.

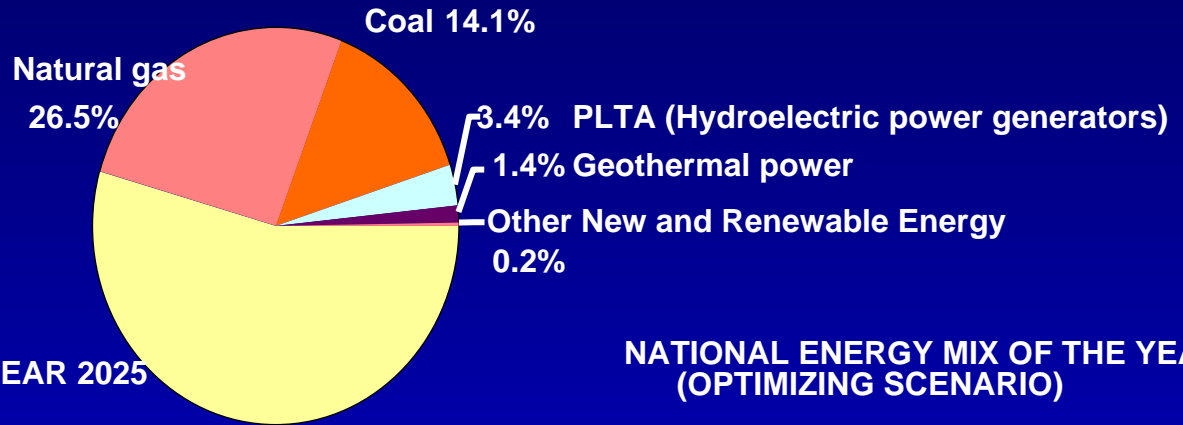
Green Energy Initiative-2020.

- Maximum utilization of renewable energy.
- Efficient utilization of both renewable energy and fossil fuels.
- Clean, high performance fossil fuels.
- Public awareness of all aspect of energy efficiency.

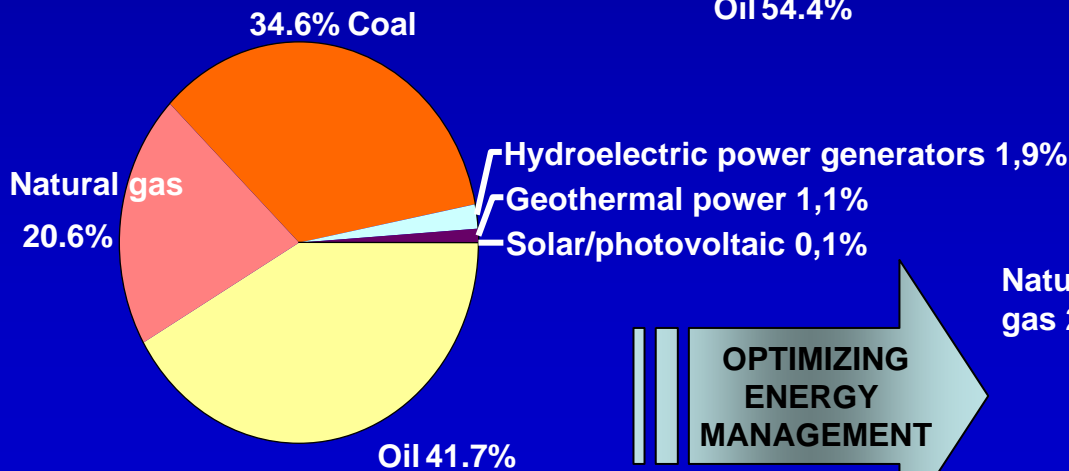
TARGET OF NATIONAL ENERGY MIX 2025



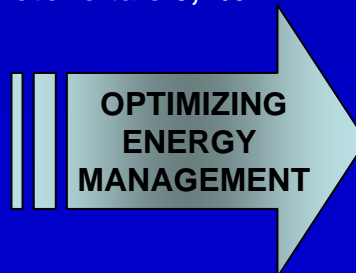
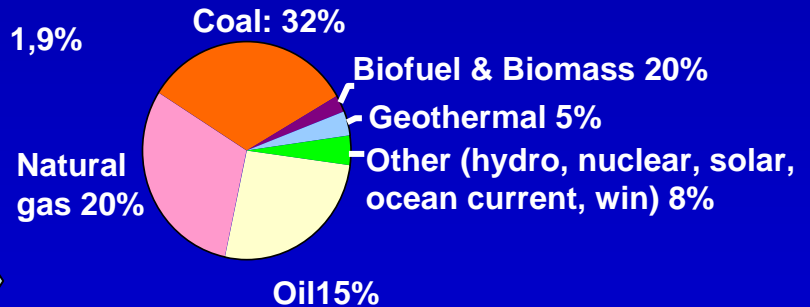
NATIONAL (PRIMARY) ENERGY MIX OF THE YEAR 2003



NATIONAL ENERGY MIX OF THE YEAR 2025
(The SCENARIO of BaU)



NATIONAL ENERGY MIX OF THE YEAR 2025
(OPTIMIZING SCENARIO)



Source: Dept. Energy & Mineral Resources (modified)



SMRT → **Policy on R&D**



State Ministry of Research and Technology (SMRT) has inaugurated important steps :

- 1. Set up Priority Programs including Strategic Policy, National Research Agendas and White Paper.**
- 2. Established research incentives both fiscal and non-fiscal.**
- 3. Encourage the involvement of private sectors**

SMRT → Policy on R&D (continued...)



❖ 6 priority programs for 2004-2009 :

1. Food
2. Energy
3. Transportation
4. ICT
5. Defense
6. Health

❖ Research incentives (Fiscal) :

- Tax deduction (in preparation for government regulation)
- Research Funding based on competitive and top down bases (RUK, RUT, RUTI, etc)

❖ Research incentives (Non-Fiscal) :

- Technical Assistance as in-kind contribution to SME's

❖ Synergizing the potency of research between : Research Institutes – Business Community – Government (ABG)

Policy on R&D of Biofuels and Biomass In BPPT



- ❖ Promoting the steadily increase of substitution of Gasoline & Diesel oil by “Biofuels”
- ❖ Enhancing the utilization of Biomass for Power and Heat Gasifiers
- ❖ Encouraging bilateral/multilateral research cooperation in “Green Energy” with Developed Countries.

Achievement of biofuels program by BPPT



- **Bio-diesel** : design and engineering of pilot plant production with production capacity of 1.5 – 8 tons/day. Low grade CPO is used as raw material, but currently, design and engineering of production facilities that aimed to use Jatropha/curcas oil (from *Jatropha curcas* sp.) is underway.
- **Bio-ethanol** : design and engineering of manufacturing facility of fuel grade ethanol with capacity of 250 L/day. New dehydration unit will be installed to improve quality from technical to fuel grade.
- **Bio-oil** : design and engineering of pilot plant production of bio-oil using biomass as raw material (capacity 1 ton/day). One ton of biomass can produce 0.4 tones (40%) bio-oil with 0.2 tons charcoal as additional product.
- **Biomass** : using gasification technology, the gas produced from biomass (rice husk, wood chips, saw dust and free fruits bunch oil palm) is converted to energy that replace diesel oil as main energy for diesel-based engines such as rice mill and other industrial purposes.

Research and development conducted by other institutions:



- **Research and Development Center for Oil and Gas Technology (LEMIGAS)** : 1) development of biogas as replacement of kerosene for fuel, 2) development of biofuels comprising: bioethanol, methanol and biodiesel.
- **Ministry of Forestry**: 1) production of biogas using by-product or waste of palm-oil and lignocelluloses as raw materials by fermentation process, 2) study of physical and chemical properties of briquette charcoal using mixture of sawdust and woody slab wastes
- **Ministry of Agriculture**: 1) power generation for household and drying process for coffee and cocoa industries using biomass including sugar cane waste, saw dust, rice husk, 2) biogas production from fluid waste in aerobic reactor,, 3) biodiesel production using refined, bleached and deodorized palm oil.

Research and development conducted by other institutions (continued)...



● **Faculty of Forestry, Gadjah Mada University (UGM)** : Research on biomass into energy conversion. The study was primarily on evaluation of physical and caloric value.

● **Faculty of Chemical Engineering, Bandung Institute of Technology (ITB)** : R&D on 1) power gasification using wood chips, rice husk and saw dust as raw materials, 2) biodiesel production using crude palm oil, coconut oil and jatropha oil as raw materials. 3) bio-oil production using solid waste from palm oil industry as raw material and 4) development of pilot-plant production of bioethanol.

IV. PROPOSAL FOR COOPERATION



- Information and expert exchange
- Training and education
- Joint research on both basic and applied subjects
- Institutional strengthening, including management and facilities
- Pilot projects on biomass utilization for renewable energy

V. CONCLUDING REMARKS



- To achieve national energy security, government of Indonesia has introduced National Energy Policy, focusing on program to stimulate energy diversification and conservation; increasing the production capacity of oil and gas, and setting up a proper pricing policy of oil, especially on fuels for domestic consumption.
- Green Energy Initiative-2020 has been set as national commitment for sustainable energy supply and Utilization.
- Research and Development for renewable energy as an alternative energy has been encouraged to reduce in step-wise bases, utilization of limited oil-base energy.
- Collaboration with other countries with the agenda of: development and exploration of new energy sources and supplies; diversification of the energy mix and promotion of alternative fuel sources; facilitating energy efficiency and conservation and promotion of renewable energy should be established.



Thank you