RENEWABLE ENERGY GRID INTEGRATION: INDONESIA's PERSPECTIVE

Andi Novianto

Presented at:

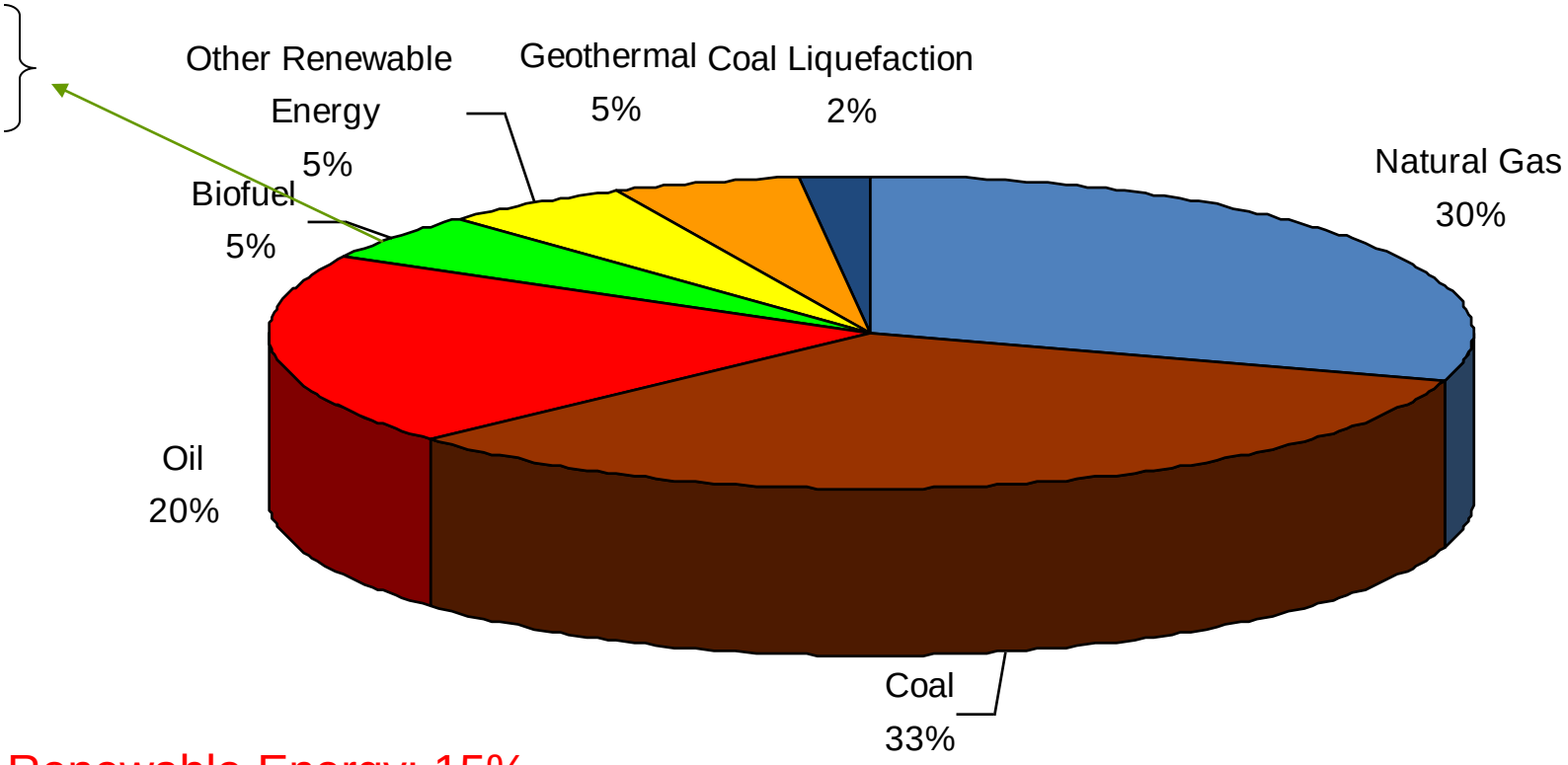
Workshop: "Addressing Grid-interconnection Issues in Order to Maximize the Utilization of New and Renewable Energy Resources"

Tokyo, 12 October 2010

Background:

- Limited energy reserves.
- Increasing energy consumption: 7% per year.
- Uncertainty of international energy prices.
- High domestic subsidy.
- Abundant unutilized renewable energy.
- Electrification ratio: 65% in 2009.
- Dependency on oil (unbalanced energy mix).

TARGET ENERGY MIX 2025:



Renewable Energy: 15%

NATIONAL ENERGY PLANNING to 2025:

- Population Increase:
- Increase in Economic Growth:
- Increase in Living Standard

- Energy Demand Increase
- Electricity Demand Increase

Environmental Issue:
- Global Warming
- Air Pollution
- Acid Rain
- Health

TYPE OF ENERGY SELECTION

Environment | INFRASTRUCTUR | ENERGY RESOURCES | SOCIAL-CULTURE | GEOPOLITIC | ECONOMY

Fosil Energy

OIL | COAL | Gas

BASED ON NATURAL RESOURCES

NEW AND RENEWABLE ENERGY

Nuclear | Hiydro, Microhydro | Solar, wind, bio fuel , geothermal, hidrogen, FC

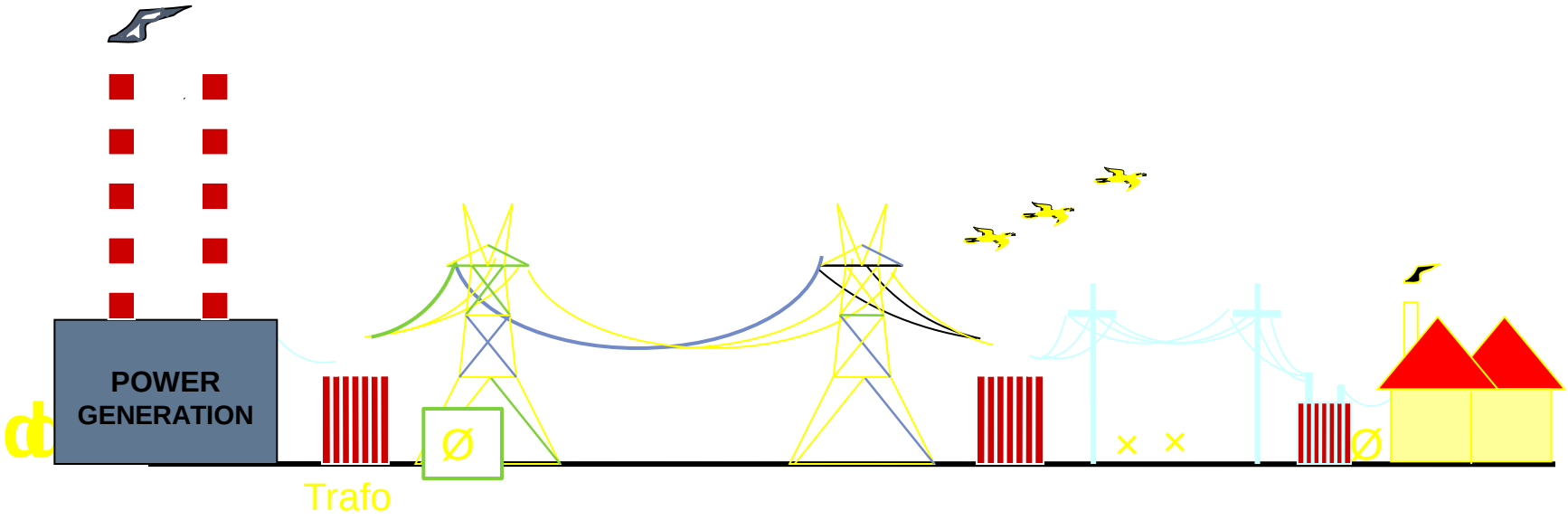
BASED ON TECHNOLOGY

RENEWABLE ENERGY POL

POWER SECTOR CONDITION:

- Installed Capacity of National Electricity: 30 GW with around 83% supplied by The National Electricity Company (PT PLN), 14% by Independent Power Producers/IPP), and 3% by private power utility.
- Power Generation sources coal (34.3%), gas (25.3%), oil (24.4%), hydro (12.3%), and geothermal (3.7%).
- Consumer of electricity: household (90%), public (6%), business (4%).

ELECTRICITY SYSTEM:



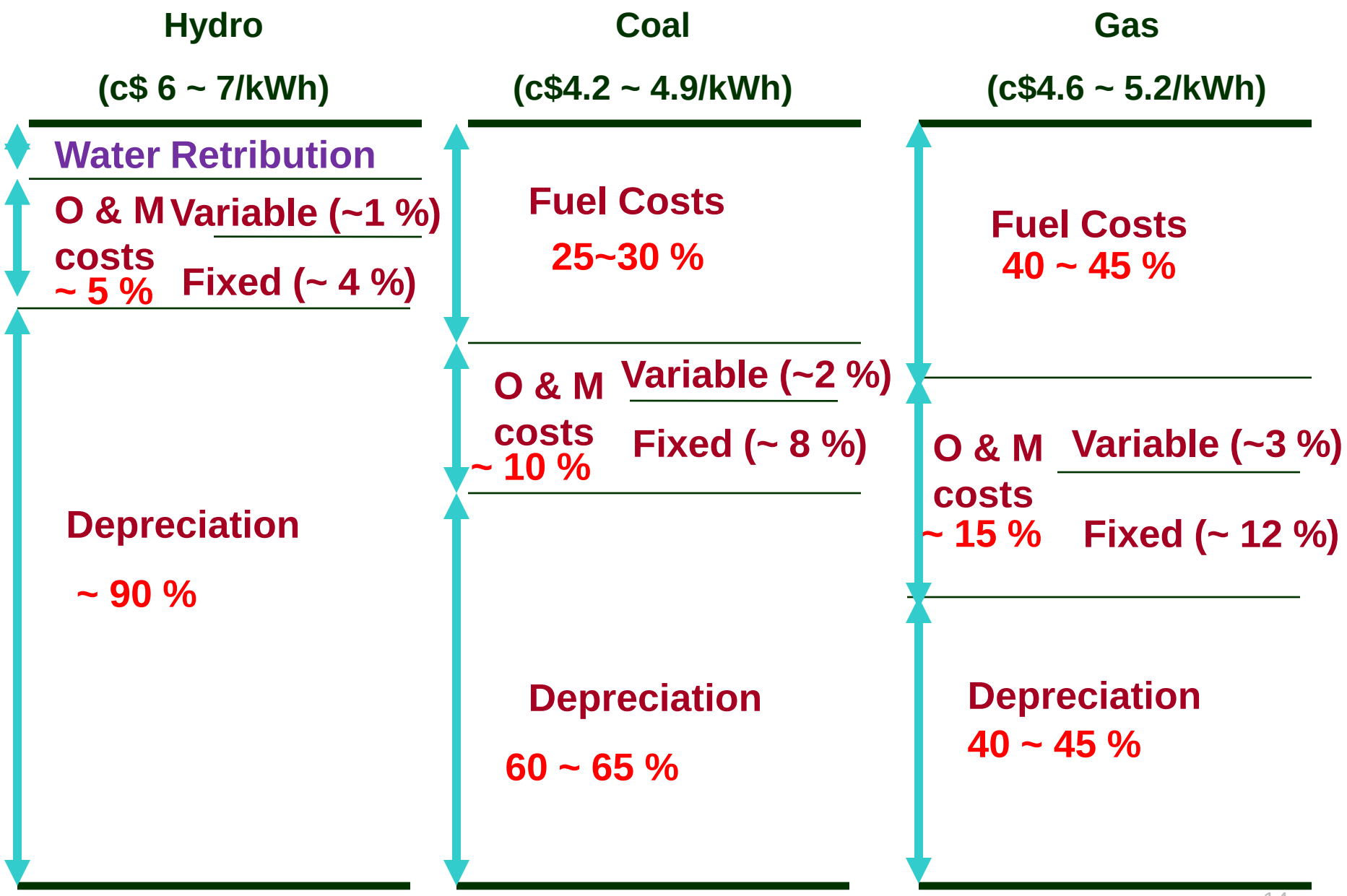
Center
Power
Generation

Transmission
500 kV
150 kV
150 kV
70 kV

Distribution
30 kV
20 kV
20 kV
6 kV

220 Volts

Consumer


Hydro
(c$ 6 ~ 7/kWh)
Water Retribution
O & M costs
~ 5 %
Variable (~1 %)
Fixed (~ 4 %)
Depreciation
~ 90 %
Coal
(c$4.2 ~ 4.9/kWh)
Fuel Costs
25~30 %
O & M costs
~ 10 %
Variable (~2 %)
Fixed (~ 8 %)
Depreciation
60 ~ 65 %
Gas
(c$4.6 ~ 5.2/kWh)
Fuel Costs
40 ~ 45 %
O & M costs
~ 15 %
Variable (~3 %)
Fixed (~ 12 %)
Depreciation
40 ~ 45 %

CONCLUDING REMARKS:

- Renewable Energy has a lot of potency to be developed in Indonesia. The Government of Indonesia has given priority in developing renewable energy, through incentives and regulations, mainly to substitute fossil fuel used in transportation and power generation.
- Efforts need to be done to push the development of renewable energy, including providing incentives through fiscal policy, to stimulate grid integration, and to develop rural and remote areas
- As part of the international community, Indonesia shares its concern on the environment and development issues by introducing clean-renewable energy to reduce CO_2 emission