

Technical Cooperation for Sustainable Environmental Development  
in the Asia-Pacific Region

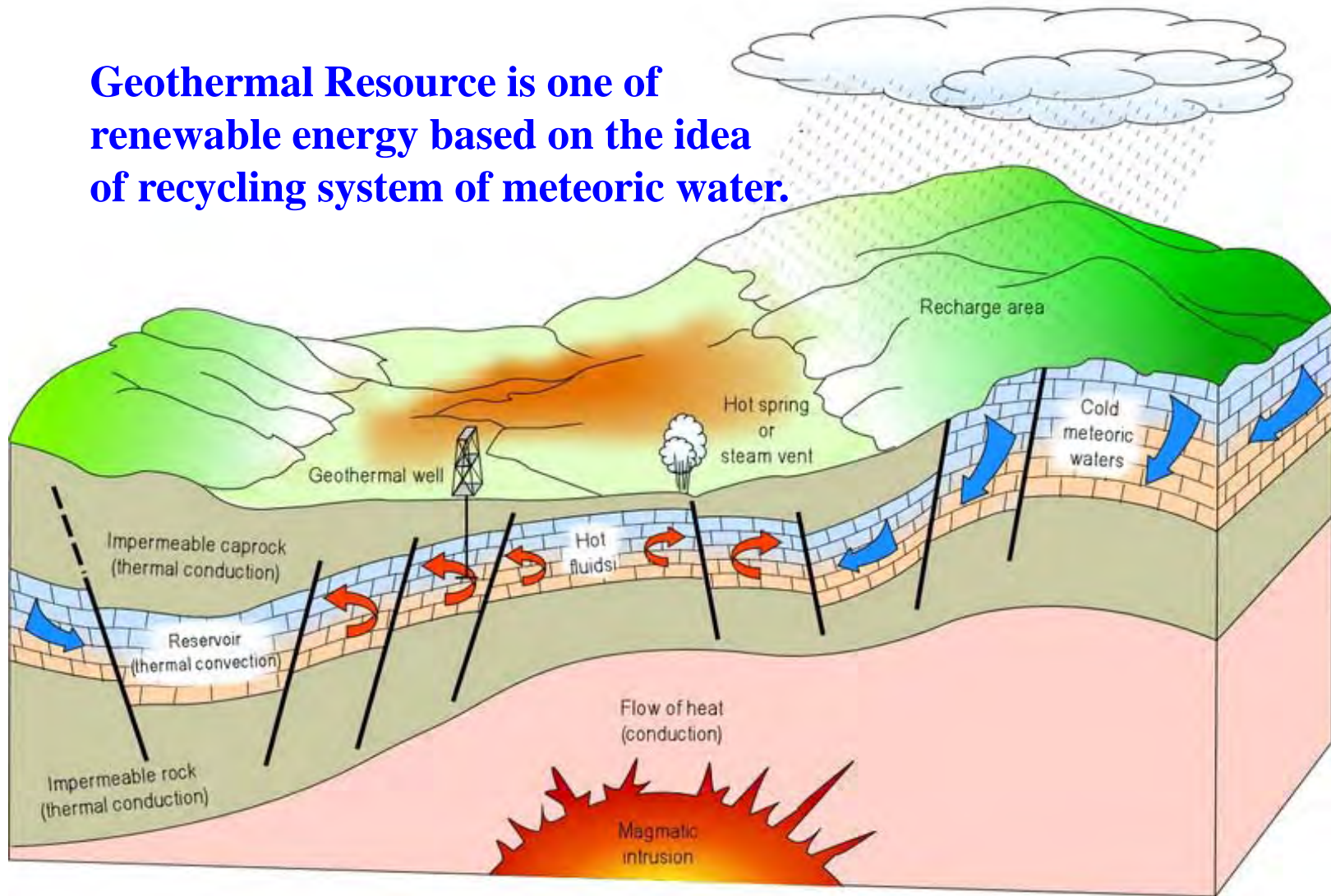
## **Expert Group Meetings 2010**

### **Multipurpose Utilization of Geothermal Energy**

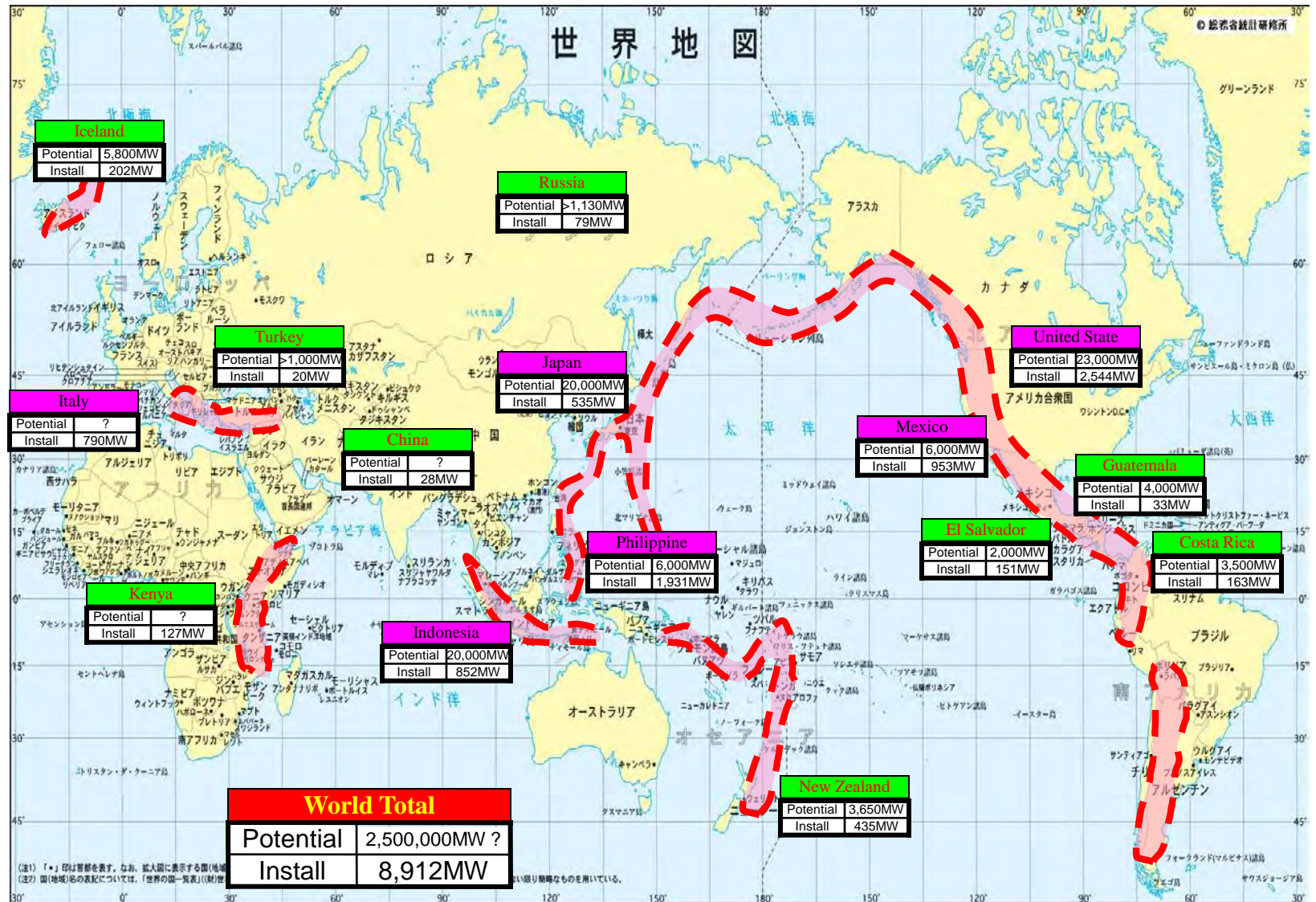


# Representative Geothermal System

**Geothermal Resource is one of renewable energy based on the idea of recycling system of meteoric water.**



# Geothermal Resources World-wide



# Geothermal Resource Potential World-wide

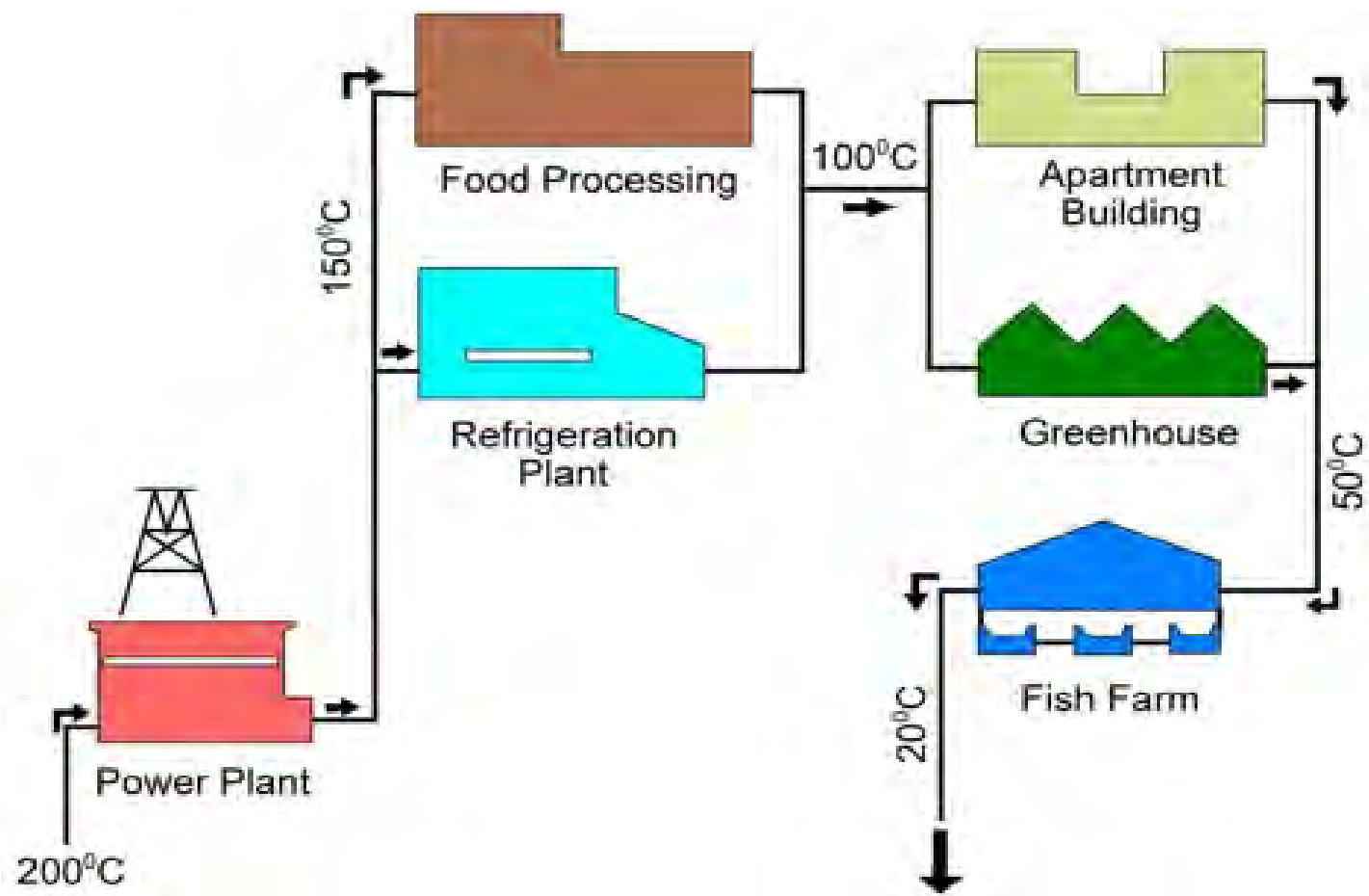
	High-temperature resources suitable for electricity generation		Low-temperature resources suitable for direct use in million TJ/yr of heat (lower limit)
	Conventional technology in TWh/yr of electricity	Conventional and binary technology in TWh/yr of electricity	
Europe	1830	3700	> 370
Asia	2970	5900	> 320
Africa	1220	2400	> 240
North America	1330	2700	> 120
Latin America	2800	5600	> 240
Oceania	1050	2100	> 110
World potential	11 200	22 400	> 1400

Temperature (°C) 0 20 40 60 80 100 120 140 200 350



Diagram showing various utilization of geothermal energy

# Cascade Utilization of Geothermal Energy



# Local Industries using Geothermal Energy

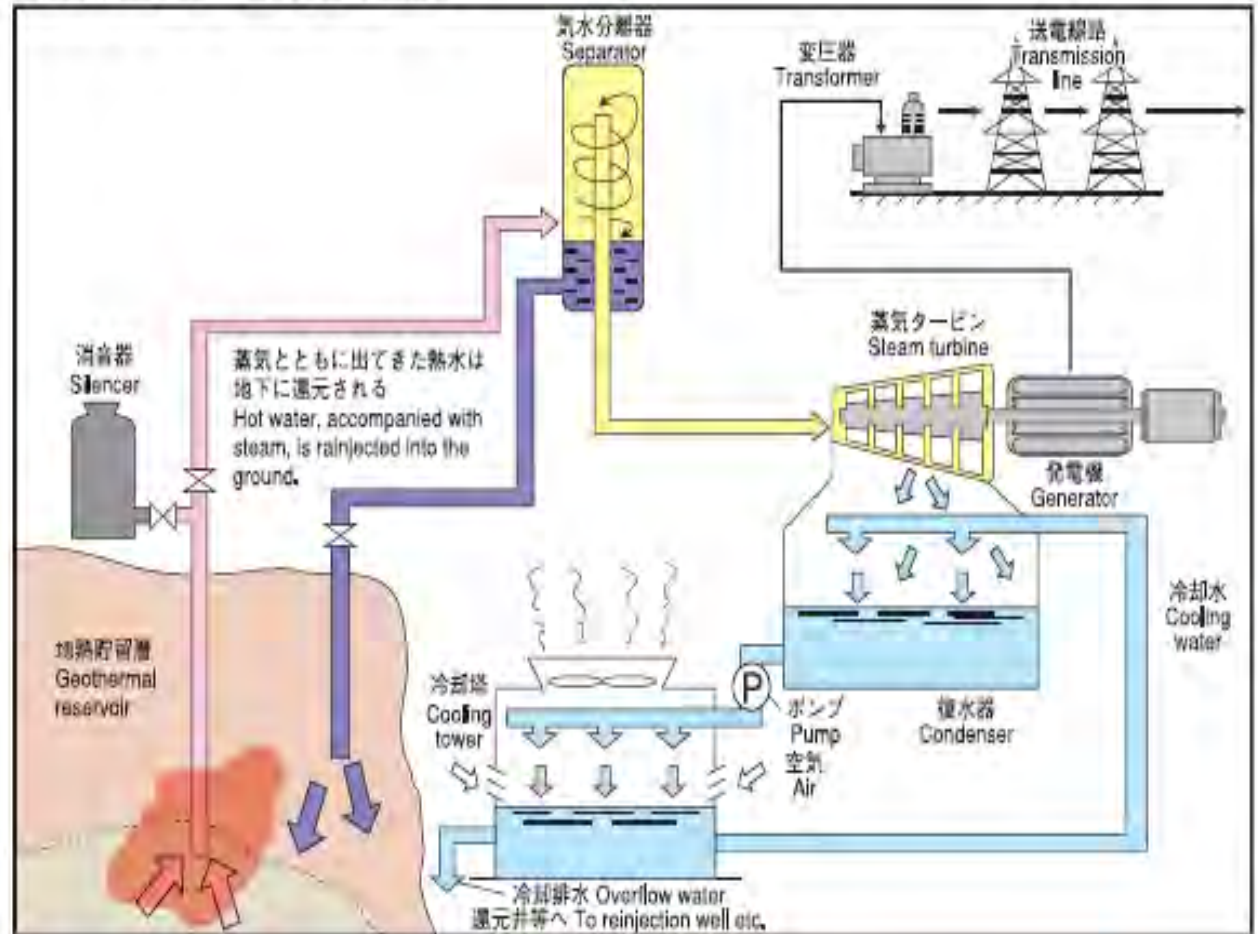
swimming pool, green house, food and crop drying, etc.



# Schematic Diagram of Geothermal Power Generating System



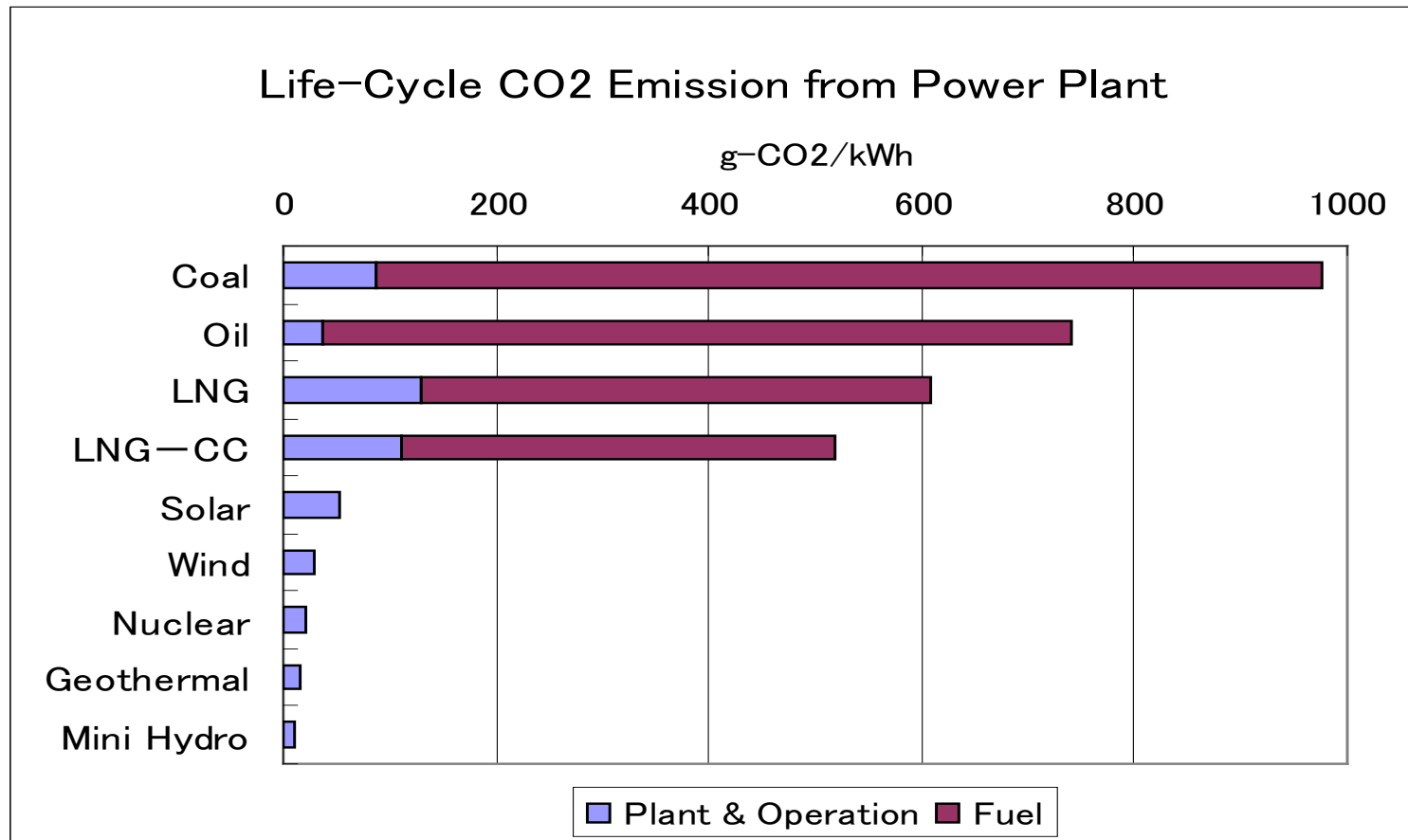
蒸気発電方式 Single Flash





# Less CO2 emission compared with other energy sources

- No CO2 emission from burning fossil fuel like other thermal power plants
- High capacity factor (Geothermal 70%、Wind 20%、Solar 12%)
- Geothermal power plant with 50MW is equivalent to 170MW of Wind power and 300MW of Photovoltaic power



(Source: Central Research Institute of Electric Power Industry News No. 338)

# Significance of Geothermal Energy Development for developing Countries

## For developing countries

- ✓ Global rise and fluctuations in fuel prices
- ✓ Indigenous energy unaffected by the exchange rate fluctuations
- ✓ Stable source of energy and supply (the earth as a boiler)
- ✓ Less environmental pollution energy
- ✓ Contribute to local economic development and rural electrification

## Japan For

- ✓ Earn CO<sub>2</sub> emission rights from CDM projects
- ✓ Contribute to International cooperation based on high technologies in Japan

# Indonesia

## Mataloko (Flores) 、 Lahendong (Slawesi)



# Philippines, Northern Negros



# Mongolia, Bayankhongor





## **Geothermal Energy**

**renewable and  
sustainable  
energy gift from  
the earth**