

国連ハビタットとアジアの連繋による 環境技術専門家会議

United Nations Human Settlements Programme
Fukuoka Office

Geothermal Resource Development

～アジア太平洋地域における持続可能な環境開発のための技術協力を考える～

October 28, 2009

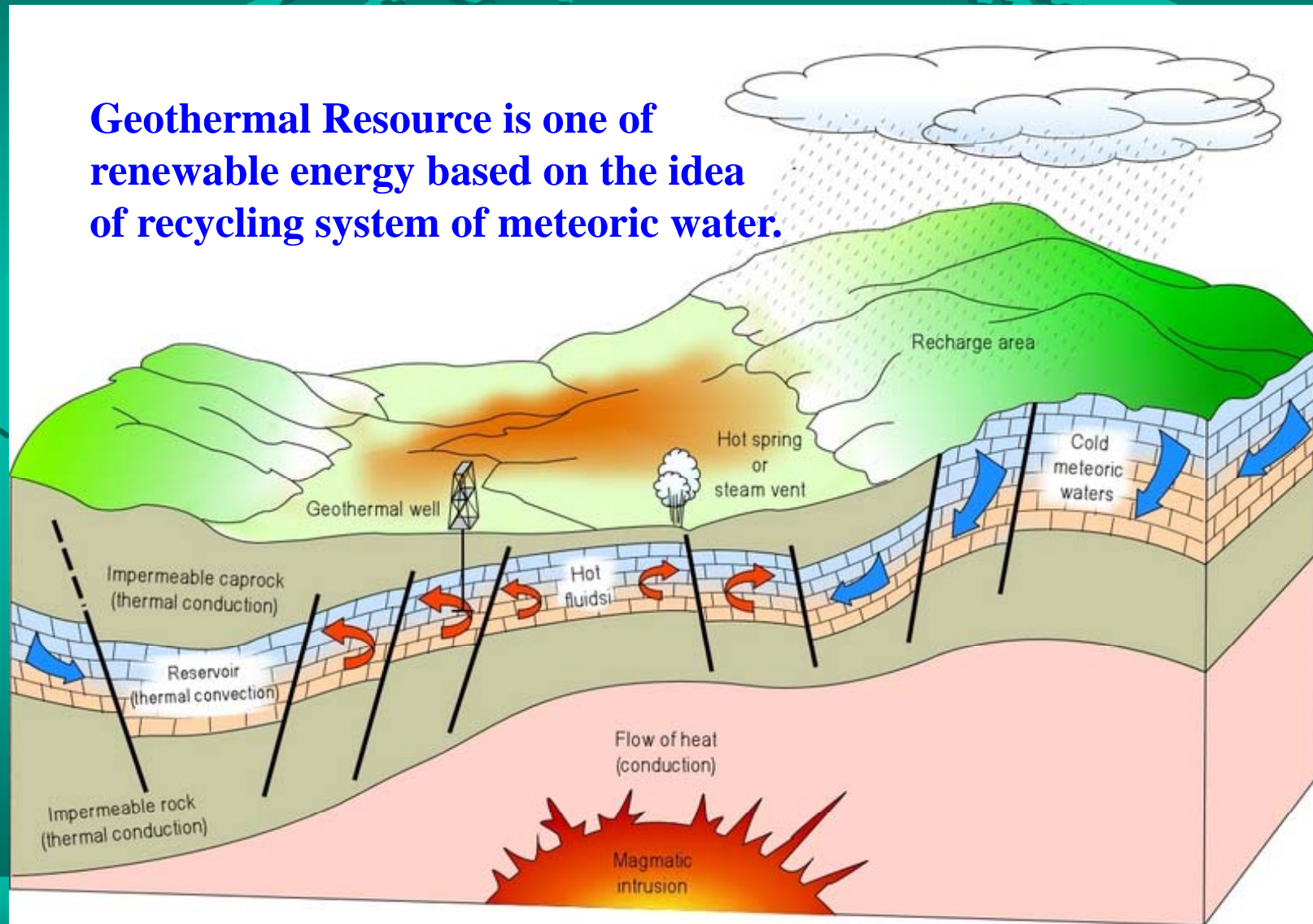
ACROS Fukuoka Building, International Conference Hall

West Japan Engineering Consultants, Inc. Geothermal Department

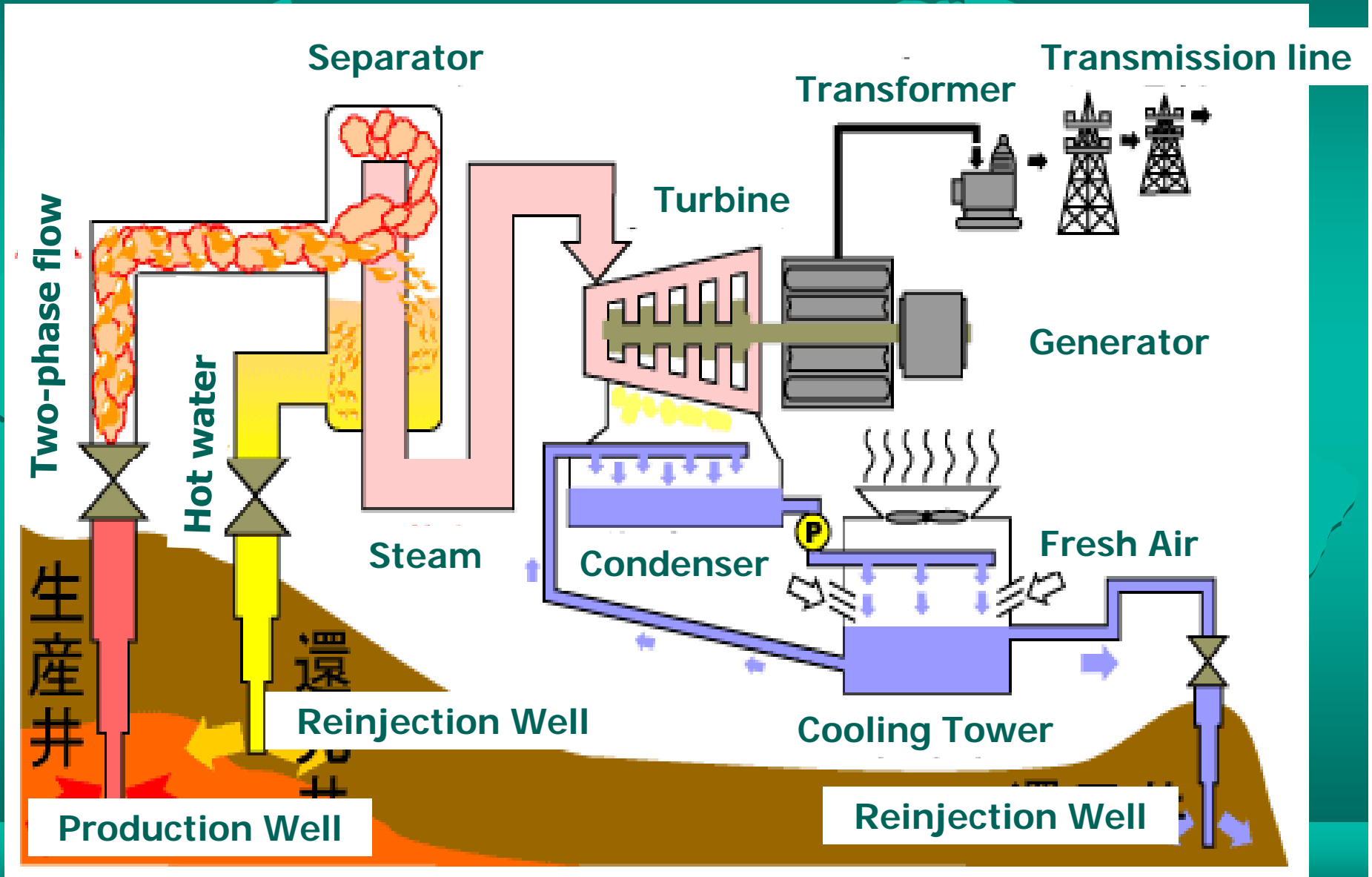
Koichi TAGOMORI

Representative Geothermal System

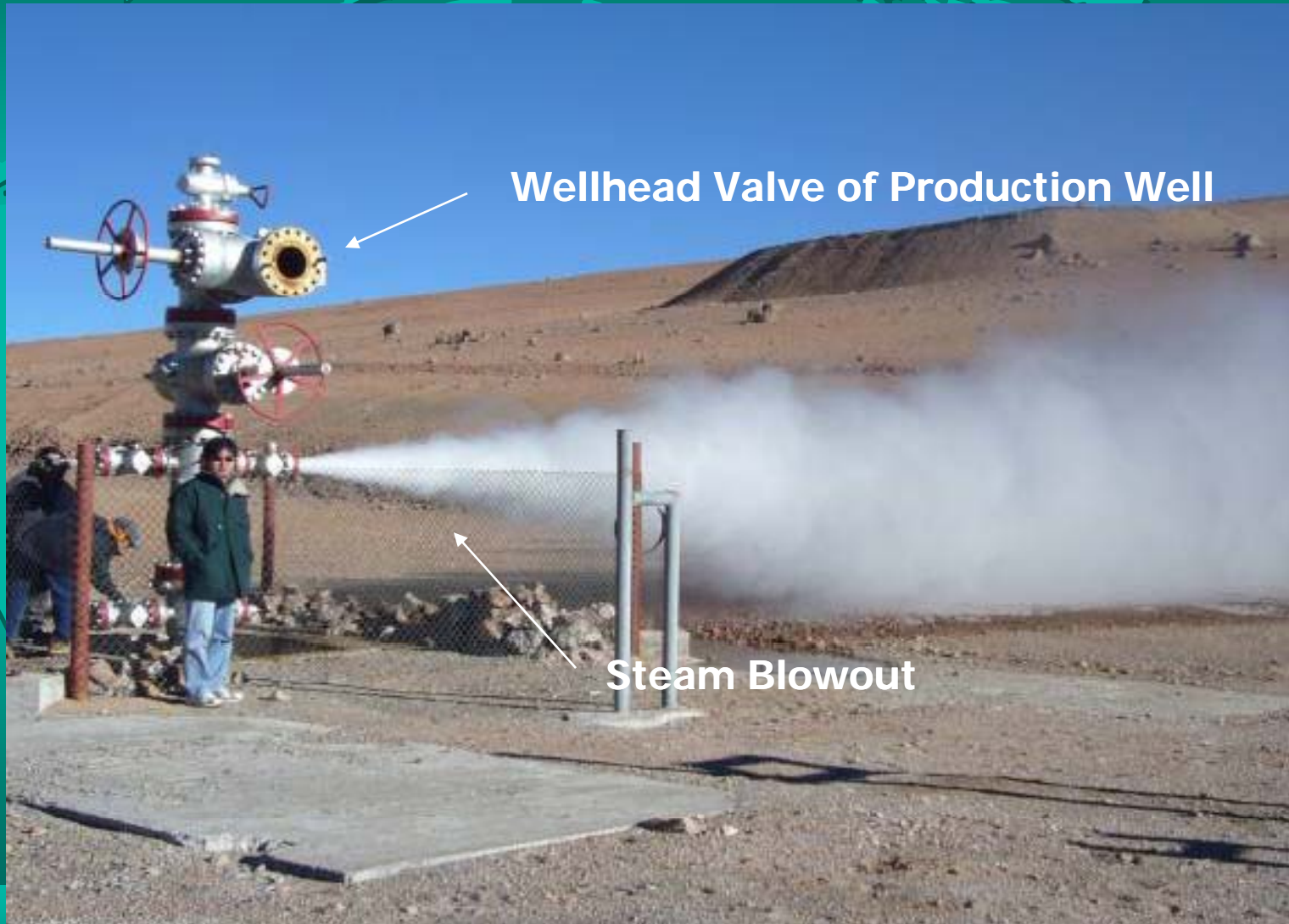
Geothermal Resource is one of renewable energy based on the idea of recycling system of meteoric water.



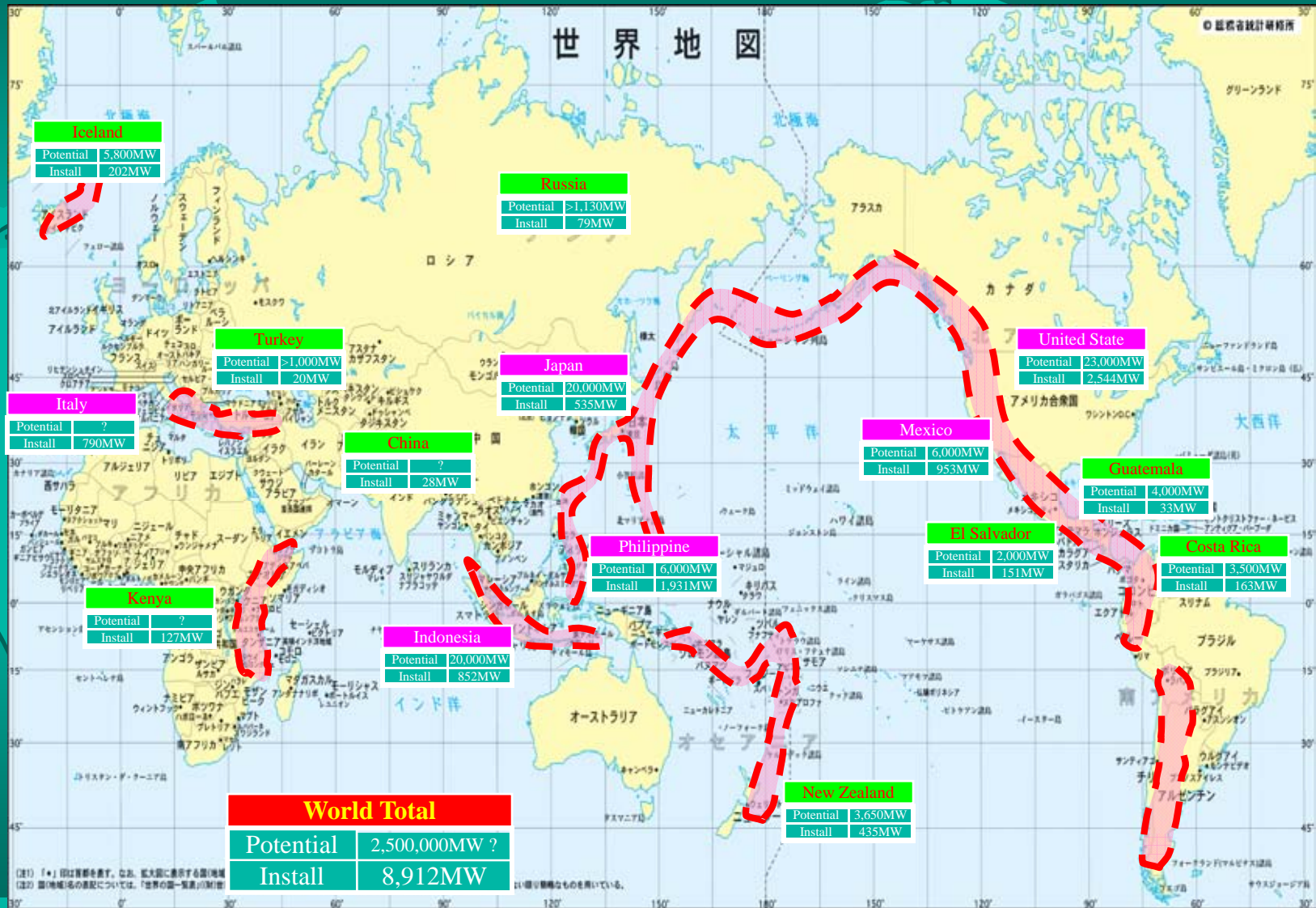
Schematic Diagram of Geothermal Power Generating System



Steam blowout conditions from Geothermal Production Well



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

Technologies and Competitiveness of West JEC for Geothermal Power Projects in Overseas Countries

◇ Technologies

- Integrated consulting services from resource study to power generation and transmission
- Various capabilities from geoscientific field to power engineering
- Most advanced 3-D reservoir simulation for reservoir evaluation
- Good partnership with domestic machinery makers having a world market share over 70%

◇ Competitiveness

- Sole consulting company in Japan for international geothermal market
- Leading worldwide geothermal consultant having integrated technologies (competitors: e.g., SKM in NZ, ELC in Italy, and GeothermEx in US)
- Overseas business experiences for over 30 years from the mid of 1970s

Significance of Geothermal Energy Development for developing Countries

For developing countries

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

For Japan

- ✓ Earn CO₂ emission rights from CDM projects
- ✓ Contribute to International cooperation based on high technologies in Japan

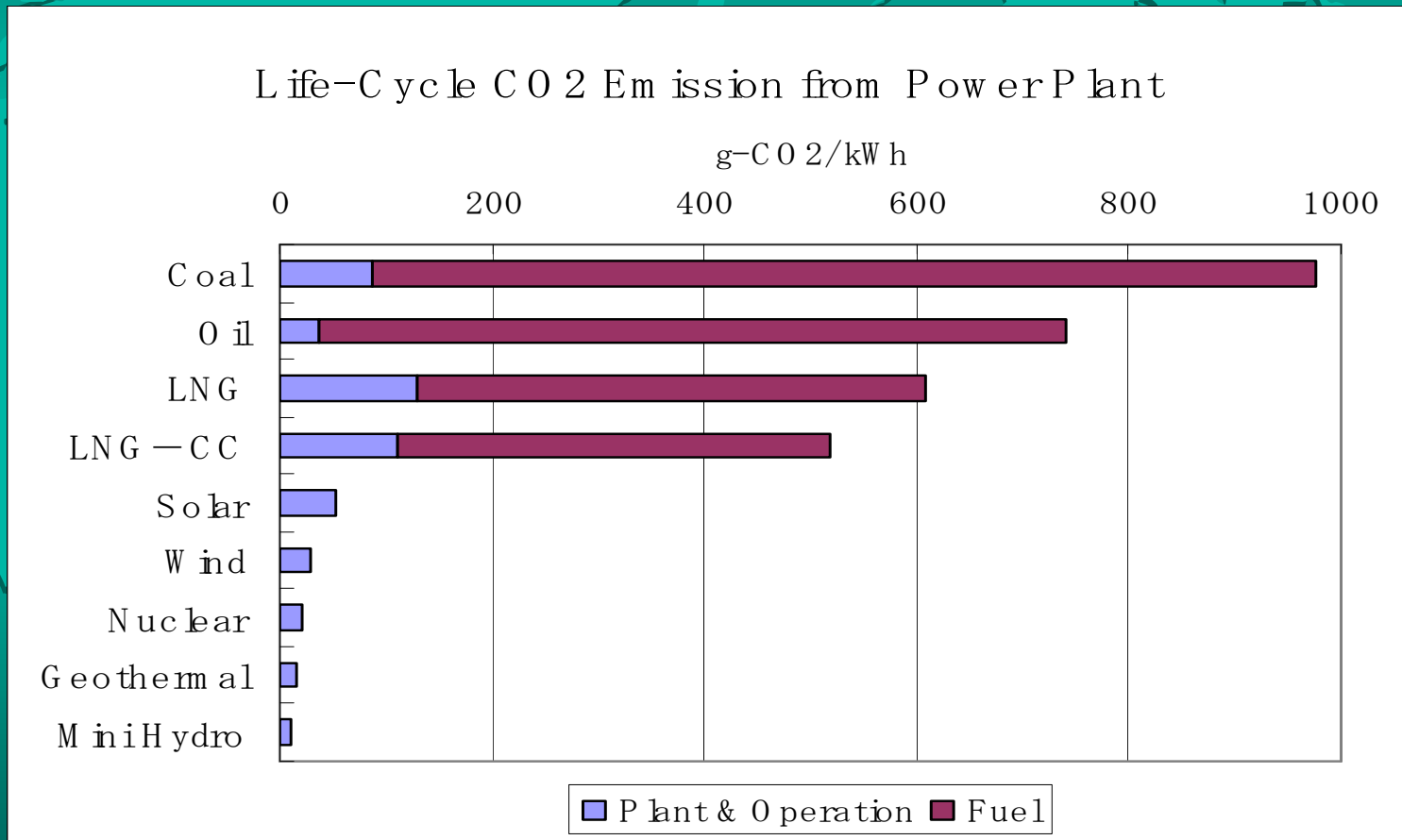
Temperature (°C) 0 20 40 60 80 100 120 140 200 350



Diagram showing various utilization of geothermal energy

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)

Indonesia, Flores



Indonesia, Lahendong



Philippines, Northern Negros



Mongolia, Bayankhongor



Thank you....



Geothermal

renewable and
sustainable
energy gift from
the earth