Evaluation of Renewable Energy Sources

Items	Advantages	Disadvantages	Future prospects
Photovoltaic	·Clean ·Unlikely be depleted ·Contribution to meeting peak demand	·Low energy density ·Unstable, subject to natural conditions ·Low economic efficiency	·Prospects of providing a small-scale power source are good if economic efficiency is improved.
Wind power	·Clean ·Unlikely be depleted	·Low energy density ·Unstable, subject to natural conditions ·Few locations suitable for multiple installations	·With economy of scale, progress is beins made in the commercialization of wind power.
Biomass energy	·Reducing environmental loads	·Low power generation efficiency ·Limited supply capacity	·Prospects are good in urban areas where incineration facilities large-scale can be constructed. ·"Black liquid", a waste liquid from the paper-making processes, and construction and demolition waste, will be used steadily.
Hydroelectric power	·Clean ·Unlikely be depleted	·Difficult to expand capacity due to environmental, locational and economic constraints	·The development of environmentally acceptable smaller hydroelectric power plants is expected.
Geothermal power	·Unlikely be depleted	·Difficult to expand capacity due to environmental, locational and economic constraints	·The development of innovative technologies such as power generation utilizing hot dry rock is expected.

(Source) The New Energy Handbook.

Comparison with Nuclear Power Generation

Item			Photovoltaic Power Generation		Wind Power Generation
			Industrial	Household	
Result			205 MW		83 MW
To replace one NPP unit [1]		Investment	¥11 trillion	¥8 trillion	¥1.1 trillion
		Units	37,308	2.62 million	4,429
		Area [2]	Equivalent to 1.5 times the area inside the Yamanote railway “loop” line	Equivalent to total households in Aichi Prefecture	Equivalent to the area of Lake Biwa
			Approx. 92 km^2	2.62 million households	Approx. 700 km^2
	Assumptions for calculation	Total installed capacity	250 kW/unit	3.5 kW/unit	1,000 kW/unit
		Capacity factor	12%	12%	25%
		Electricity generated annually	260 MWh/unit	3.7 MWh/unit	2,190 MWh/unit
		Facility investment	¥300 million/unit	¥3 million/unit	¥250 million/unit

1) Assuming a 1.38-GW-class nuclear power plant (NPP) with 80% availability, facility investment of ¥360 billion, and annual generated electricity of 9.7 TWh.

2) Assuming 1kW/10 m^2 for photovoltaic power generation, and one unit/0.16 km^2 for wind-power generation.

(Source) Materials from the Nuclear Energy Subcommittee, MITI’s Advisory Committee for Energy, October 19, 1999