

POWER GENERATION



Hatchobaru geothermal power plant (Kyushu Electric Power Co., Inc.)

OUTLINE

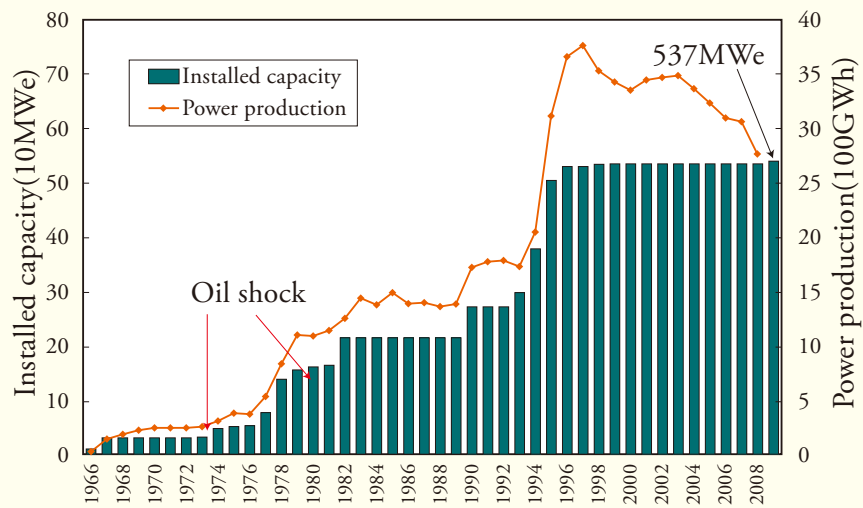
Japan has about 120 active volcanoes. The estimated potential of geothermal power generation is 20,000 MWe or more from hydrothermal reservoirs to a depth of 3 km. Currently, twenty-one electric power units at eighteen geothermal sites, mainly located in northern Honshu and Kyushu Islands, are in operation with a total capacity of 537 MWe. This amounts to about **5.3 % of the world total capacity** of geothermal power plants.

HISTORY

The first experimental geothermal power generation in Japan was conducted by Dr. H. Tachikawa in 1925 (capacity: 1.12 kWe). The first and second geothermal power plants in Japan began their operation in 1966 and 1967 at Matsu-kawa and Otake, respectively. After the first oil shock in 1973, the Ministry of International Trade and Industry (presently the Ministry of Economy, Trade and Industry) initiated the Sunshine Project to promote “new energy”, including geothermal R&D. Four more power plants in ‘70s, three plants in ‘80s, and six plants + two units opened in ‘90s. In 2000, World Geothermal Congress was held in Oita and Iwate, Japan. Development had been very slow since then, but surveys for new power plants were restarted recently.



Dr. Heiji Tachikawa

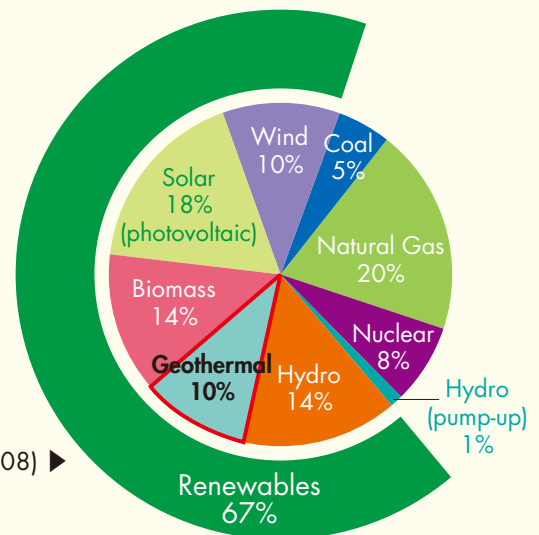


▲ Capacity and power production of geothermal power plants in Japan (1967-2009)

TASKS IN PROMOTING DEVELOPMENTS

As an environment-friendly energy system, geothermal power generation should be promoted. One of the obstacles against geothermal development in Japan is the fact that most of the promising fields are located near or inside national parks or spa resorts. In geothermal development, careful steps must be taken to preserve the scenic beauty and hot spring resources for the local residents. Another obstacle is its high development costs. The industry, the academia and the government need to make more efforts to reduce the costs by improving technology and changing related regulations for bigger and wider utilization of geothermal energy.

Power supply in Japan, 2050 prospect (ISEP, 2008) ▶



Beppu, Japan (photo by M. Hamada)



POTENTIAL OF POWER GENERATION USING HOT SPRINGS

High temperature hot spring water (about 80-120°C) can be utilized for power generation by applying the Kalina cycle system. Japan has about 28,000 hot springs that are naturally discharging or artificially drilled. An estimation suggests that, using 1,500 hotter wells and springs among them, as much as 723 MWe could be generated without additional drillings.