



Geothermal Resources of Korea

Y. Lee (1), S. Park (2), J. Kim (2), H. C. Kim (1), and M.-H. Koo (2)

(1) Korea Institute of Geoscience and Mineral Resources, Geothermal Resources Department, Deajeon, Republic Of Korea (ymlee@kigam.re.kr), (2) Kongju National University, Korea

In Korea, geothermal energy has been used for hot spring and balneology for thousands of years up until modern times, and for space cooling/heating recently. However, in general geothermal resources are vastly underexploited in Korea. It is mainly due to the fact that there is no quantitative information about geothermal resource potential of Korea. Therefore, in this work, we made a first geothermal resource assessment in Korea.

To estimate available geothermal energy and to construct temperature at depth maps in Korea, various geothermal data have been used. Those include 1560 thermal property data (conductivity, specific heat, and density), 353 heat flow data, 54 surface temperature data, and 180 heat production data.

In Korea, subsurface temperature ranges from 23.9°C to 47.9°C at a depth of 1 km, from 34.2°C to 79.7°C at a depth of 2 km, from 44.2°C to 110.9°C at a depth of 3 km, from 53.8°C to 141.5°C at a depth of 4 km, and from 63.1°C to 171.6°C at a depth of 5 km. The total available subsurface geothermal energy in Korea is 4.25×10^{21} J from surface to a depth of 1 km, 1.67×10^{22} J to a depth of 2 km, 3.72×10^{22} J to a depth of 3 km, 6.52×10^{22} J to a depth of 4 km, and 1.01×10^{23} J to a depth of 5 km. In particular, the southeastern part of Korea shows high temperatures at depths and so does high geothermal energy. If only 2% of geothermal resource from surface to a depth of 5 km is developed in Korea, energy from geothermal resources would be equivalent to about 200 times annual consumption of primary energy ($\sim 2.33 \times 10^8$ TOE) in Korea in 2006.