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Geology, energy potential and development of Indonesia's geothermal prospects

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Indonesia's regional geologic setting creates suitable conditions for the occurrence of commercial geothermal resources. A complex interaction of the Indo-Australian, Eurasian, and Pacific megaplates, as well as smaller plates, has led to island arc volcanic activity and major faulting throughout Indonesia. The combination of volcanic island arcs with shallow crustal magmatic heat sources and fault related zones of fracturing and enhanced permeability provides Indonesia with the world's largest concentration of geothermal prospects.

Indonesian geological surveys have identified 142 high enthalpy geothermal prospects for a country-wide estimated potential of approximately 16,000 megawatts. The geothermal prospects are generally characterized by vigorous thermal manifestations associated with late Pleistocene to Recent andesitic stratovolcanos and dacitic volcanic centers. Two prospects on Java, Kamojang and Awibengkok, are regarded as commercial power generation centers. Kamojang, a vapor-dominated field, has an installed capacity of 140 megawatts and is operated by PERTAMINA and PLN. The field has been producing reliably since 1983 with annual electrical generating capacity factors exceeding 80%. Awibengkok, a liquid-dominated field, is being developed by PERTAMINA, PLN and UNOCAL. A 110 megawatt power plant is expected to begin commercial operations in early 1994. Further expansion plans for both fields are currently under discussion.

Indonesia's electric power sector is experiencing rapid growth. PLN, the State Electric Company, and private power companies are expected to add 21,825 megawatts of new generating capacity by the year 2000. Geothermal energy development for electric power generation will make up approximately 1,200 megawatts of this new capacity. Future geothermal developments will be located in Java, Sumatera, and Sulawesi. The expansion of geothermal capacity will free up petroleum resources for export to earn foreign exchange and for domestic transportation uses. The geothermal capacity will also add to the development of a more diversified and environmentally preferred electrical generation fuel mix.