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The title is Refining estimates of geothermal power in sedimentary basins

Estimates of geothermal energy stored in sedimentary basins have evolved in methodology, scale, application, and results. A method common to most estimates has been to calculate: 1) the volume water in specific formations; 2) the percentage of that volume that could be produced with existing technology; and 3) the energy content based on the difference between average formation temperature and a reference temperature. In the first analysis of low-to-intermediate temperature strata bound geothermal resources, the accessible low-temperature resource base in the central United States was determined to be 27×10^3 EJ and that the total for all US strata bound resources was determined to be 100×10^3 EJ (Sorey et al., 1983; Reed et al., 1983). These initial estimates were based on only the principal well-known aquifers and excluded petroleum-bearing formations. We find that inclusion all formations that have potential for hot water production increases the resource estimate by almost two orders of magnitude. However, these estimates are for thermal energy and use a reference temperature of 15 B:C. Electrical power applications using current ORC technology must be based on the temperature difference between the resource temperature and a reference temperature determined by the condenser phase of the ORC system for site specific applications. We are applying this approach in a comprehensive analysis of the geological, geophysical, and geographical characteristics of the Williston Basin with the intent to identify the most suitable regions electrical power production from coproduced fluids. We find that 23 of 42 formations in the Williston Basin have fluid production capacity and temperatures sufficient for power generation using binary ORC technology. The most suitable regions for ORC power generation are close to the Missouri River where abundant cold water is available for cooling, and much of the Basin has significant potential using air-cooled systems.