

NATIONAL ASSESSMENT OF U.S. GEOTHERMAL RESOURCES – A PERSPECTIVE

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ABSTRACT

The U.S. Department of Interior has assigned to the US Geological Survey (“USGS”) the task of conducting an updated assessment of the geothermal resources in the United States. In that connection, we offer an objective analysis of the last such national assessment, made in 1978, and presented in USGS Circular 790, in view of the industry experience accumulated over the intervening 26 years. Based on this analysis we offer our perspective on how such assessment may be improved.

Our analysis was largely based on a comparison of the results of assessment of resources in 37 geothermal fields in California, Nevada and Utah GeothermEx has recently conducted with the resource base estimates for those same fields by USGS in 1978. This recent re-assessment shows that the total resource base in these 37 fields is about 33% of the 1978 estimate. The assessment in 1978 was found to have been optimistic partly because of higher estimates of volumes of some of the reservoirs, but primarily because of the use of too high a value (0.25) for the heat recovery factor (r). It was concluded that, had a value of 0.131 been used and the volumes used were the same as in our recent assessment, the 1978 estimates for the 37 fields would have been statistically the same as now. This paper then attempts to estimate semi-empirically the appropriate range of r values for such assessment, using a probabilistic simulation approach. The appropriate range for r is thus estimated to be 0.03 to 0.17 with a mean value of 0.11.

Finally, from this analysis, the paper points out some statistics on identified hydrothermal fields that should be borne in mind in the proposed national resource assessment: (a) temperatures of the identified hydrothermal systems are a more meaningful parameter than the number of systems identified, for 10% of prospects identified in Circular 790 contain 86% of the total resource base; (b) of the 187 prospects with higher than 100°C temperature, only about 15% have been developed to date, with 160 prospects still lying undeveloped; (c) surprisingly few new geothermal fields have been identified in the 26 years since the USGS study even though this period was marked by a most intense exploration and development episode in the history of the geothermal industry; and (d) pending the new national assessment, the total resource base in the identified hydrothermal systems in the U.S. is estimated to be on the order of 10,000 MWe.

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