

我国陆区干热岩资源潜力估算

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中文摘要:干热岩是一种清洁的可再生地热资源,在过去40年里,干热岩的利用技术日趋成熟,显现出了巨大的利用价值。我国陆区面积广阔且地处三大板块交界处,具有良好的干热岩资源背景。本文在对我国陆区大地热流、不同深度岩石热导率、岩石生热率以及放射性元素集中层的厚度分析的基础上,利用根据浅部测温资料向地壳深部外推的方法,对我国陆区不同深度进行了估算,在此基础上利用体积法对我国陆区3.0~10.0 km深处的干热岩资源量进行了估算,结果显示,我国大陆3.0~10.0 km深处干热岩资源总计为 2.5×10^{25} J,相当于860万亿吨标准煤,按2%的可开采资源量计算,相当于我国目前能源消耗总量的5200倍,其中,位于深度3.5~7.5 km之间,温度介于150℃到250℃的干热岩储量巨大,约为 6.3×10^6 EJ,按2%的可开采储量计算,也将获得126000 EJ的热能,相当于2010年我国能源消费总量的1320倍,开发利用前景巨大。

中文关键词:干热岩 大地热流 潜力评估

An Estimation of HDR Resources in China's Mainland

Abstract:As a clean renewable geothermal resource, the hot dry rock has been more and more maturely utilized with obviously increasing values. Located at the junction of tectonic plates with vast territory, China possesses abundant hot dry rock storage. Based on an analysis of terrestrial heat flow, rock thermal conductivity at different depths, radioactive heat generation and radioactive depth variable constant, the authors estimated the terrestrial temperature at different depths by calculating the measured temperatures from shallow strata to the depth of the crust. Then the hot dry rock resource amount at the depth of 3000 - 10000 m was estimated by virtue of the volume method. The results show that the resource amount at the depth of 3000 - 10000 m could reach 2.5×10^{25} J, which is equivalent to the heat of 860 trillion tons of standard coal. This resource is estimated to be 5,200 times that of the current total energy consumption on the basis of 2% of the exploitable resources amount. The hot dry rock amount at the depth of 3500 - 7500 m and between the temperature of 150 - 250℃ is estimated to reach 6.3×10^6 EJ, which could yield 126000 EJ on the basis of 2% of exploitable resources amount, around 1320 times that of the total energy consumption in 2010, thus demonstrating a promising utilization potential.