

## The Huge Potential of Geothermal Power

The full potential of geothermal energy is not well determined, but it is thought to be enormous. Estimates vary widely, but one reputable study concluded that enhanced geothermal plants could generate 100 gigawatts of electricity (about 8 times total U.S. consumption in 2006) within the next 50 years.<sup>i</sup>

As the map at right shows, geothermal potential is concentrated in the West (as is solar potential). To become a significant national electricity resource, geothermal would require significant investment in electrical transmission infrastructure. No new technology would be required, it would be a completely domestic power resource (providing energy security), it would be reliable, it would not fluctuate with the weather or the seasons, it would have minimal environmental impact, and compared to building coal fired or nuclear facilities, the cost would be competitive.<sup>i</sup>



Geothermal Education Office

In debates over the Energy Efficiency Act of 2007, an argument emerged that requiring utilities to obtain minimum levels of renewable energy would involve a transfer of wealth away from some states towards others. With respect to geothermal power, the argument is probably correct, and as the map illustrates, Missouri would not be one of the recipients. However, the argument is misleading, for it implies that the current power-generating infrastructure does not involve such a transfer. It clearly does. Missouri coal dollars already flow to coal states, natural gas dollars already flow to natural gas states, and oil dollars already flow to the Middle East. We must find a way to get beyond such posturing if we are to secure our energy future.

We noted in a previous white paper that water is the limiting factor in current geothermal fields. Extensive development of geothermal may place increased stress on water resources in a dry part of the country where water is already scarce. Hot rock underlies the entire world, however, the question is how deeply? *Hot Fractured Rock* may be the geothermal approach of the future. It would involve drilling wells deep enough to get to the “hot zone,” and fracturing the rock between them. A fluid would be pumped down some of the wells, where it would flash into gas, travel to a recovery well, return to the surface, turn a turbine to generate electricity, and be re-injected down the well. The technology for each step is already in common use in oil and gas fields. Ironically, CO<sub>2</sub> may be one of the best candidates for injection. Estimates suggest that the potential resource is sufficient to supply substantial portions (if not all) of electricity demand at a low price, and prototype projects are underway.<sup>ii</sup>

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<sup>i</sup> Massachusetts Institute of Technology. (2007). *The future of geothermal energy*. Renewable Energy and Power Department, Idaho National Laboratory. Retrieved online 12/20/2007 at <http://geothermal.inel.gov>.

<sup>ii</sup> See the website of Geodynamics, Ltd., <http://www.geodynamics.com.au/IRM/content/home.html>. See also *Between a rock and a hard place*. *Macquarie University News*, (August, 2005). Retrieved online 12/28/07 at <http://www.pr.mq.edu.au/macnews/showitem.asp?ItemID=408>. See also Hanson, Todd. (4/21/2004). *Hot dry rock goes supercritical*. Los Alamos National Laboratory News and Information Office. Retrieved online 12/28/2007, at [http://www.lanl.gov/news/index.php/fuseaction/home.story/story\\_id/2054](http://www.lanl.gov/news/index.php/fuseaction/home.story/story_id/2054).