Low-Temperature Geothermal: Baseload versus Distributed Power

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ABSTRACT

Geothermal energy is known for its reliable production of baseload power. Yet with the changing grid system to smart grids, the need for flexible power has become an important component (Office of the Governor, 2014). New technologies and the combinations of resource types are opening the door to development of geothermal resources found in low temperature reservoirs (<150°C) that are widespread in Texas and other sedimentary basins. Heat resources can be utilized through a variety of applications such as binary power plants, combined with storage systems or solar, or direct use of the heat. Thus exploring sites with the expectation of being a distributed energy source can open new opportunities for expanding geothermal power into sedimentary basins. Power can become very small (<10 kW) to start engines, to large projects (< 20 MW) for powering industrial sites based on the available heat stored in the sedimentary basins, i.e., East Texas (Richards and Blackwell, 2012). Determining the user first of the heat and/or power allows for both the baseload and distributed options to be considered. The focus during the past 10 years of using oil and gas field operations as a user of the power has not come to fruition for multiple reasons. There are misconceptions related to how to develop within an oil and gas field that must be overcome before success can happen regardless of baseload or distributed production. For example, "Team building", which seems obvious; we have watched company after company leave the development space without success because they did not have the all the necessary pieces within their team to cover from idea to production (Figure 1). Beyond the misconceptions are suggestions for areas that continue to be either overlooked or not yet "known" within this space. For instance, there is no legal language for geothermal in many states and the oil and gas industry has their own language, which does not always fit. The potential for Naturally Occurring Radioactive Materials (NORM) is a common problem in many sedimentary basins and oil field operations (USGS FS-142-99), yet not typical for geothermal projects, therefore rarely discussed as part of project consideration. As geothermal power is a new product in most states, Conser (2013) suggests changing the vernacular for the fluid used for heat transfer as "supplied" rather than "mined" by the producers. Protecting ownership interests by writing laws to protect the resource, as to not allow the heat resource to be exhausted, is another suggestion. These both help keep geothermal considered green, welcomed, and sustainable, all very important as geothermal expands development into new basins.

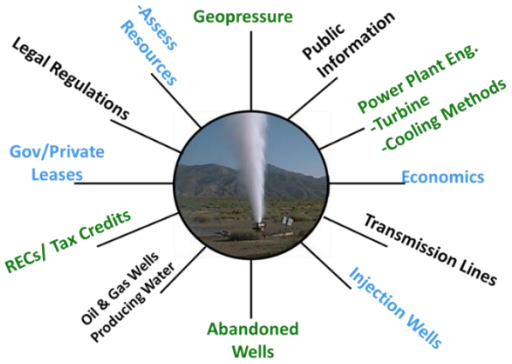

Figure 1. Team building for success; knowledge on every one of these categories is necessary for successful completion of small-scale geothermal energy.

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