

AAPG EMD Annual Geothermal Meeting Report 2010
Geothermal Energy Committee
Richard J. Erdlac, Jr., Acting Chair

Geothermal Energy Committee Composition

Joel Renner recently stepped down as Chair of the committee. He has recently retired from the Idaho National Laboratory and is thus decreasing his outside professional activities. However, he has agreed to remain involved as Special Consultant to the Geothermal Committee. David Blackwell is listed as the Academic Vice Chair on the committee, although it is my understanding the his involvement may be limited due to other activities. Tom Anderson from RMOTC, a member of the observing committee, has expressed interest in being more actively involved. He is looking in to the possibility of becoming the Governmental Vice Chair, though this must be approved by management. Richard Erdlac is presently conducting double-duty as Industrial Vice Chair and Acting Chair of the Committee. Once the officer positions are filled, then the active committee will be developed with input from the Vice Chair positions.

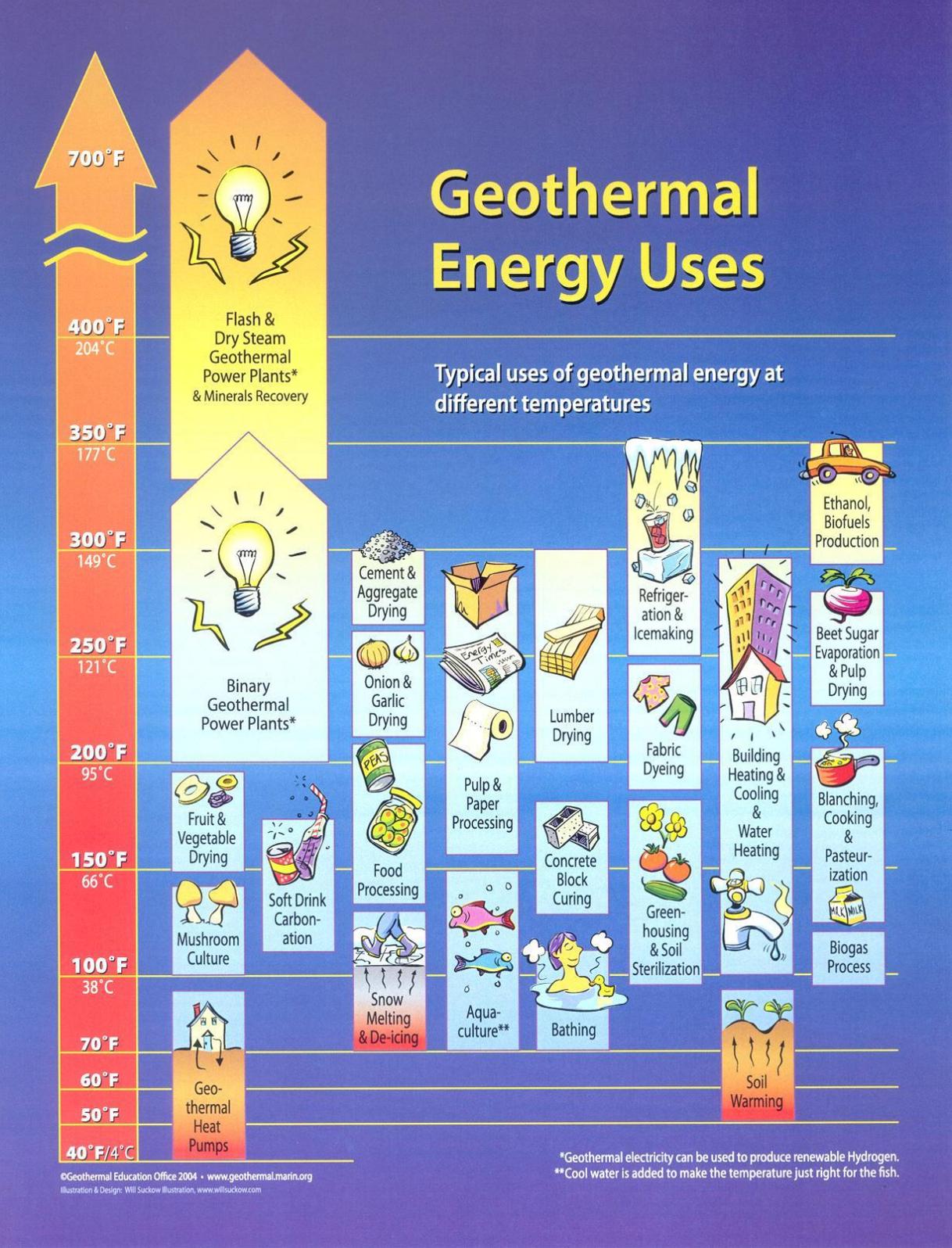
Geothermal Opportunities For O&G Industry Involvement

1 – Direct Application of Heat Energy

Production of hot water from wells, whether in conjunction with oil and gas (O&G) production or not, is not always of sufficiently high temperature or volume for electrical production. But many other industries use heat energy for various processes and represent an opportunity for an oil/gas producer to sell this heat.

The diagram below (Geothermal Energy Uses) was developed by the Geothermal Energy Office in 2004 (<http://geothermal.marin.org/GEOpresentation/index.htm>) for the purpose of providing a quick reference as to the uses of geothermal energy based only upon temperature. The lowest temperatures are used for geexchange (i.e. geothermal HVAC) an application which is out of the realm of O&G operators though not out of the realm for the water well drilling industry. Temperatures in the 100-200°F range, and a bit higher, can be used by numerous industries (see below) where heat is required in a manufacturing or processing activity. The opportunity for O&G producers exists because the industry has drilled wells that encounter these temperatures, and presumably water in these warm/hot formations, in the search for oil/gas. If a hot water resource exists and is produced in conjunction with the hydrocarbon, or if the well is “dry” from an O&G standpoint, the operator may be able to enter into a business venture with a local industry that needs the heat that can be produced from such a well. If the operator is not interested in such a partnership they may be able to sell access to the well to that industry or business that can then produce and use the heat from that well. This also has the long-term potential of improving O&G industry PR by being able to advertise the active involvement in providing a renewable energy resource for industrial processes. The

operator of a greenhouse who can use the hot water does not have the expertise to ensure that the well operates at it optimum capability whereas O&G geoscientists



and engineers can provide that expertise as energy providers. This approach for O&G industry involvement has yet to be explored but may represent a way for an O&G company to recoup some of the expense in drilling the well and/or open the door for an additional profit stream.

2 – Electrical Power Generation

In the simplest approach, geothermal energy production for electrical production is developable from two broad categories listed here as “conventional” and “unconventional”. Conventional geothermal energy production exists in areas of the world (i.e. California, Nevada, Utah, Japan, etc.) where heat energy has made its way close to the surface of the earth due to various geologic processes such as rifting, volcanic activity, deep fault systems, etc. In general depth is 12,000’ or less, with this having generally been considered the maximum economic depth from which to extract heat energy. The “unconventional” resource lies within other geologic environments such as sedimentary basins where depth much greater than 12,000’ are reached by the O&G industry. Both of these categories can be considered to be targets for geothermal production by O&G companies. A prime example is Chevron who operates more “conventional” geothermal resource acquisition facilities in the Philippines and Indonesia.

When considering the “unconventional” geothermal only, the O&G industry has the opportunity to develop geothermal energy along two lines of approach. The first is within the realm of co-production whereby produced hot water of sufficient quantity and temperature can be used to generate on site electrical power to offset operating costs of that well or field. If the co-produced water is not hot enough or of sufficient volume then the potential for its use in a direct use application can be explored if near existing industry, a town, or an entrepreneur who might desire to initiate such a business due to the availability of the heat energy. The second is the purposeful production of hot water for the generation of grid-based electricity, such as what was accomplished in Brazoria County, Texas in the late 1980’s using the geopressured geothermal resource. The development of “unconventional” geothermal or even the ancillary development of this resource can alter the economic of O&G acquisition in a favorable manner by providing three reasons for drilling...oil, gas, hot water. It can also enhance the potential for drilling for smaller O&G reserves if there is sufficient reason for also thinking that geothermal energy may also be an additional resource for development.

Geothermal Electrical Power Update – O&G Focus

The Geothermal Mid-Year 2009 Report gave an update on geothermal energy and companies involved with looking to develop co-produced geothermal or geothermal for power production. No updates are presently available on these company activities.

Several additional groups are looking to develop geothermal from O&G wells or from within sedimentary basins in general. A company called Linear Power Ltd

(<http://renewableone.com/linearpower>) is offering to buy wells for geothermal use. They are affiliated with Green Well Power (<http://greenwellpower.com/home/>) from Vancouver and Free Green Energy (<http://freegreenenergyllc.com/index.html>) out of Houston. They had an advertisement in the NAPE brochure offering to buy existing wells, giving the well owner an interest in the geothermal income.

Another company looking into geothermal is Pioneer Natural Resources. Pioneer had attempted to acquire a DOE grant last year but was unsuccessful. Nevertheless they are undertaking a scoping study with the Colorado Survey and the Colorado School of Mines for generating geothermal electrical power from the Raton Basin, where potential temperatures of 300°F may exist at 8,000'. This would be a dedicated Enhanced Geothermal Systems project (EGS) for electrical production.

Craig Dunn with Borealis Geopower (<http://www.borealisgeopower.com/contact/>) in Calgary acquired \$2.6 million from the Alberta energy Research Institute to conduct project to develop the Swan Hills Power production plant. The main part of the Swan Hills (Western Canada) produces oil, gas, and water from a depth of approximately 9,000' with fluids pumped to the surface at 163-170°F in high volumes. They have partnered with Free energy Power Corporation (<http://www.freeenergysolutions.ca/>) located in Richmond, BC.