Wednesday, November 16, 2020

Virtual Meeting via Zoom
6:00 –7:00 p.m.
HGS Members $15 Non-Members $35 Students $5
https://www.hgs.org/civicrm/event/info?id=2242
Registered Attendees: A confirmation email will be sent upon registration with meeting links.
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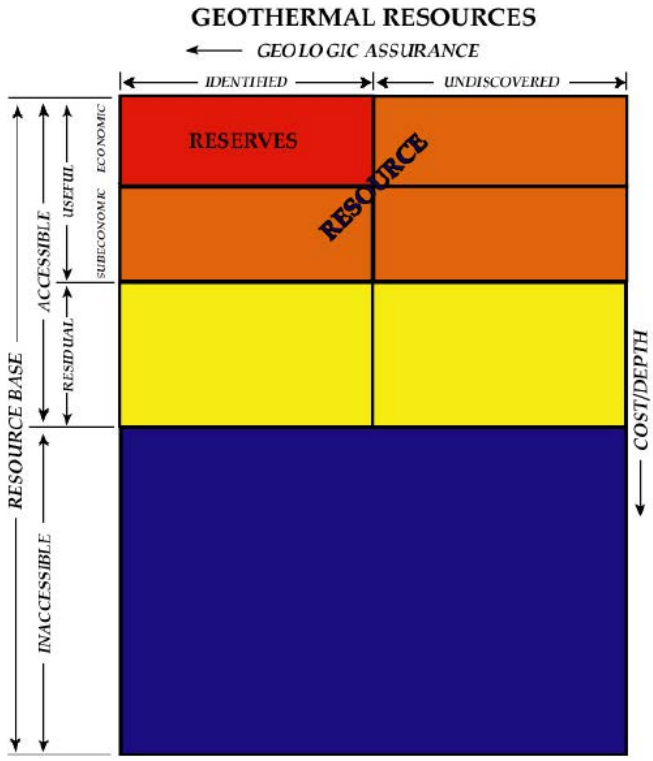
Steve Getz
Green Cloud Inc
Bob Wiener
Goh Seismic Interpretation Services and Goh Exploration, Inc.

Global Exploration for Geothermal Resources

This talk reviews the basics of geothermal energy and our role as geologists to find where it can be economically produced now and where deeper future reserves can be found.

Oil and gas exploration has had a long run since the 1973 Arab oil embargo and the 1978 Iranian Revolution. Scientific and social concerns now bring into question that drive for ever increasing hydrocarbon production. Yes, the decline curve will require consistent reserve replacement for many years, but industry concern is no longer peak oil, rather it is peak demand. One of the driving factors towards peak hydrocarbon demand is climate change.

The scientific consensus is that climate change is real, burning fossil fuels is a primary accelerant; catastrophic social and economic changes are beginning. This is driving a major push to carbon free or at least carbon neutral alternative energy sources. These include nuclear, hydro, solar, wind, biomass, hydrogen, and geothermal. Geothermal is the topic of this paper. Since geothermal can provide 24/7 baseload power and 97% up-time it is a much better renewable energy than wind or solar. It is good for the climate, good for the economy, and good for geologists. The McKelvey diagram, show here, is named after Vincent E. McKelvey (1972), a former Director of the USGS. He came up with this chart to help illustrate concepts and terminology used in resource evaluation. In this diagram the vertical axis represents the degree of feasibility of economic exploitation. The horizontal axis represents the degree of geological certainty. Has resource been discovered and is certainly there; or has it not yet been discovered but is likely to be there? The vertical axis has four divisions with increasingly favorable economics towards the top. The following resource-assessment terms are illustrated on the chart and defined as follows.



McKelvey diagram representing geothermal resource and reserve terminology in the context of geologic assurance and economic viability.

1. **Resource Base** – all the heat in the Earth's crust beneath a specified area, referenced to local mean annual temperature.

2. **Accessible Resource Base** – the thermal energy at depths shallow enough to be tapped by drilling using technology available at present or within the foreseeable future

3. **Resource** – that part of the accessible resource base that is producible given reasonable assumptions about future economic and technology.

4. **Reserve** – that part of the resource, which is identified and producible with existing technology and under present economic conditions

At present the geothermal energy industry is exploring and developing resources at the top of the McKelvey diagram, in the red and orange.

So, it is important to know where in the world these geothermal resources and reserves exist. ■

Biographical Sketches

Steven L. Getz worked nine years as a geophysicist for Cities Service Oil Company before becoming an oil and gas consultant for twenty-six years. From 1983 through 1987, he was an owner/partner of a NASD firm, wherein he held a Series 24 license. After the stock market collapsed of 1987 he resumed work as an oil and gas consultant until 2005. From 2005 through 2010 he was Chief Geologist for Allen Hoffman Exploration. Upon leaving Allen Hoffman in early 2011, he resumed work as an oil and gas consultant. He worked for Fortesa International, as well as Petrotrin the national oil company of Trinidad and Tobago. He also worked for a private landowner in the northern Gulf Coast of the USA before starting work in 2017 for Green Cloud Inc, a geothermal resource company in Reno, Nevada.

Mister Getz is the current Chairman of the HGS International Group and past chairman of the AAPG Geophysical Integration Committee. He served four terms in the AAPG House of Delegates and gave four technical papers to HGS audiences, one of which regarded the relationships between oil and deposits and over-pressured sedimentary sequences. His interests are music, poetry and martial arts.

Bob Wiener was raised in the idyllic coastal town of Narragansett, Rhode Island. He graduated from the University of Rhode Island with a BSc Geology. After stint at Core Labs, he was hired by Cities Service Company (compliments of Arab Oil Embargo). Initially he lived in Tulsa and worked on new venture projects. In 1978 he transferred to Cities International, Houston. That year he joined the HGS. After career changes and overseas positions with Conoco, Bob returned to Houston and began his independent oil and gas consulting and prospect generating company, Goh Seismic Interpretation Services and Goh Exploration, Inc. Bob has more than 40 years of diverse exploration and production experience in technical analysis, project management, project economics, and senior management levels. His focus is the integration of appropriate geophysical technology with available geological data at regional and prospect levels to develop play concepts, evaluate leases, develop and risk prospects, and get commercially successful wells drilled. He is currently applying these skill sets to geothermal energy exploration and development.

Bob was member of the AAPG Geophysical Integration Committee. He is a past Chairman of the North America Interest Group and a past Vice President of the HGS.