Geothermal Engineering: Fundamentals and Synergies with Petroleum Engineering

Abstract

Renewable energy is seen as the future source to meet the world’s growing demand, with geothermal resources offering a constant and independent supply.

Over the past century, the oil and gas sector has developed high level technologies for the exploitation of hydrocarbon reservoirs and most of this expertise is directly transferrable to geothermal exploitation.

This presentation begins with a review of the principles and uses of geothermal energy in today’s sustainable energy scenario, from district heating to electricity generation from the more recent Enhanced Geothermal System (EGS) concept. The challenges faced by the geothermal sector within the broader energy landscape are also discussed.

Special attention will be paid to those aspects of geothermal exploitation that overlap with the oil and gas expertise, such as drilling and completions practices, the characterization of fluid flow through porous media and in wellbores, and resources classification.

The comparison will shows how hydrocarbon exploration and production complements that of geothermal exploitation and identifies technical areas where future research efforts could be addressed to enhance the technology transfer between these energy sectors.

Short Bio

Gioia Falcone holds the Endowed Chair and Professorship in Geothermal Energy at TU Clausthal. She is also Adjunct Associate Professor in petroleum engineering at Texas A&M University, where she was formerly an Assistant and then Associate Professor and Chevron Corporation Faculty Fellow. She holds a *Laurea Summa Cum Laude* in environmental-petroleum engineering from University Sapienza Rome, a M.Sc. in petroleum engineering and a Ph.D. in chemical engineering from Imperial College London. Prior to joining Texas A&M, she worked with ENI-Agip, Enterprise Oil, Shell and TOTAL, on offshore and onshore assignments. She has served on SPE Technical Program Committees for the ATCE, LACPEC and CO2 Storage & Utilization conferences. She was the recipient of the SPE Young Professional Paper Certificate at the 2008 and 2009 SPE ATCE for her contributions to the discipline of projects, facilities and construction. She has co-authored over a hundred scholarly articles, one US patent and one textbook on Multiphase Flow Metering.