

Workflow on the Economics of Shale Plays Using Analogs

Scott Tye¹

¹Wintershall

Abstract

This presentation outlines the workflow for economic results of a representative shale play in the UAE using geological similar producing analogs from North America. In the early exploration phase of an underexplored shale play such as in the Middle East, shale properties and potential production rates are highly uncertain. This information however is essential for internal decision points on the future of the play, which is dependent on economic calculations. Due to the difficulty of testing and appraising this unconventional shale play in the UAE, a collection of analogs were chosen to best represent sections with unique characteristics. A suitable analog will provide production type curves, hydrocarbon yields, EUR ranges, reserves, drilling & completion styles and possible well CAPEX. However, choosing an appropriate analog based on subsurface parameters such as depth, maturity, facies, etc., is critical. For the integration of subsurface knowledge and a characterization of the potential shale play, the analytical method of Common Risk Segment (CRS) mapping is applied. One CRS map is created for every parameter considered. Four CRS maps (depth, thickness, maturity & facies) were created for a representative onshore source rock in the UAE. The resulting maps were combined into a final shale prospectivity map showing the potentially best area for shale production. This high-graded area was then divided into five sub-domains corresponding to hydrocarbon phase (oil, condensate & gas) and reservoir type (shale or hybrid). Hybrid corresponds to a conventional type reservoir such as carbonates associated in close proximity to the source rocks for which special analogs are used. The five sub-domains identified each have a unique U.S. analog that best represents their parameters.

Using the current fiscal terms of the UAE, five economic models were created representing each sub-domain. The remaining inputs for the economic model include assumptions on prices, taxes, and tariffs. The framing of the economic model will include all project phases from exploration, pilot, pre-development and development, with infrastructure costs, exploration costs and well counts per year. Every sub-domain/analog pair will have an individual economic model. The results show which sub-domain is currently economic (or not) using Pre-Tax NPV and Post-Tax NPV and if gas or liquids is the preferred economic option. The models also include government take, fiscal deductions, a potential cost breakeven, CAPEX, company cash flow and cumulative government cash flow. Moreover, these economic models provide a powerful tool for the negotiation of improved fiscal terms for unconventional shale projects with the national authorities.