Evaluation of Shale Gas Resource Potential of the Middle Benue Trough, Nigeria

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Abstract : Shale formations of the Middle Benue Trough in North Central Nigeria present a variety of opportunities for the exploration, development and exploitation of unconventional natural gas. Prospective formations range in age from Albian through Coniacian; they include the Asu River Group, Awe, Ezeaku and the Awgu formations, however, the Keana and Lafia formations are thought to be of lesser importance. The Awgu formation presents the best prospect when compared to the Barnett Shales of Fort Worth Basin in Texa, United States with regards to the organic matter maturition, TOC content of formation and shale thicknesses which are key attributes that aid in determining the economic viability of any shale gas play. The vitrinite reflectance value from Rock Eval pyrolysis for Awe and Awgu formations are 0.89—1.34(%) and 0.83—1.13(%) respectively and are good and sufficiently mature to generate gas from the Benue Trough. The TOC value are good for Awgu formation which is 0.83—6.54(%) and closest to that of the Barnett at 1—4.5(%). Asu River and Ezeaku are less viable. Furthermore, the High to Medium Volatile bituminous coals found in the Awgu formation are characterized by high TOC contents which may enhance gas generation and this is good for further examination and possible development.

Keywords : shale gas, resource, unconventional, benue, TOC
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