

## **Economic Feasibility of Developing Shale Gas in Pakistan**

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### **Abstract**

Energy is vital for socioeconomic growth and development of any country, while Pakistan unfortunately is faced with unprecedented energy crisis for more than a decade, which is rampant and thus causing restlessness among the masses. This energy situation calls for an immediate review of our current and long-term energy supply and demand situation vis-à-vis setting priorities for exploitation of available energy resources within the country.

As large discoveries of conventional oil and gas reservoirs in the Upper, Middle and Lower Indus Basins have already been made and duly exploited in the country – there is dire need felt for speedy exploitation of unconventional oil and gas reservoirs such as Shale oil and gas.

Shale gas energy may safely be regarded as future and one of the solutions for meeting the energy requirements of energy starved Pakistan. Initial studies have indicated significant potential for shale gas exploration in the country and believed that Shale gas exploration and production have the potential to strengthen Pakistan's economy manifold.

A report on “Shale Gas Potential in Pakistan” issued by the US Energy Information Administration (EIA) has not only encouraged the government to undertake concrete steps towards speedy exploitation of this huge energy resource but at the same time has been instrumental in catalyzing the efforts of Oil and Gas Exploration & Production Companies for exploitation of Shale gas reserves in Pakistan.

This paper is aimed at evaluating the economic viability of exploration and production of natural gas from Shale Gas formations in Pakistan. For economic evaluation of investment in Shale Gas venture, the basic information used for evaluating an investment in a Shale Gas Well included: a) Estimated Ultimate Recovery (EUR) b) Production Decline Forecast c) Drilling and Completion Cost of Well d) Annual Operating Costs for gas production, and e) Shale Gas Price.

In view of country's urgent need to meet the burgeoning demand for natural gas, and acute gas shortage, it is essential that extraordinary policy measures and decisions be taken for Shale Gas Price mechanism enabling accelerated exploration and production of Shale Gas in Pakistan.

This paper is based on the results of Economic Feasibility Model and Gas Pricing Mechanism for Shale Gas, which provides reasonable Rate of Return on investment. Several economic cases have been generated for evaluation and assessment purposes and are based on Initial Well Flow Rate, EUR per Well, Field Size, Tight Gas Policy Fiscal Terms, and range of premium on gas price (which are established by merging Tight Gas Policy 2011 and Petroleum Policy 2012).

Project economics suggests that an optimum gas price would be required in order to make positive economics of shale gas extraction that would go a long way towards re-building the economy of Pakistan and meeting its energy challenges in a befitting manner.

The gas pricing mechanism used in this research paper follows similar pattern as was used to develop Tight Gas Price under the Tight Gas Policy 2011. In this mechanism, the range for premium on tight gas price has been increased up-to 90% for first two (2) years and 80% for rest of the life to determine a price, which offers reasonable and acceptable Rate of Return on investment.