ECONOMIC FEASIBILITY OF COALBED METHANE DEVELOPMENT PROJECT IN INDONESIA

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Overview

Due to recent development of unconventional gas such as coalbed methane (CBM) and shale gas, natural gas will play an important role as primary energy source for a considerable period. According to IEA(2011), 22.5% of world total primary energy supply will be covered by natural gas in 2030. The CBM project has several advantages; natural gas is an eco-friendly energy source, there are additional coal reserves, and the project has great expectation for commercial recovery with lower producing cost than shale gas.

Korean government recently concentrated on the development of unconventional gas to prepare so-called "golden age of gas". The R&D program of the Korea Gas Corporation (KOGAS) to develop CBM in Indonesia is an example of that effort. In this context, we conducted a feasibility study for CBM development in Indonesia. The framework for a feasibility study was established and the legislation and taxes of Indonesia were also reviewed.

Methods

The profitability of a CBM project is generally dependent on various factors; gas content, permeability, water disposal volumes and methods, accessibility to gas market, and gas price. We reviewed those factors based on Advanced Resources International(2002)'s argument.

Because the gas price is volatile, we also investigated benchmark gas price and conduct a feasibility study with benefit/cost ratio, net present value, internal rate of return, and payback period. Binomial option pricing model was also considered to appraise the CBM development project. The parameters of the decision tree model might be signal indicators of national economic spread effects.

Results

The procedure of producing CBM is different from conventional gas reservoir. It has smaller pressure and essential dewatering process to produce the gas resource. It is thus important to consider water production and treatment in CBM production(Aminian and Ameri, 2009). There are generally five options to treat the produced water; surface discharge, impoundments, shallow reinjection, reverse osmosis treatment, and ion exchange.
We also identified the following factors those affect the feasibility of CBM project: wellhead price of natural gas; gross gas and water production; gas treatment, compression, and transportation costs; basis differentials; hurdle rate(discount rate); delay and depreciation factor; capital investment options; capital costs such as well drilling and water disposal facility; operating and maintenance costs; royalty and taxes.
With these factors, we developed a feasibility study model for Indonesian CBM project. Real option modeling is also considered in our model. The real option model can represent uncertainty of long-period development; abandon options, technical development, alternative operating scale and possibility of economic growth etc.

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