

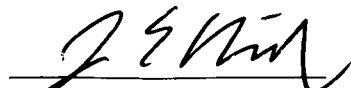
A Decision Analysis for Valuation of Natural Gas Resources with High CO₂ in East Natuna Basin, Indonesia

Addian Mirsha

The natural gas industry has a specific challenge associated with greenhouse gas (GHG) emissions. Naturally occurring CO₂ from natural gas production is one of the major anthropogenic sources of GHG emissions within the industry. Unfortunately, a significant portion of the world's natural gas resources are contaminated with CO₂, at varying concentrations. Decarbonization targets of oil and gas companies increase the difficulty in developing these challenging resources. The conventional practice of releasing the separated CO₂ gas into the atmosphere is unlikely to be favorable to the recent OGCs' attitude towards decarbonization.

A synergy between natural gas resources with high CO₂ concentrations and oil fields with CO₂-EOR applications can effectively address the two most important issues: the environment and the economy. However, economic issues arise when opportunities for the utilization of CO₂ produced are unavailable, making CCS to saline aquifer the only realistic option for developing these resources in an environmentally responsible manner. This obviously will increase resource development costs without increasing expected revenue, and eventually lessen the EMV of investing in these resources.

A valuation model based on decision analysis was built to assess the impact of additional costs from CCS deployment. The model focuses on the valuation of a natural gas exploration venture opportunity that potentially contains high CO₂ concentrations. The case of Paus Prospect in East Natuna Basin, Indonesia, was selected for implementing the model due to basinal and local indications that its target reservoirs have significant CO₂ concentrations. An Indonesian PSC cashflow model was used to estimate the potential outcomes of developing this prospect. The results indicate negative EMVs for this investment opportunity, by considering the CCS deployment, would cause a delay in development schedule. The fiscal terms improvement of the PSC and the adaptation of a tax credit for CCS were evaluated to provide policy recommendations for attracting investment to develop this challenging natural gas resources.



J. Eric Bickel, Supervisor