I Would Rather Be Vaguely Right Than Precisely Wrong: A New Approach to Evaluating Oil and Gas Investment Decisions

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Abstract

Many oil companies consistently under-perform in returning the economic metrics that were the basis of investment decisions. Their evaluation procedures systematically over-estimate returns and/or under-estimate the risks of loss, due to failure to properly account for uncertainty. They also find it imperative to do more with less—making faster, smarter decisions, using an appropriate level of technical analysis with acquisition of appropriate data. But what is "appropriate" in the presence of uncertainty?

Answering this question requires a holistic approach that incorporates all of the key components (G&G, Drilling, Production, Facilities, Economics, ...) that influence a decision—a Stochastic Integrated Asset Model (SIAM). This approach trades-off precise technical analysis within any one component for the ability to model the complex dynamics of the interactions between components, whilst gaining an accurate, global assessment of the impacts of uncertainties. The role of classical modeling changes to supporting the SIAM approach by providing uncertainty estimates on component model input parameters, calibrating them or generating simple surrogates.

Such an approach can identify which "state-of nature" uncertainties (e.g., porosity) can be ignored, mitigated or need to be resolved, thus focusing classical modeling and/or additional data collection on those areas having the biggest impact. It can also identify which "choice" variables (e.g., numbers of wells) the investment is most sensitive to, thus indicating value levers for optimizing it. Further, the SIAM approach can determine the relative merits of investing in reducing uncertainty versus developing flexible responses to deal with it. An intriguing, counter-intuitive, capability is that it can show how uncertainty can be exploited to create value—this point is illustrated by a simple example. It also provides consistent risk assessment methodology for input to portfolio management activities.