CHALLENGE

Making robust decisions concerning one project in a company's portfolio can be a challenge. Now envision doing the same for 100+ projects and then deciding which ones to pursue with a constrained budget, set employee count and other limitations. Recently, an oil and gas company approached EpiX with this conundrum. They had a large portfolio of potential oil wells and were using Monte Carlo to evaluate each well. In addition, they wanted to optimize their drilling portfolio to maximize value under certain constraints such as budget, drilling rig and summer/winter access limitations. While they had already constructed an optimization model, the problem was that it was much too slow and complex, taking 2+ days to run one optimization. That would be fine if they only needed to run the model once every now and then. However, in order to make informed decisions, they needed the ability to rerun the optimization many times using changed constraints such as what would happen if they increased the budget or procured more drilling rigs. Thus, 2+ days was impractical, making the model impractical in supporting their decision-making.

WHAT EPIX ANALYTICS DID

It is very important to build optimization models properly as they can easily become slow and sprawling "monsters". And our client had a monster. Based on a review of their model, we made a number of changes that included:

- Improving how constraints were being defined;
- Employing a number of techniques to restrict the decision-space;
- Streamlining the model to increase the calculation speed;
- Where possible, using probability calculations including applying the Central Limit Theorem.

These changes reduced the time to run the optimization model from 2+ days to less than 1 minute, while also finding better portfolios than the ones found with the original model. The reduced run time and better results gave our client the ability to rerun the optimization under many different constraints in a short amount of time allowing senior management to pose "what-if" questions and even made it possible to build efficiency frontiers on constraints such as the one shown in the Efficiency Frontier Example below.

EFFICIENCY FRONTIER EXAMPLE

Each marker represents an optimized drilling portfolio under a particular budget constraint. Similar frontiers could be made for other constraints such as # of FTEs, # of drilling rigs, risk tolerance, etc.
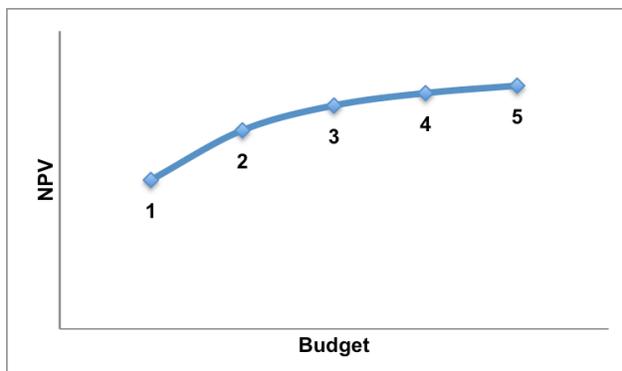
TECHNIQUES & METHODS USED

- Monte Carlo simulation
- Various distributions, including the Bernoulli and Lognormal
- Central Limit Theorem
- Modeling relationships
- Assessing confidence levels

BENEFITS TO OUR CLIENTS

Optimization under uncertainty is a very powerful tool in decision-making. Of course that's only true if optimization results are available within a reasonable timeframe. For our client, we were able to take an impractical tool and make it invaluable in helping our client decide on the right drilling portfolio. We did this by dramatically reducing the time to run optimizations while also giving superior portfolios.

Of course, optimization models should never be seen as the one and only tool to support portfolio decisions. However, over and over we've seen optimization to be a very powerful tool to quickly, and consistently explore the effects of alternatively optimal (strategic) portfolios.

In this case study, we used one of our oil and gas clients but we have completed similar projects for clients in chemicals and pharmaceuticals. Basically, the right optimization analytics can help any organization pick the right portfolio of products or projects.

MORE INFORMATION

⇒ ModelAssist® for @Risk®

⇒ ModelAssist® for Crystal Ball®

⇒ Testimonials

ABOUT EPIX ANALYTICS

EpiX Analytics, LLC is a leading firm specialized in probabilistic and optimization modeling. Using our analytical expertise, we help private and public institutions worldwide to make decisions in the presence of uncertainty.

EPIX
ANALYTICS
Sound answers for complex decisions

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