**Mineral Asset Impairment – the insight from simulation analysis**

Given the current challenging economic climate and depressed commodity market, the risk of impairment for mineral or oil and gas assets is increasing. In order to better prepare for the increased focus on impairment, the requirement for analytical insight is key, together with a need to assess and quantify the relationships and effects of factors influencing the mineral or oil and gas asset's fair value. A stochastic simulation approach can assist in this regard.

Impairment occurs when the Carrying Value of an asset is more than what it can fetch in the market or generate in use. In valuing mineral or oil and gas assets, the approaches available are the cost, market and cash flow approaches. The latter is considered to be the most reliable method in valuations and in impairment tests.

The cash flow approach relies on the Discounted Cash Flow (DCF) model. This is a deterministic modelling approach that derives a single Net Present Value (NPV) from a set of input assumptions. In addition to the single-view NPV, a handful of alternative scenarios or sensitivities are generally run based upon a range of input assumptions.

An approach used by Venmyn Deloitte to test mineral or oil and gas assets for impairment is Multivariate Monte Carlo simulation. In essence, by applying a range of possible values for each variable in the discounted cash flow, a NPV output range is generated. This allows a number of values to be selected for a specific input, the output presenting the combined effect of all possible outcomes within a unified range.
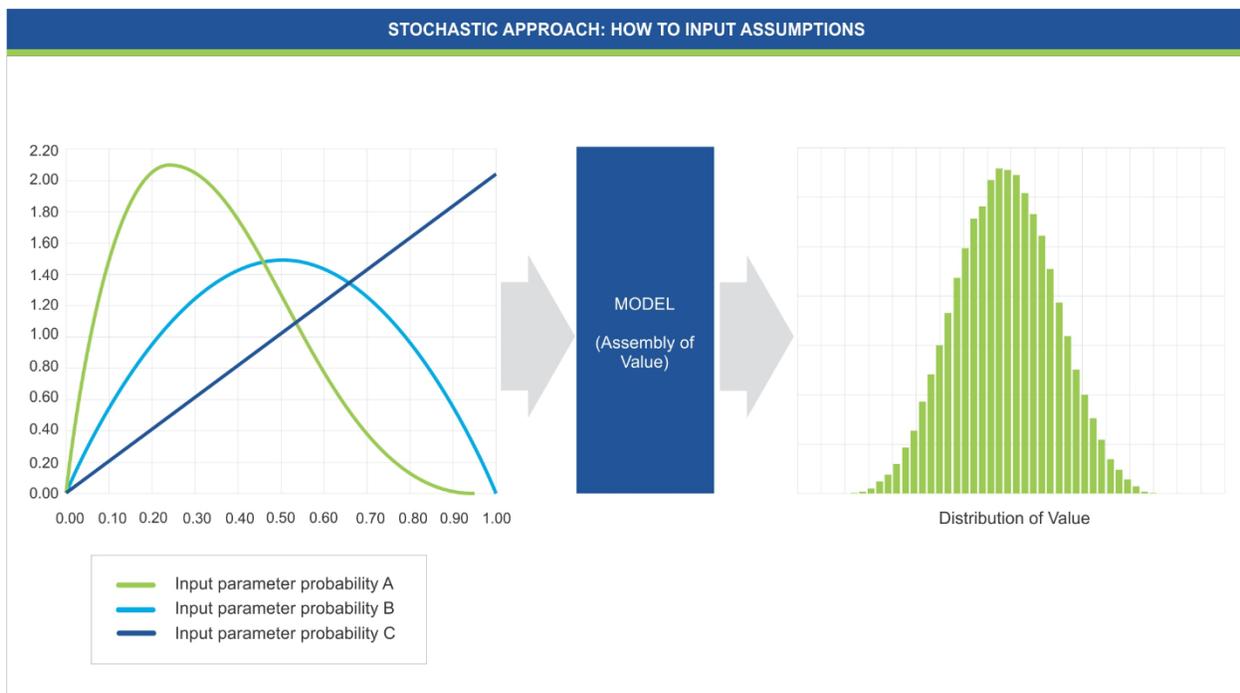
From the resulting NPV distribution, a probabilistic view can be formed of the NPV range. Armed with this information, the mineral or oil and gas asset's carrying value, the DCF NPV and additional scenario results can be assessed relative to the simulation results.

MINERAL ECONOMIC NPV SCENARIO EVALUATION
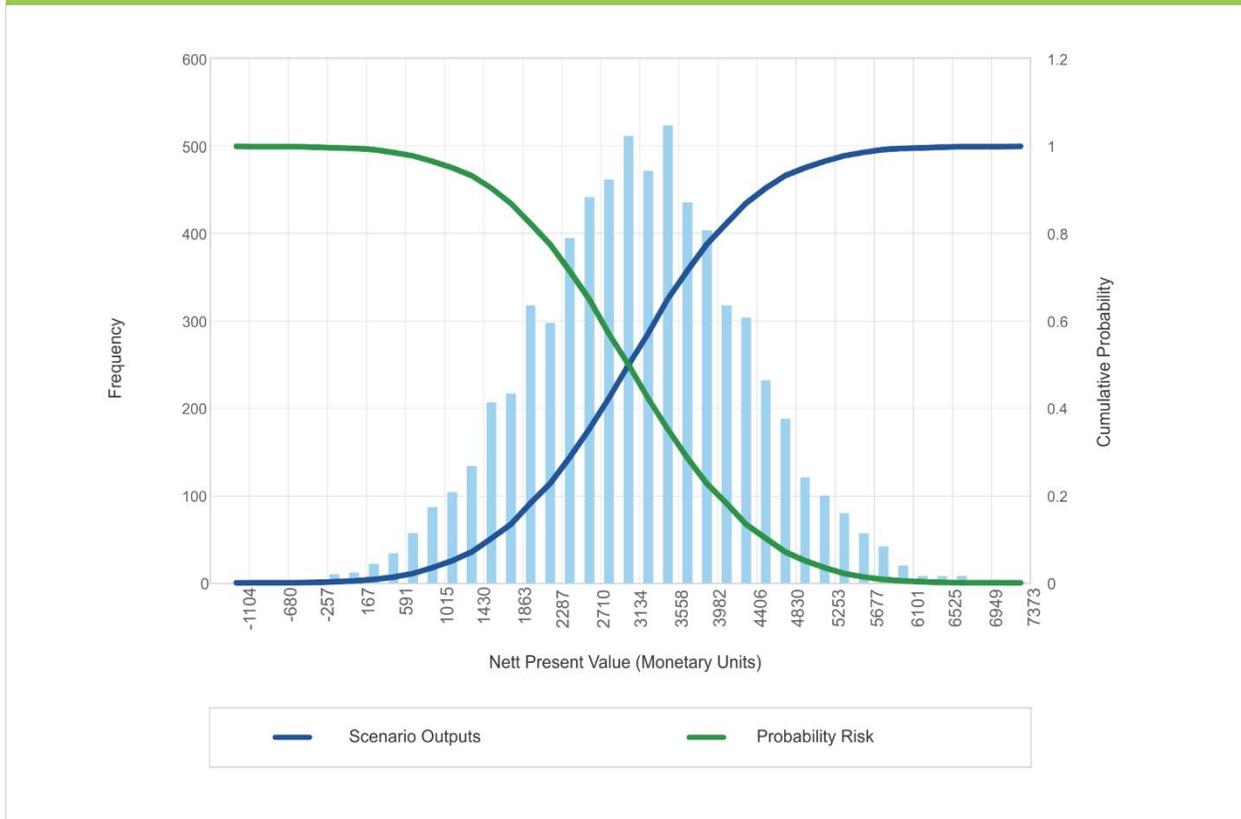
The risk associated with the attributable value (be it the carrying value or the DCF NPV) can be tested as a percentage of probable outputs, where the NPV falls in relation to the cumulative probability. For example, if the carrying value of a mining or oil and gas asset falls on the 50% cumulative-probability point, this means that, for all possible outputs, there is equal probability that the value would be higher or lower than the carrying value. The risk of impairment of this asset is much greater than when the carrying value falls on the 20% cumulative-probability point, which, in this case, would mean 80% of all possible outputs result in a NPV above the carrying value.

Venmyn Deloitte applies this approach in offering a holistic view of the risk associated with a mineral or oil and gas asset, insight into the probability of the scenarios that are likely to occur and affords additional analytical output to underpin decision making.