

## **Petroleum Economics**

Petroleum economics typically refers to the economic modelling of an oil and gas project. These economics are usually associated with a reserve assessment or development project.

Petroleum economics can also refer to economics that are more complicated to model such as oil and gas property purchase or sale price, reversions of ownership, risk adjusted economics of an exploration project, the economic optimization of a processing plant and associated production, or the economics of multiple owners of the same properties. Each of these has nuances that require experience to model properly. A discussion of each is detailed below. Aeon has performed economic modelling of each of these types of projects and can certainly model any type of project that may exist at your company.

The purchase and sale of oil and gas properties is a complex process. Even though there are items like property title, operations, employees, etc. to consider, the main thing to consider is the sales price. The sales price, contrary to popular belief, is not just some “discounted value” arrived at through the projection of production and the associated economics. The sales price is actually determined by looking at a range of values for the particular group of properties. Performing an economic analysis of the properties is a starting point, but other metrics must also be used to arrive at a sales price. Things to consider in determining a sales price include ownership percentage in each property, well life, location of properties, production decline, operatorship versus non-operatorship, future capital requirements, potential future development, etc. As an example, for a group of properties, the sales price that includes the operatorship is higher than the sales price a non-operator in those same properties would receive. If the group of properties to be sold has both operatorship and non-operatorship, then the values for operated properties and non-operated properties would have to be separately assessed and then combined for a sales price.

An ownership reversion is a change of ownership in an oil or gas property at some time in the future. The change of ownership is usually stated in the operating agreement for the property. The change in ownership can change at a particular time, at a certain cumulative production point, or a point in time when some multiple of a capital investment is paid out. The economic software we utilize is capable of performing these ownership changes and

calculating the correct net values. The key to performing this correctly is interpreting the operating agreement and conferring with the client to make sure the correct cumulative production or capital recovery is used.

Projects that require a processing plant to remove natural gas liquids, CO<sub>2</sub>, or helium require knowledge of how these projects operate and the associated costs for the operation. If the project is yet to be developed, then an optimization of the design must be performed. This will involve estimating reserves or resources of the wells proposed for connection to the plant, calculating the plant capacity, determining the initial number of wells needed to commence plant operation, the timing of subsequent wells drilled and completed to maintain plant capacity, and performing economic analysis of the project. Several iterations of this process are required to successfully optimize the economics for development. For an ongoing project, a detailed review of the operating statements should be done to determine the processing costs for each plant product as well as to estimate the shrinkages of each product as it moves through the plant. As this is done, it is also important to determine the sales points of each plant product. For example, does the plant process raw gas for a fee and “net” each plant product back to the well, or does the plant buy the raw gas for an adjusted price it expects to receive for its sale of products. Based on this analysis, an accurate economic model for the plant and associated wells can be done.

At first glance, it seems pretty simple to perform an economic analysis for multiple partners in the same project. However, after doing a large number of these, Aeon will assert that it is easier said than done. Some of the variations in ownership between partners involve differences in royalty burden, capital costs, overhead, and ownership reversions. For example, the operator of the property may be paying an overriding royalty interest that is not paid by the non-operating owners. The operating agreement for the property may exclude certain owners from paying any capital costs for a certain period of time. In some agreements, only non-operators pay overhead to the operator. And, as mentioned earlier there may be ownership reversions that must be considered when modelling each partner.

Whatever the type of economic modelling your company may require, be assured that Aeon Petroleum Consultants can accomplish it. Not only can

we do most economic modelling using commercial software, we have also written software or spreadsheets to model more complex problems.