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Execution Risk / Value-at-Risk

What is Execution Risk

There are numerous types of risks to be considered when sourcing energy. Most energy buyers and sellers are familiar with price risk, credit risk, and operational risks. In this month's newsletter we will shed some light on an often-overlooked risk component - execution risk. No, we are not talking about capital punishment, we are going to explain and quantify the very real risk created by deliberate inaction or procrastination.

If you have ever traded stocks through a full-service broker or done it yourself with an online account, you have probably experienced some anxiety caused by execution risk. You see a price that you are willing to accept, you pull the trigger, and later find that your order was not immediately filled or not completely filled in one transaction. The price you ultimately receive is not what you expected pay. If the price went up, you were hurt by execution risk. Execution risk can be viewed as price risk AFTER you have received an offer to buy natural gas or electricity.

Execution Risk - Common Causes

Natural gas and electric markets are extremely volatile. Prices are continually changing and suppliers are often unable to hold price quotes for more than a few minutes. It is wise to know in advance of receiving bids what will constitute an acceptable offer and be able to act immediately. Failure to do so puts you at risk of having to accept a higher price later. It also creates frustration for suppliers who have worked hard preparing your bid. Some common causes of Execution Risk are:

- Failure to identify an acceptable price before bids arrive;
- Failure to review and approve contract terms and conditions before bids arrive;
- The decision maker is not available to approve/reject bids when they arrive;
- A poorly constructed RFP/RFQ results in bids that require lengthy analysis to place them on an apples-to-apples basis;
- The decision maker is unfamiliar or uncomfortable with the process before soliciting bids; and
- Failure to obtain prior approval from other internal stakeholders, e.g., legal review of contract.

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Execution Risk – Quantifying

The potential cost of delay can be measured by a concept known as Value-at-Risk (VAR). VAR is a risk management tool that can be used by energy traders, financial institutions, or anyone possessing an asset of changing value. The technique is used to mathematically predict how much value could be lost over a period of time if a decision is delayed. In other words, "how badly could things get if I do nothing."

Let's consider an example of a Purchasing Manager (we'll call him Sam - short for Strategic Asset Manager) who has carefully identified and obtained approval for his company's 2008 natural gas budget of $1,620,000. Sam has just received bids for his annual natural gas needs, has quickly identified a winning bid, and has pre-approved all contract terms and conditions. Sam, however, discovers a problem. The Plant Manager who normally concurs with such agreements is on vacation and won't be back for seven days. Sam is torn between disturbing his boss who is relaxing on a beach for the first time in 5 years, or waiting for his return? Let's see if we can help Sam make an informed decision. As Sam's consultant we have access to historical energy price returns that we will need to compute his VAR. The only other information we need to know is how confident does Sam want to be with his prediction. For this example, we'll assume Sam wants to know his VAR with 95% confidence. The calculation of VAR is:

VAR = Mark-to-market value x Confidence Factor x Annualized Volatility x Square root of (holding period / days in a year).

Given and/or assumed information:

- Winning bid is a fixed price of $8.00/Dth;
- Approved annual natural gas budget = $1,620,000;
- Bid price needed to achieve budget is < $8.10/Dth;
- Annual consumption is 200,000 Dth;
- Annualized volatility of price returns for a 12-month gas strip ~ 22%;
- Holding period = 5 trading days (not the 7 seven vacation days);
- Natural Gas trading days per year = 252 trading days; and
- Confidence Level = 95% which produces a Confidence Factor of 1.645.

Calculations:

Mark-to-market value of current offer = $8/Dth x 200,000 Dth = $1,600,000

VAR = $1,600,000 x 1.645 x 0.22 x SQRT(5 / 252) = $81,563

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Analysis:

The VAR calculation means that Sam can say with 95% confidence that the cost of his company's annual gas needs will NOT increase by more than $81,563 from the present offer within the next 5 trading days. Another way to express this would be to say, there is a 5% chance they could have to pay as much as $1,681,563 ($1,600,000 + $81,563) if they wait for the Plant Manager's return. With an annual budget of $1,620,000, Sam would be smart to make the call, politely inform his boss of the risk and obtain permission to execute the contract. I suspect that Sam's boss would not be annoyed by the call, but rather impressed with the quality of Sam's analysis, and the decision to buy now would be an easy one to make.

Notes:

1. Each monthly natural gas Future's contract has its own volatility. A volume-weighted average would be modeled based on a customer's unique load profile. The 22% annual volatility value is an approximation for current market conditions.

2. The Confidence Factor of 1.645 is obtained from "Z" table statistics for a normal distribution curve with a 95% confidence level.

3. There are several generally accepted methods for calculating Value-at-Risk (variance-covariance, Monte Carlo simulation, and historical price returns). This example uses the historical price return method.

4. Volatility is the standard deviation of the daily price returns for the 12-month strip of natural gas futures contracts.

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