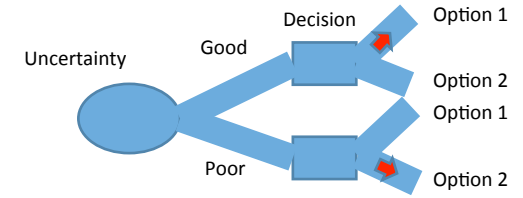
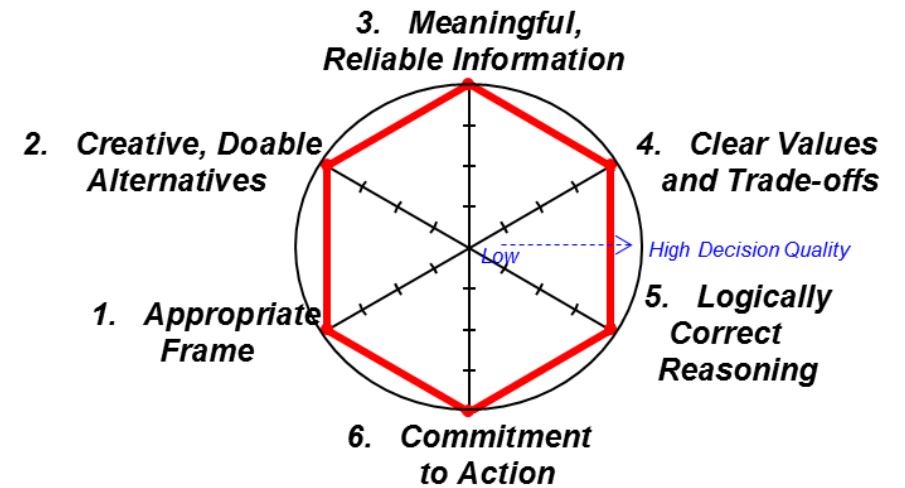


Probabilistic Analysis and Decision Making



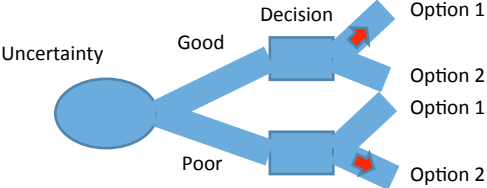
- Decisions made with deterministic assessments are most often wrong as anticipated results are either too high or too low
- Scenario planning may identify the extremes but not the shape of the value measure distribution (NPV?, ROR?, etc.)
- Using Decision Quality tools and simulation provides insights about the opportunity that can lead to more innovative alternatives to improve the value.
- SIPmath modeling is an effective way to conduct simulations at no cost

Decision Quality



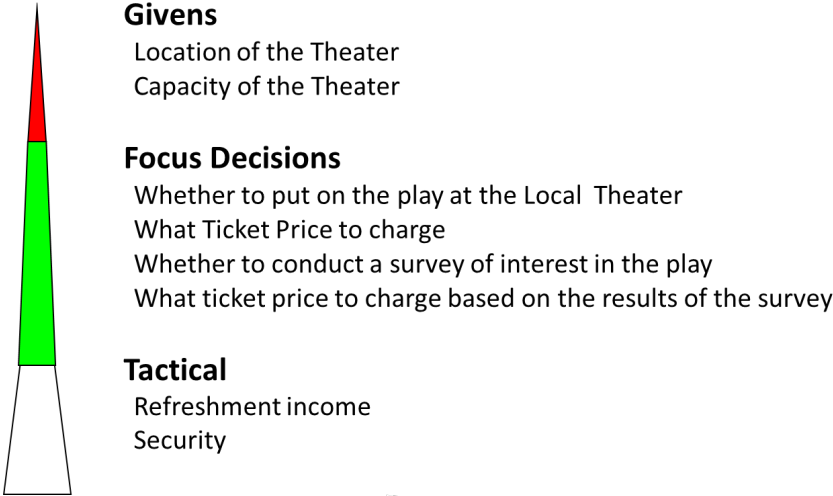
* DQ Spider developed by Strategic Decision Group (SDG)

Framing the Opportunity is Critical to Good Decision Making



Decision Hierarchy

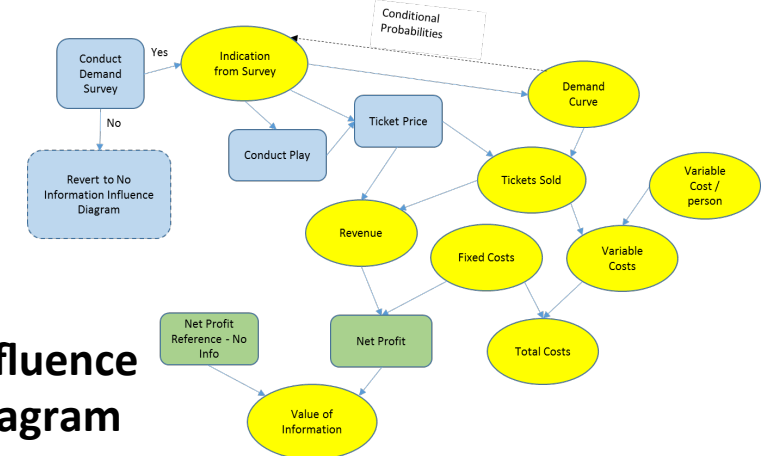
Put on a Play at Local Theater



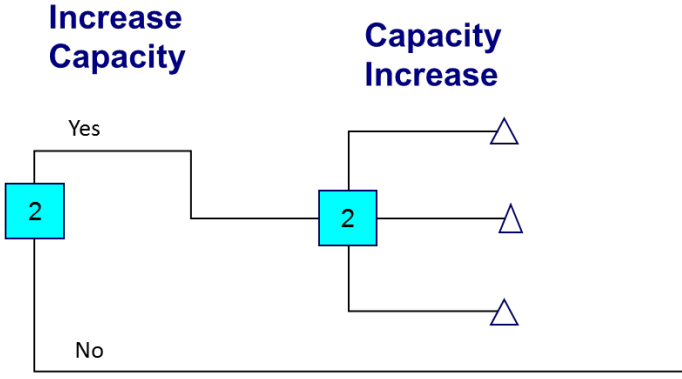
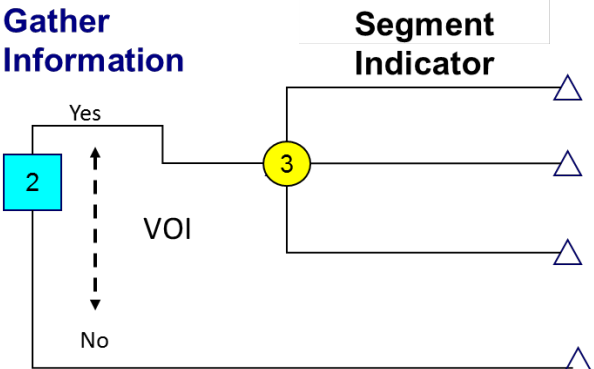
Put on a Play at Local Theater

Strategy Table

Decisions	Alternatives -->				
Whether to put on the play at the local theater	Yes	No			
What ticket Price to charge	30	35	40	45	50
Conduct a survey before setting price	Yes	No			
Type of survey	Talk to some	Limited	Significant		

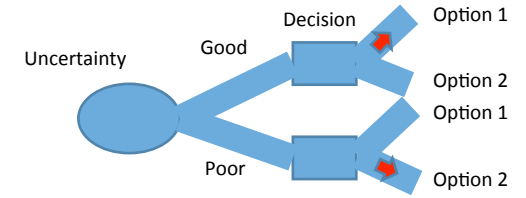


Decision Tree



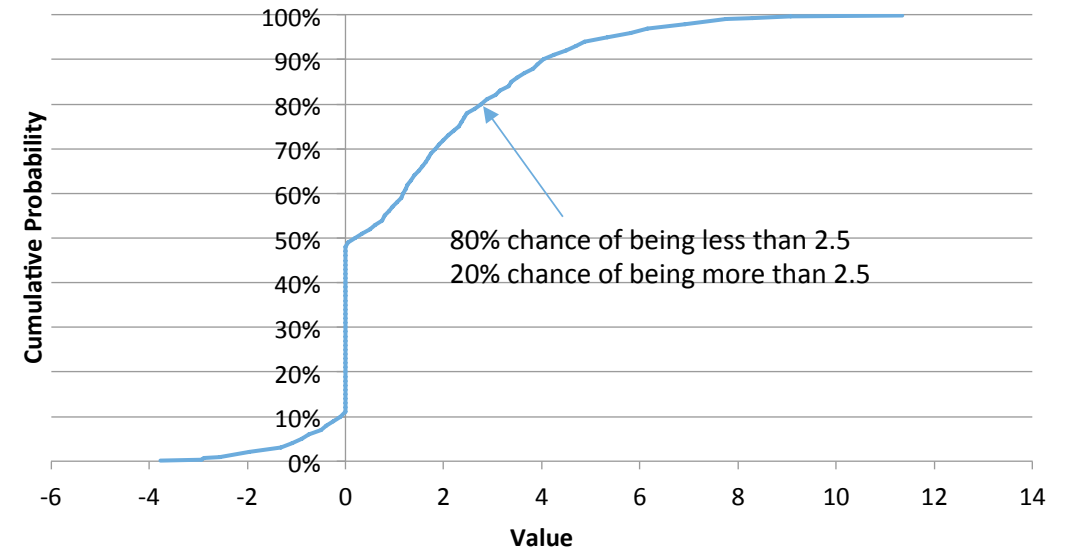
What is SIPmath & Why SIPmath?

(Stochastic Information Packet)



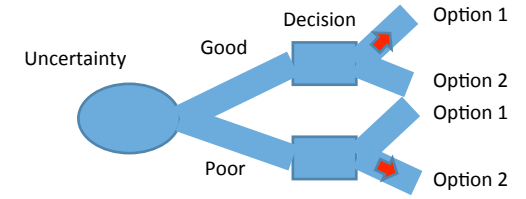
- Enables communication/ demonstration of uncertainties in a way others can understand
- Enables probabilistic analysis that provides Excel graphics automatically without additional process using a variety of distributions or user specified distributions.
- Enables users (PM, DE) to interact with simulation in an Excel spreadsheet with the same keystrokes used for numerical calculation
- Results are repeatable because of separate seeds for each uncertainty.
- Excel Model is transferable to anyone with Excel as no special software is required and model is fully functional.
- Conceived by and promoted by the non-profit organization ProbabilityManagement.Org to conduct probabilistic analysis.

Cumulative Distribution Chart



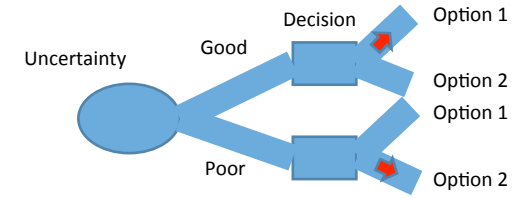
Making Decisions with Simulation

Applications with SIPmath



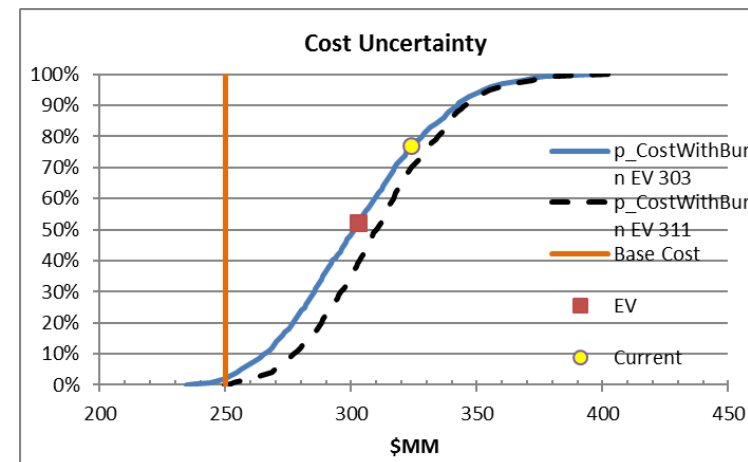
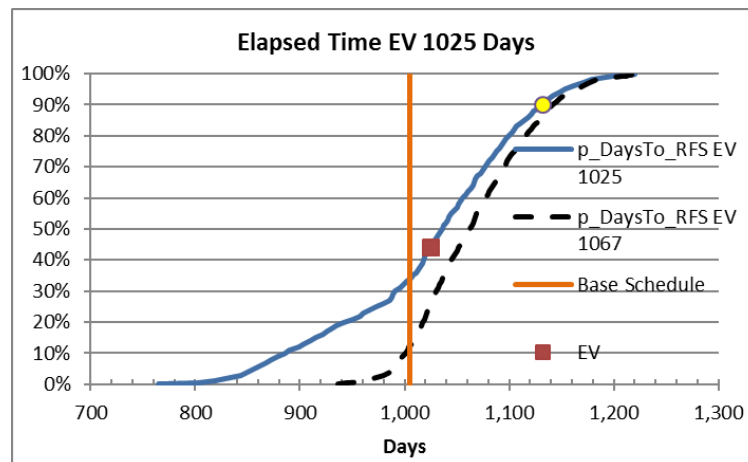
- Cost and Schedule Risk Analysis
- Scheduling of commercial activities
- Facility Cost Estimates
- Drilling Estimates
- Resource Assessment across fields or reservoir horizons
- Production uncertainty at Business Unit, Operating Co
- Discretizing a curve (e.g. lognormal for VOI analysis)
- Economic Evaluation
- Reliability analysis
- Inventory Control
- Portfolio Characterization & Optimization
- Financial Forecasting
- Visualizing distributions
- Doing “Arithmetic” on distributions of anything!

Why is understanding Cost and Schedule Risk important?

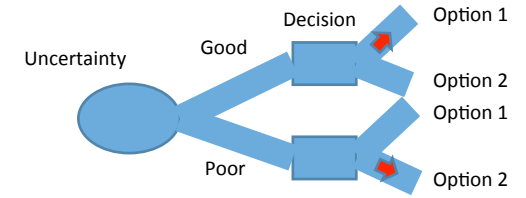


- Most projects are behind schedule and over cost. Combining “Most Likely” estimates for the base estimate results in a P10 or less outcome.
- A Cost & Schedule workshop is a comprehensive review that quantifies the major potential uncertainties and risk factors to make better decision and with the proper budget and timing.
 - ✓ Workshop and evaluation is useful in evaluating mitigation plans to improve the delivery schedule.
- It is necessary to perform both cost and schedule analyses in a single, integrated cost and schedule workshop in order to properly represent the time-related cost implications of schedule delays into the overall cost risk range.

Primary Outputs of a CSRA Workshop



VOI – Value added by Information

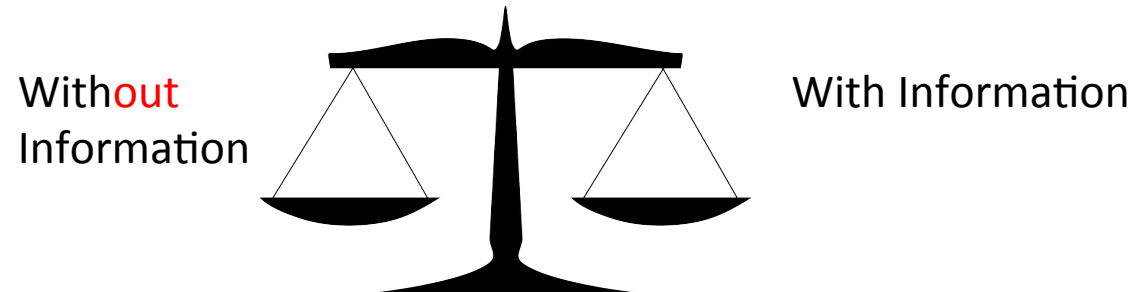


- One component of VOI is the Expected Value added to our opportunity if we acquire the information.
- The added value is how much better off we are with the information than without it.

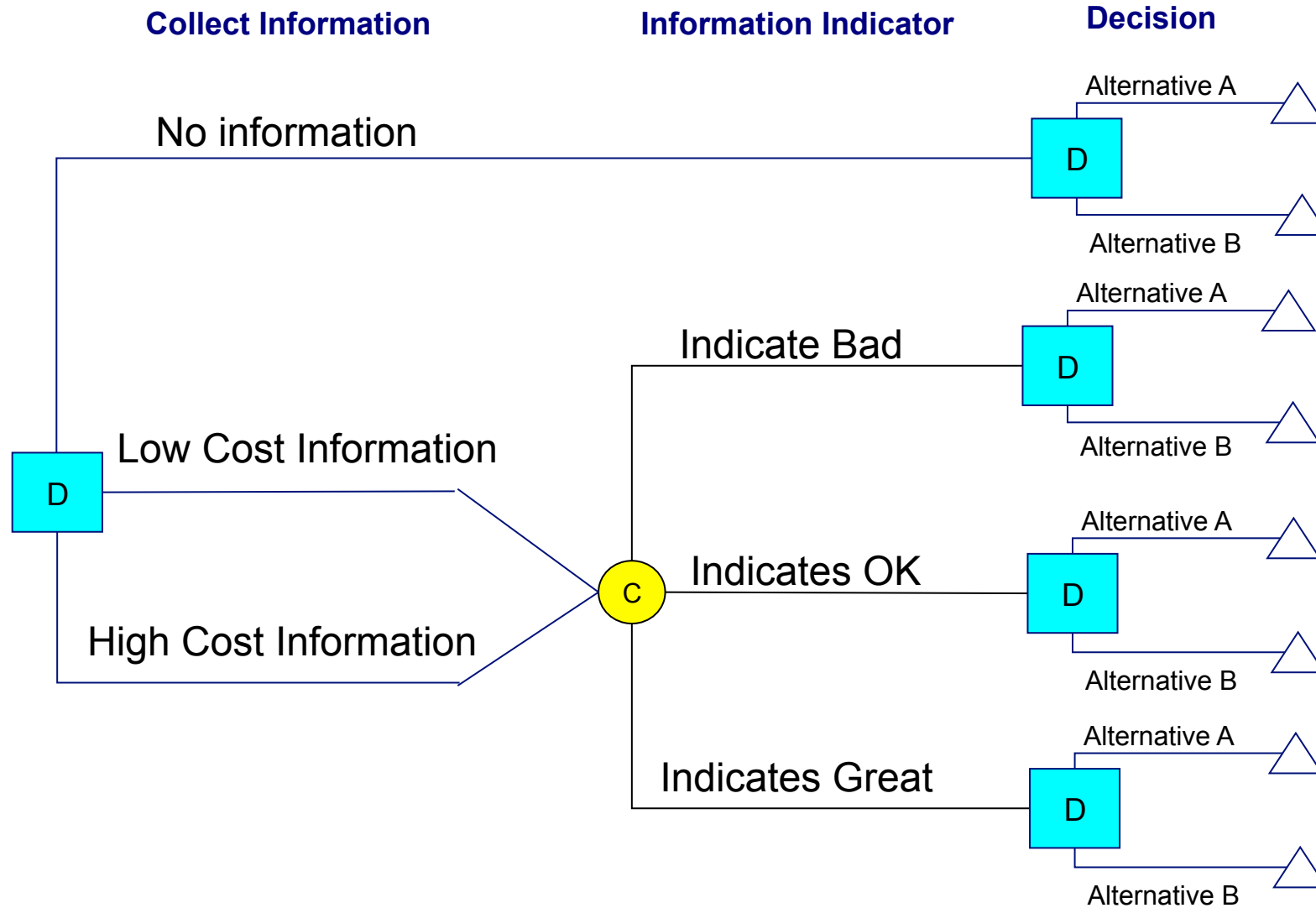
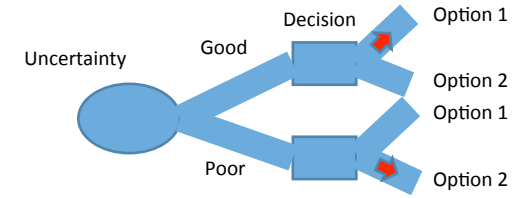
$$\text{VOI} = \text{Project EV}_{\text{with addtl info}} - \text{Project EV}_{\text{without addtl info}}$$

- This can be calculated using any economic value measure, such as NPV

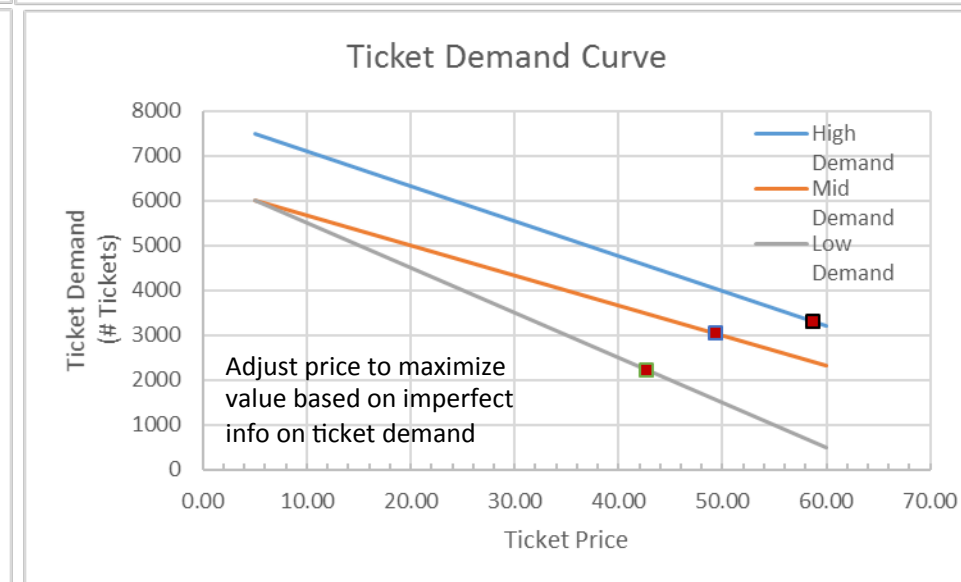
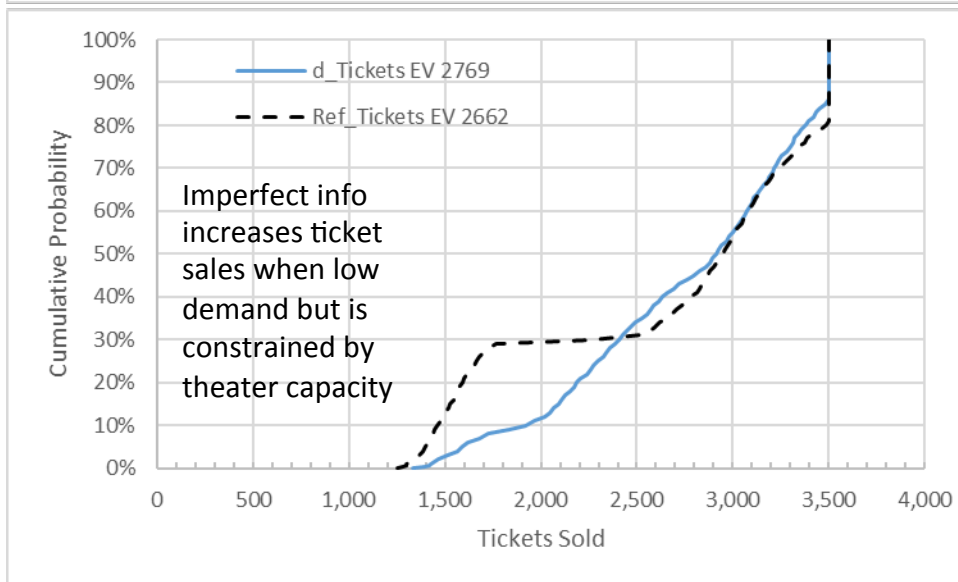
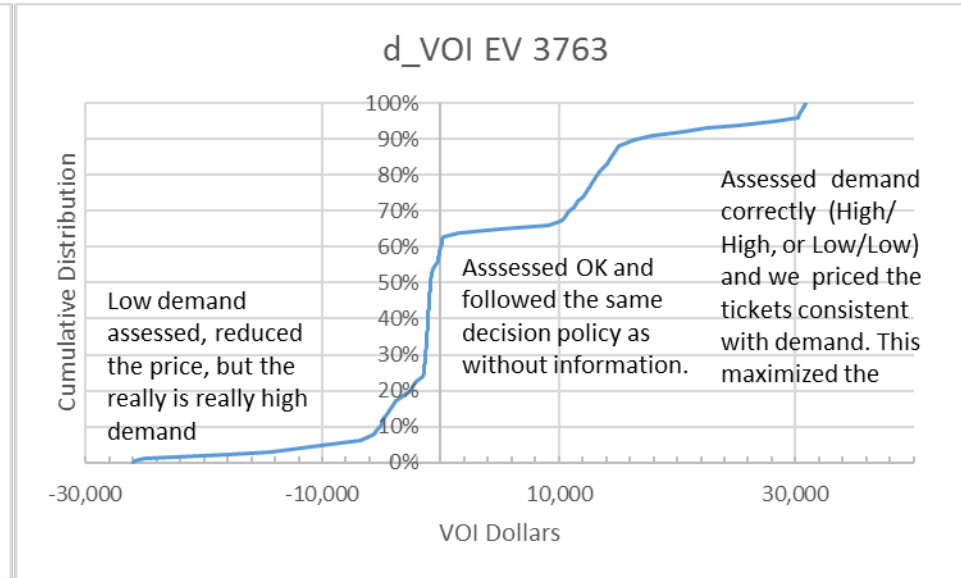
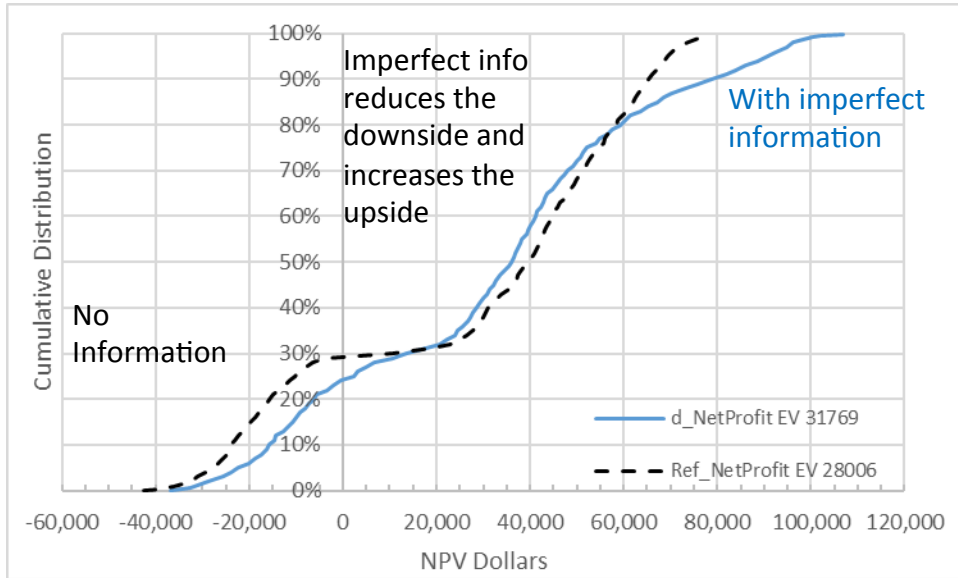
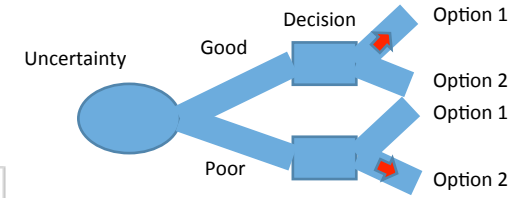
Value with Information must consider the cost and schedule impacts of acquiring the information



Decision Tree help us visualize the options the information provides

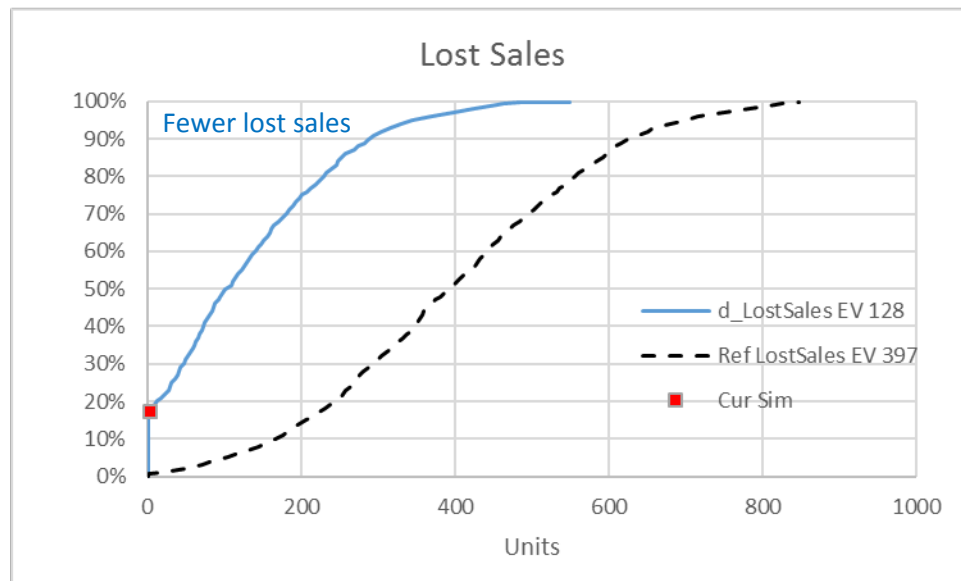
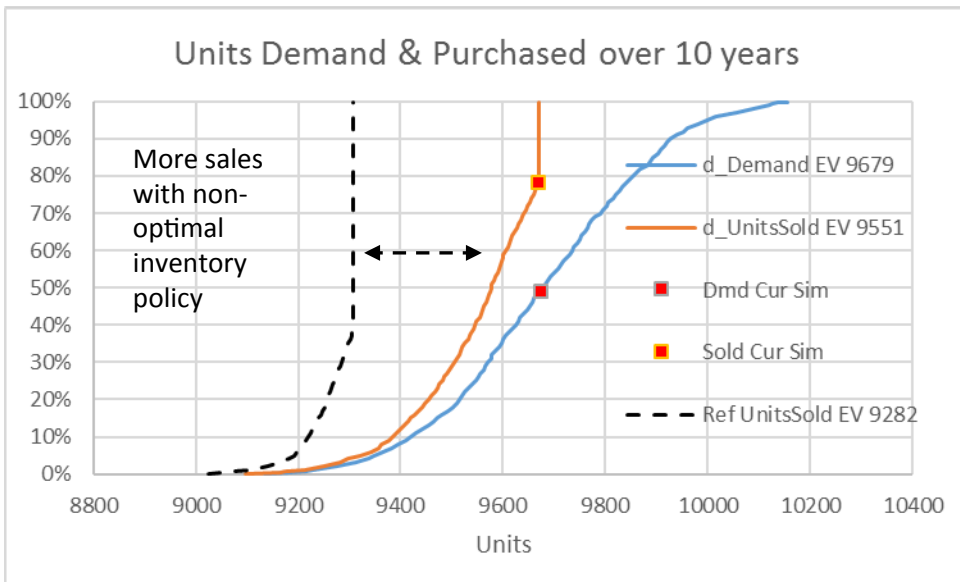
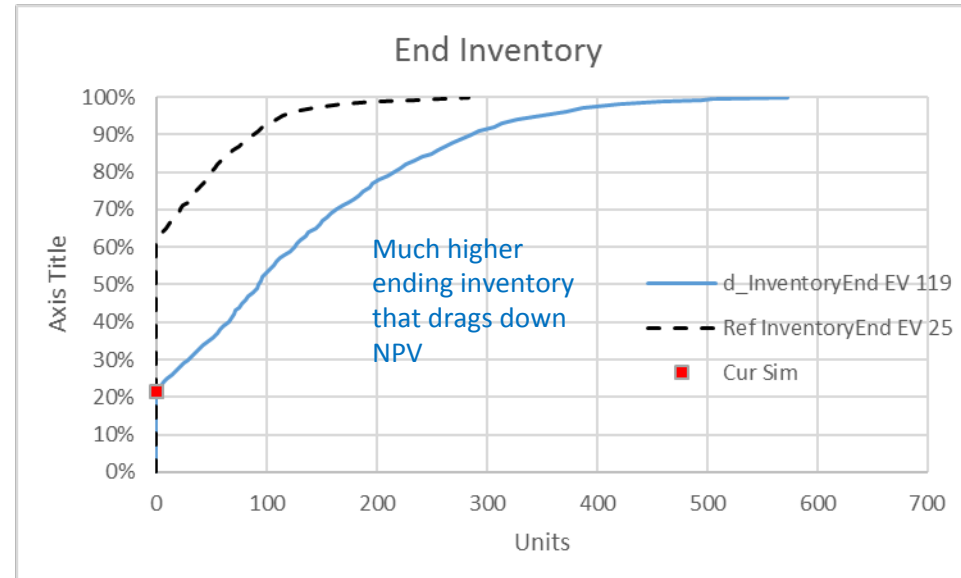
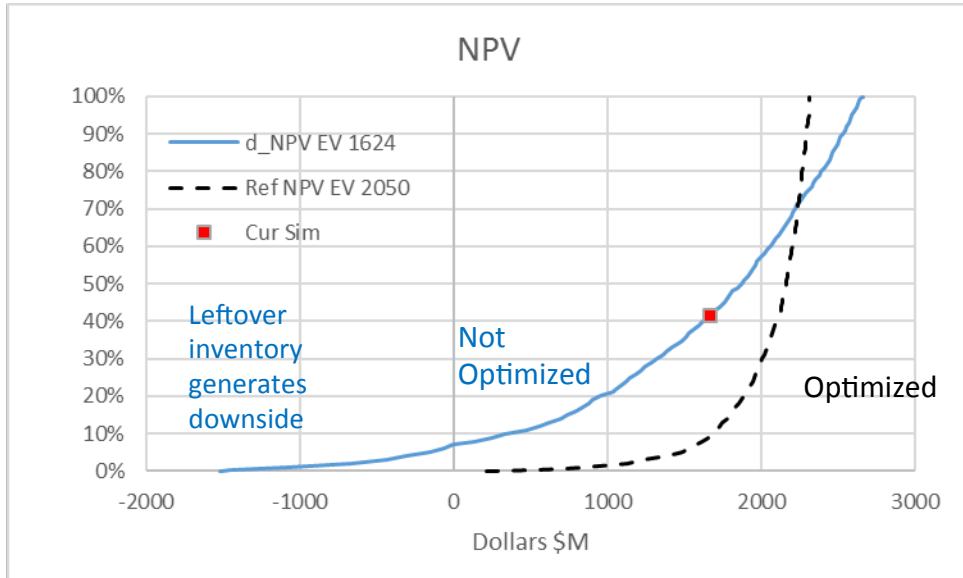
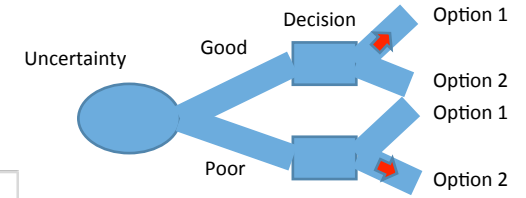


Value of Information for Ticket Demand



- No information is reference (black dash line)
- Ticket price is a decision, but treated as continuous variable with SIPmath

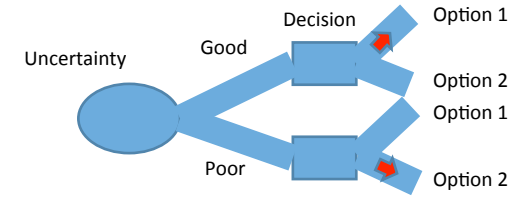
Inventory Control



- Visualize what is happening – good and bad
- Optimize Inventory control to risk preferences
- When not optimized, sales are higher and few lost sales, but too much inventory is left over.

Portfolio Analysis

How is Risk Defined



- Standard Deviation of Portfolio
- Probability of losing money?
- EV of the downside tail (Semi-Deviation)
- P10 Outcome

SIPmath enables maximizing the P10 Outcome

