

The Process

What Ingen Does

- We support businesses and assets delivering valued decisions and solutions in the areas of oil and gas developments
- We supply tooling and technical support to enable decision makers to deliver maximum value from their assets

Method

- Understand the issues
- Capture the options
- Build the strategy
- Build the appropriate model
- Test the options
- Quantify the risks
- Determine the value
- Recommend the optimum plan

RAVE

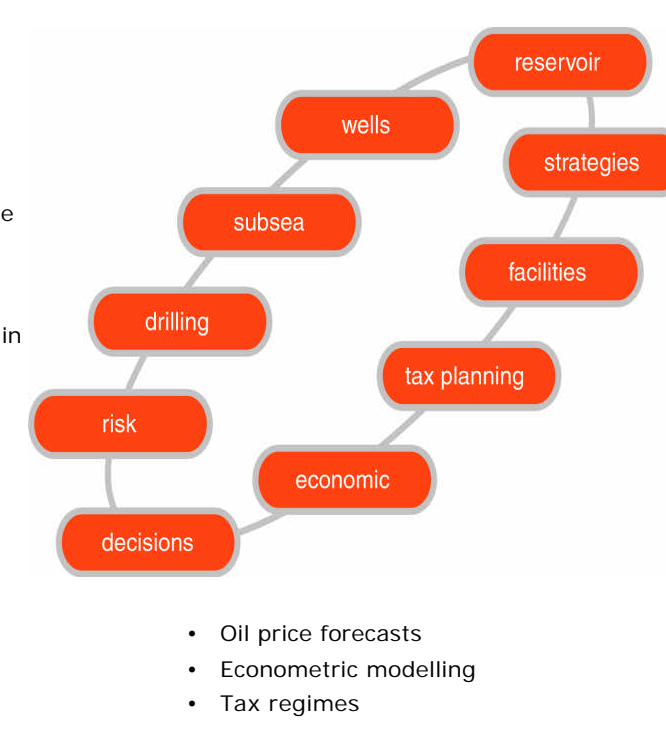
- Over the past 3 years ingen has funded the in house development of an integrated asset modelling package
- This model is focused on screening options, assessing risk and delivering value
- This model delivers the big picture
- This model is unique
- This model is called RAVE - "Risk And Value Engineering"

The Appropriate Model

Must be

- Fast
- Capable of multiple scenario comparison
- Flexible
- Open
- Integrated technically and commercially
- Only detailed where details affects value
- Auditable and verifiable
- Capable of assessing risk and uncertainty

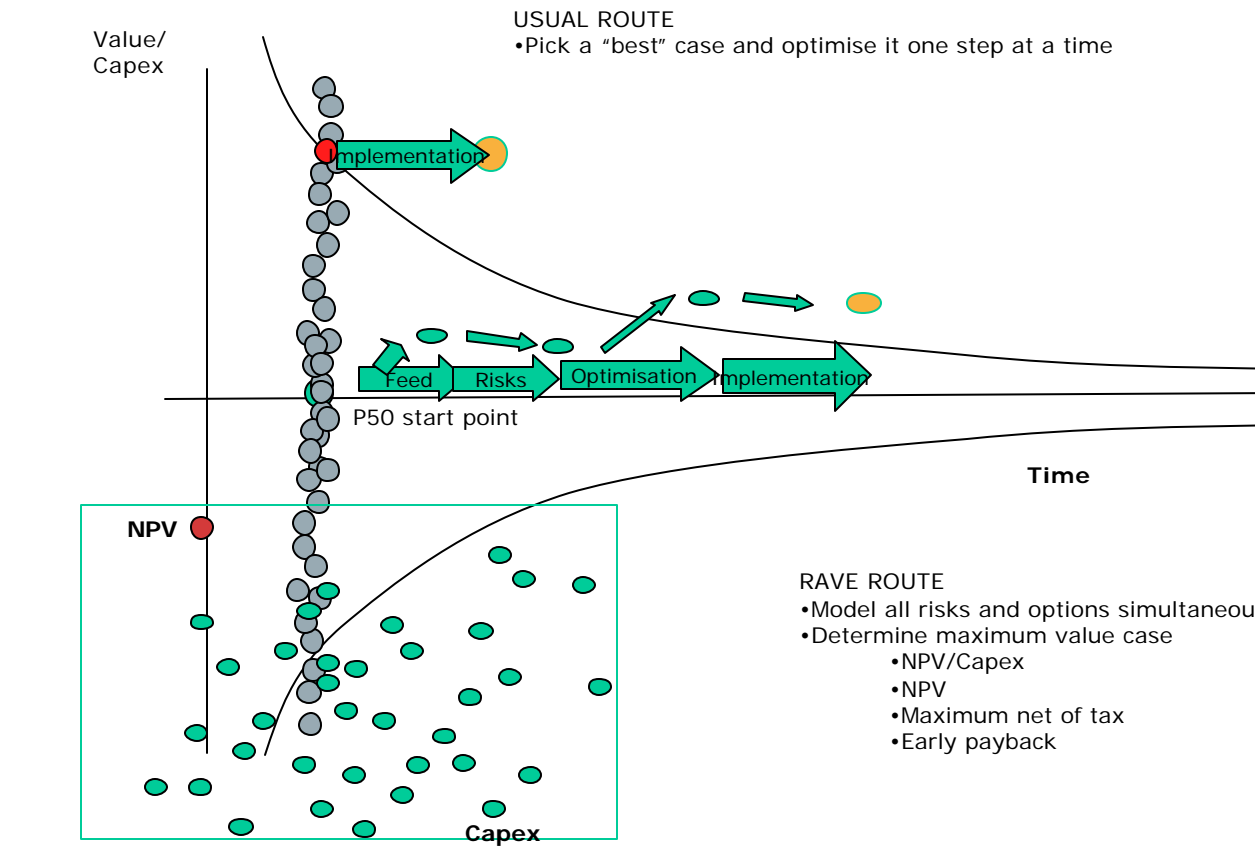
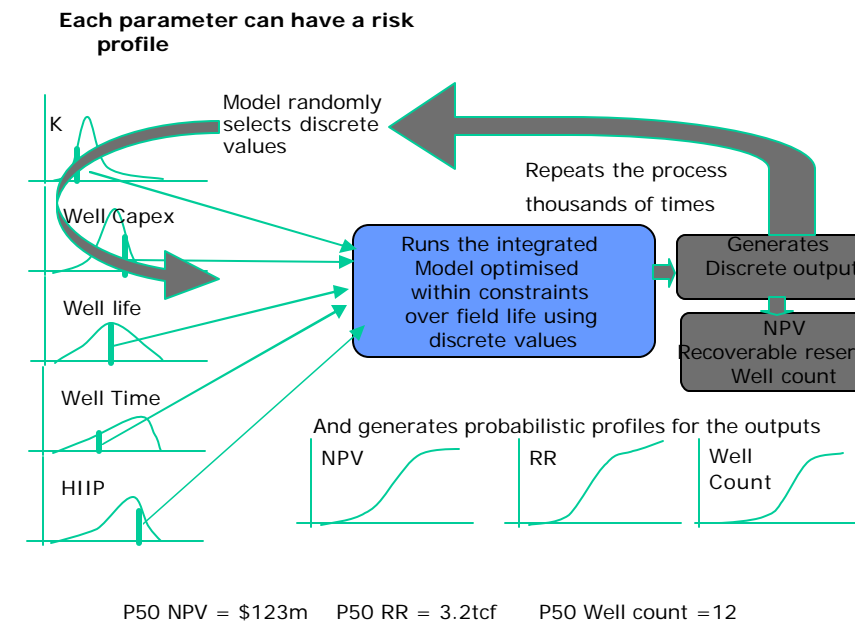
- Reservoir performance modelling
- Proxies for many reservoir types
- Drilling programmes
- History matching
- By Well Modelling
- Continuous link of geological uncertainty to reservoir performance



- Wells and flow lines
- Production systems
- Pressure balance & constraint management to assess development alternatives

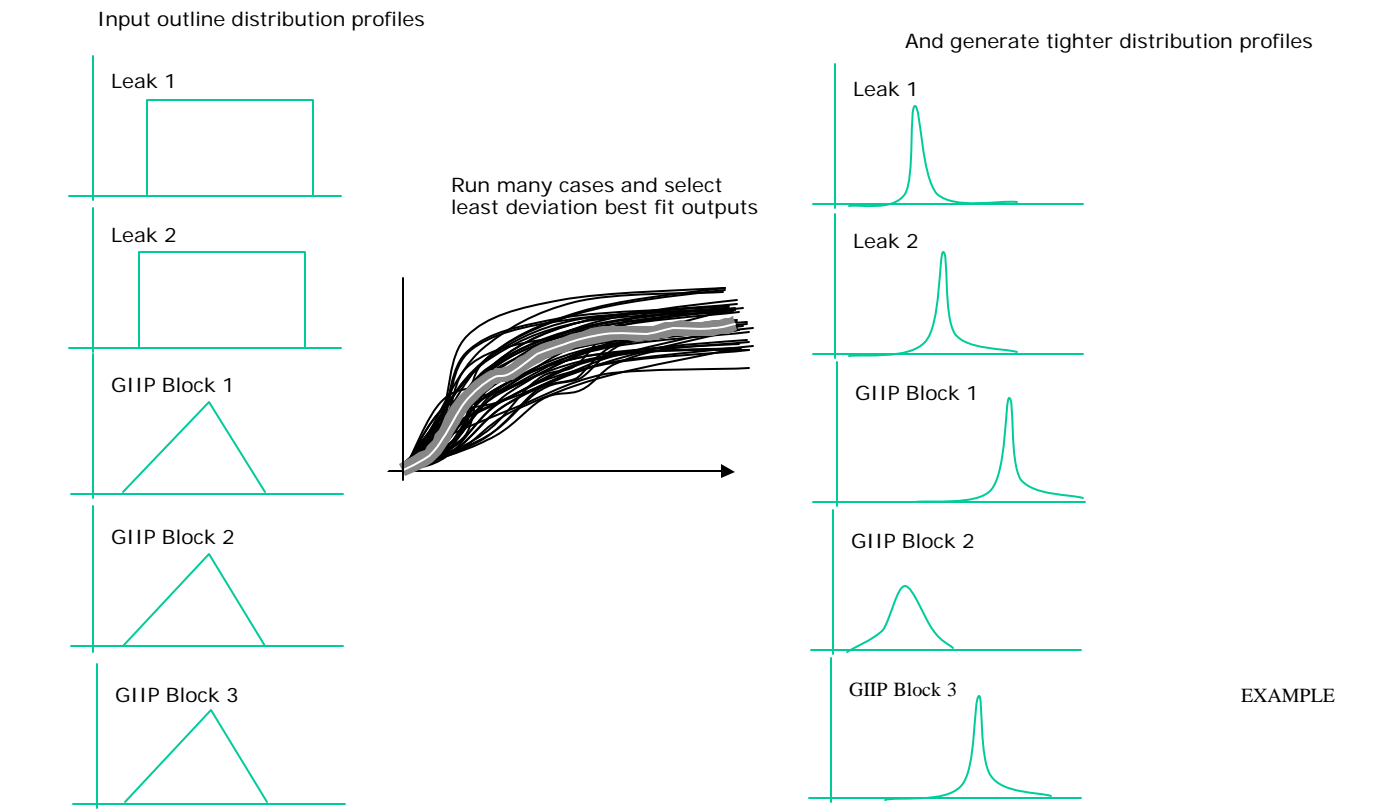
- Topsides facilities
- Export and terminals
- Ability to optimise production to constraints e.g.
 - Gas Lift
 - Pumping
 - Water injection
 - Flow regime change
 - Profile change
 - Life of field

Stochastic Integrated Asset Modelling



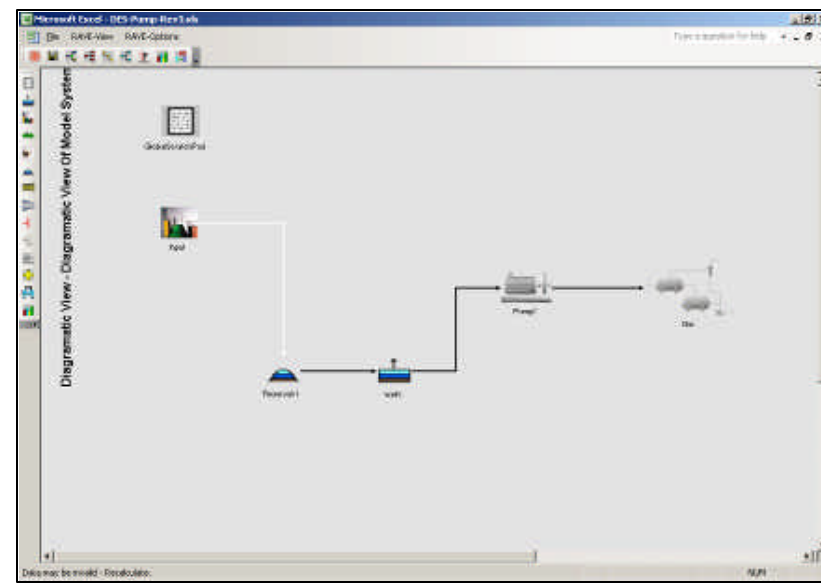
Automatic History Matching

The power of RAVE – Bayesian Inversion

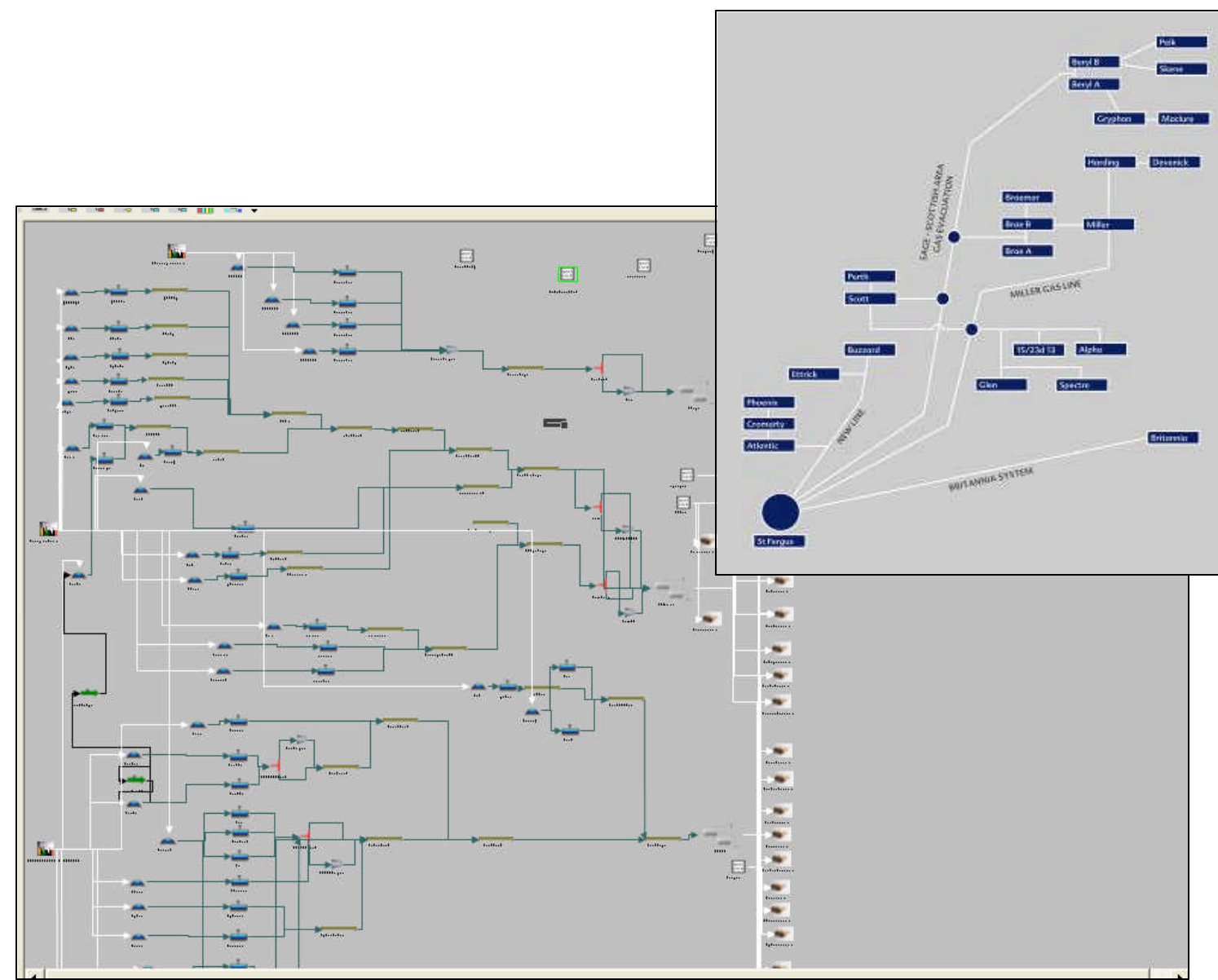


The Tool

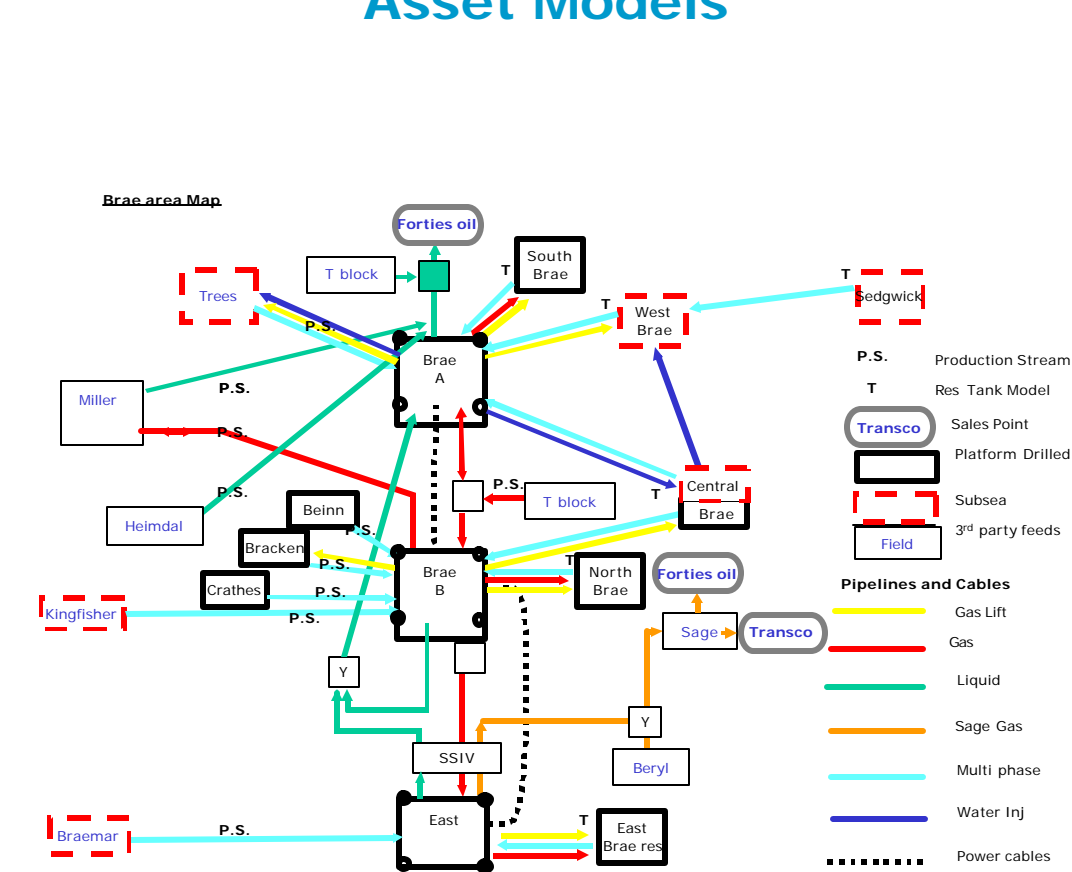
Very Simple Generic Models



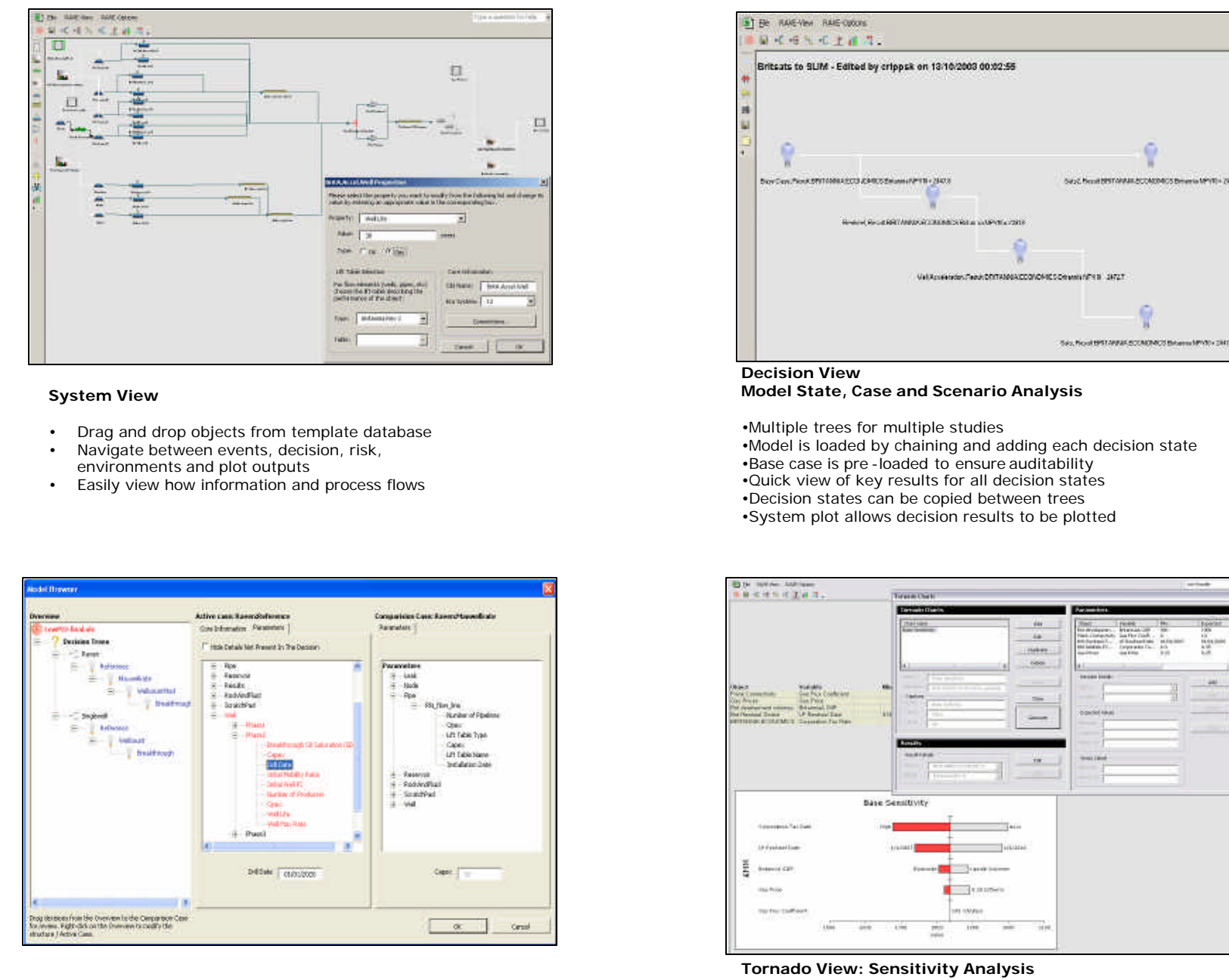
Large Scale Infrastructure Models



Very Complex Asset Models



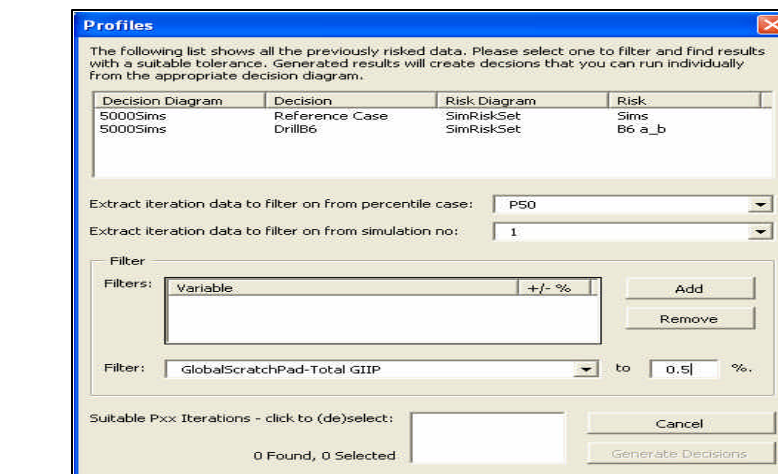
Graphical Interface



- System View**
- Drag and drop objects from template database
 - Navigate between events, decision, risk, environments and plot outputs
 - Easily view how information and process flows

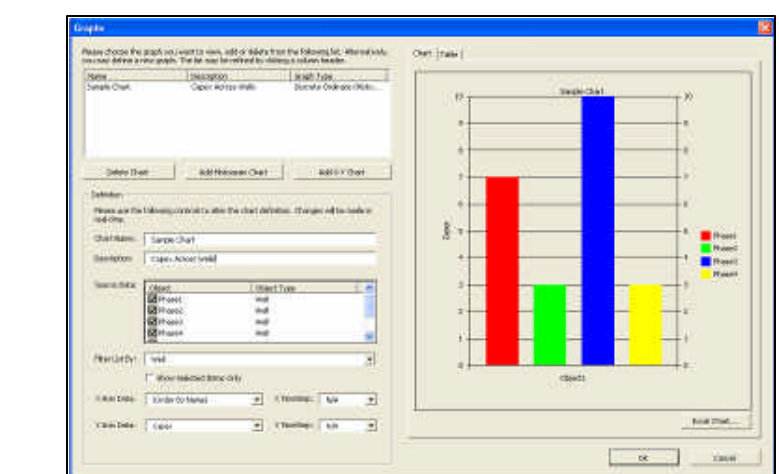
- Decision View Model State, Case and Scenario Analysis**
- Multiple trees for multiple studies
 - Model is loaded by chaining and adding each decision state
 - Base case is pre-loaded to ensure auditability
 - Quick view of key results for all decision states
 - Decision states can be copied between trees
 - System plot allows decision results to be plotted

Tornado View: Sensitivity Analysis



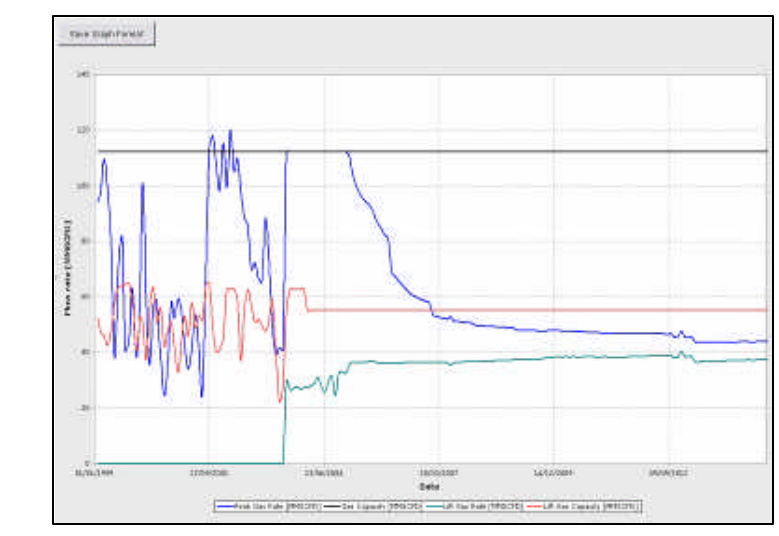
Risk View and Property Dialog

- Risk Analysis Input**
- Supplies Monte Carlo and Latin Hypercube stochastic analysis
 - All parameter in model can be populated with probability distribution functions
 - Trees allow multiple risk sets and studies to be loaded
 - Most PDF's supported



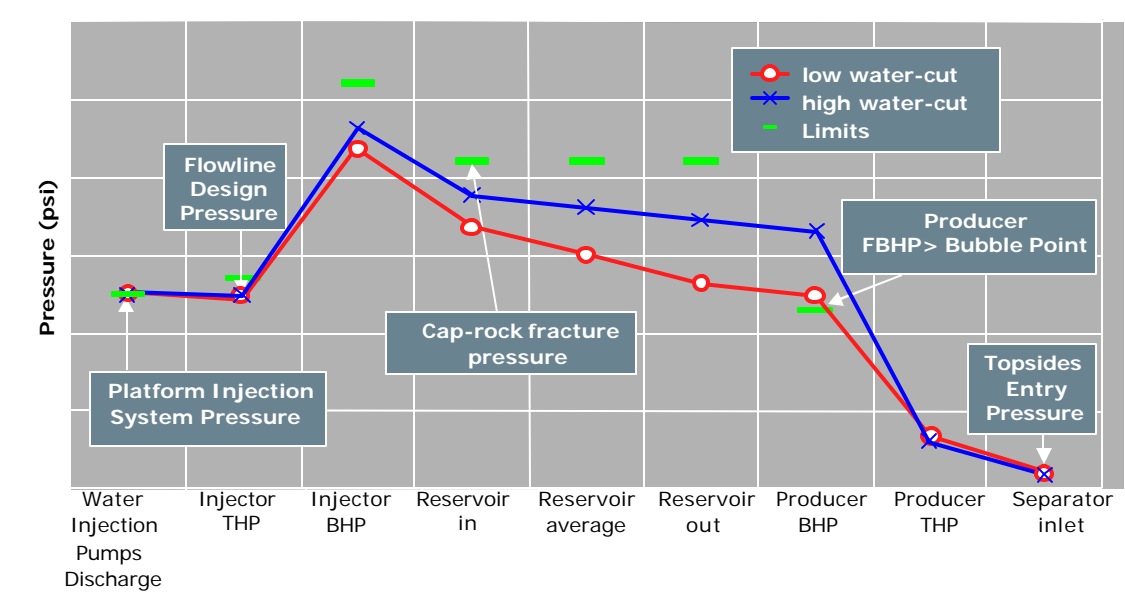
Graph - Profile Plot

Any model plot can be plotted against any other or series of others

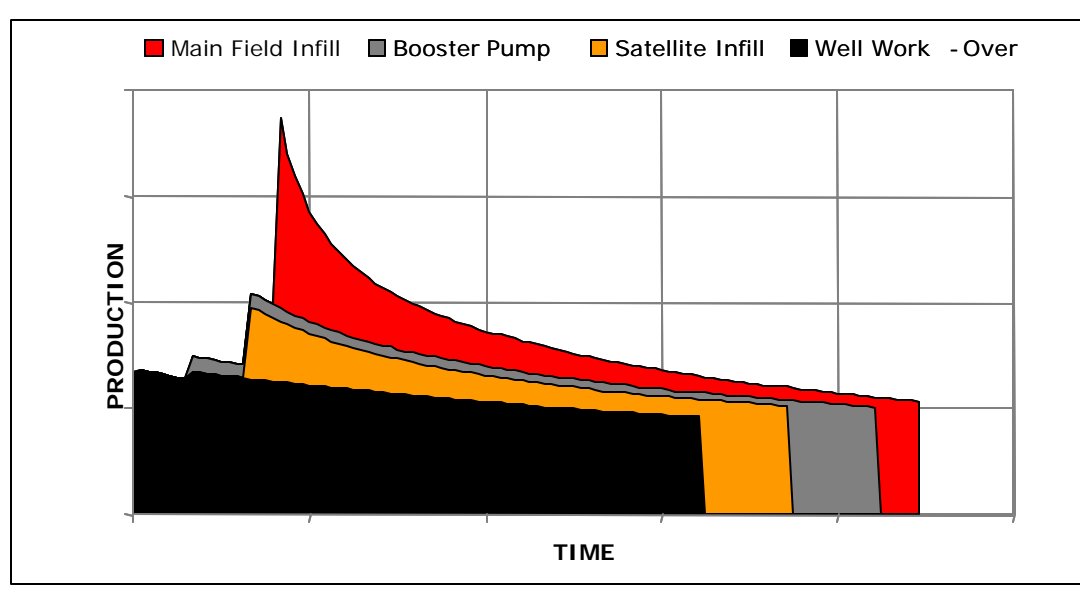


The Output

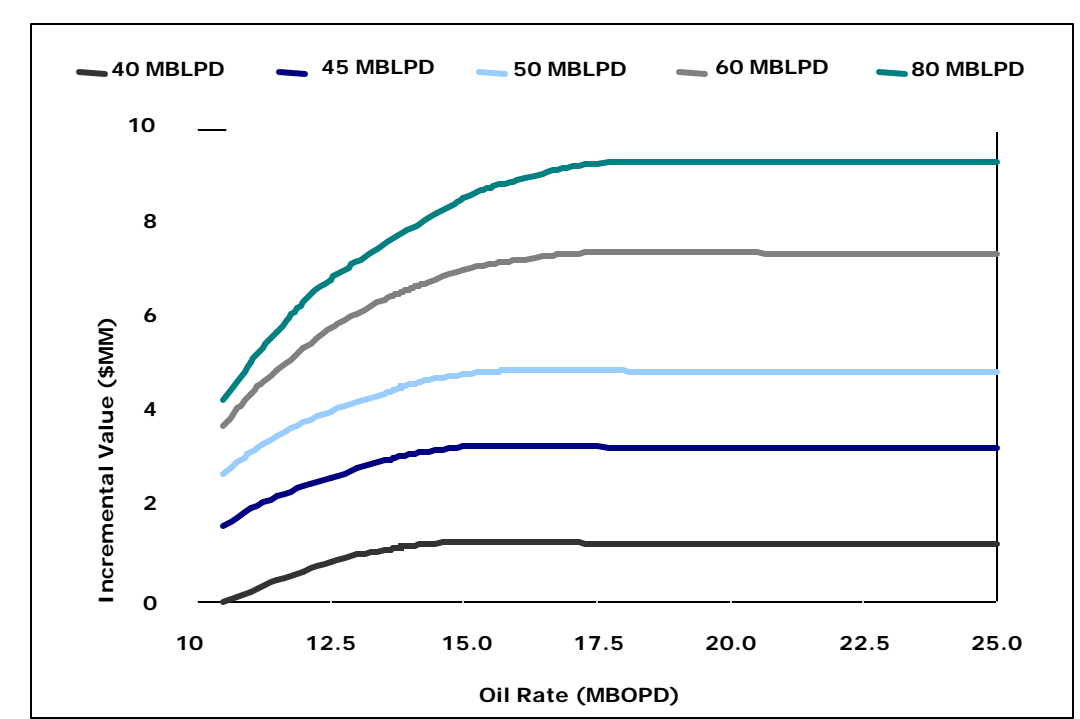
System View



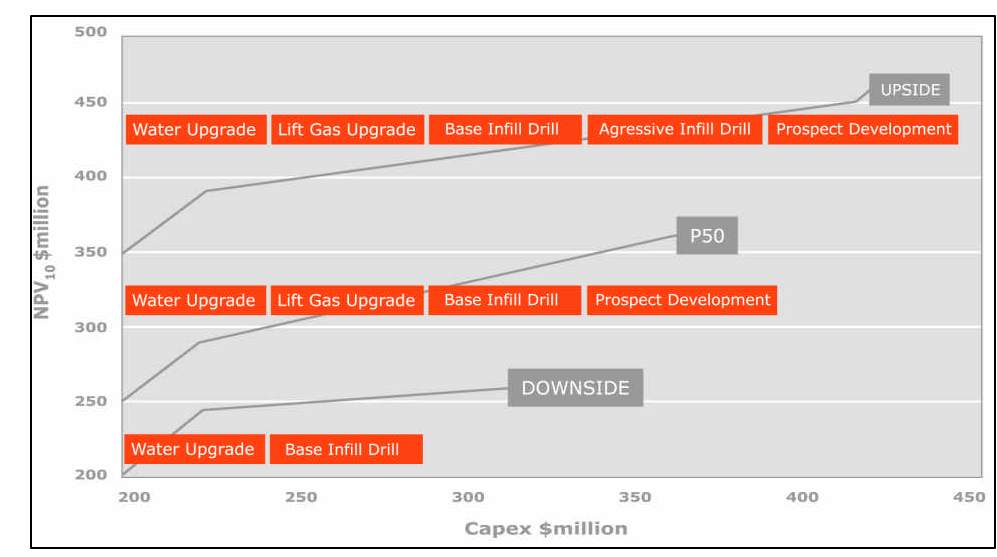
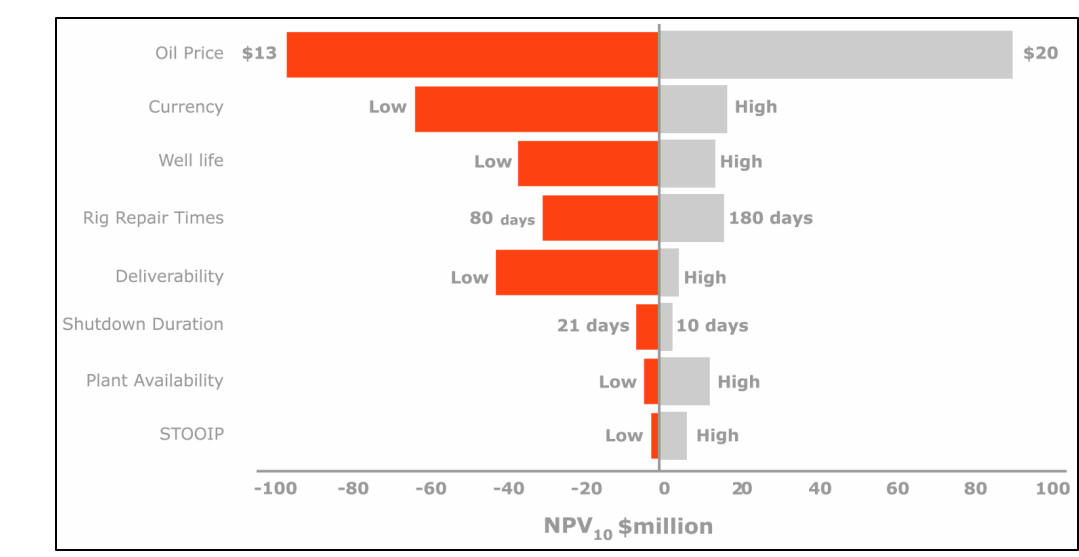
Business Planning Programme



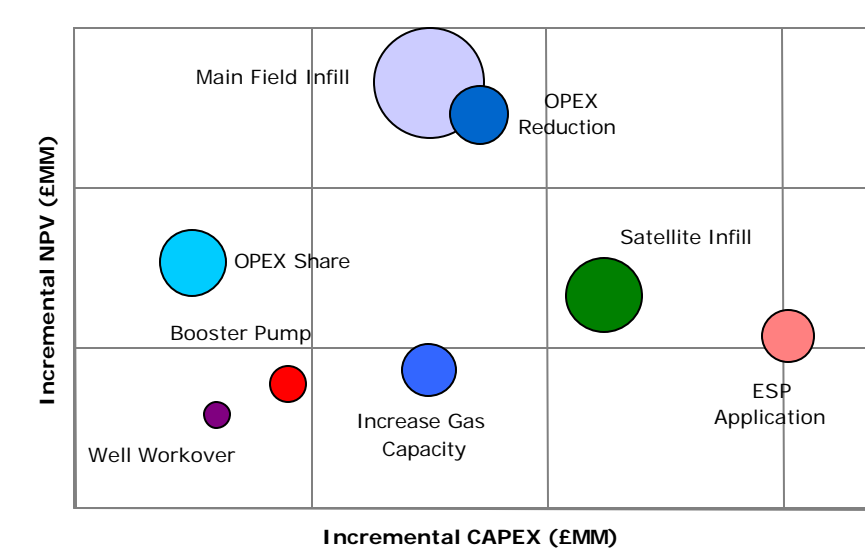
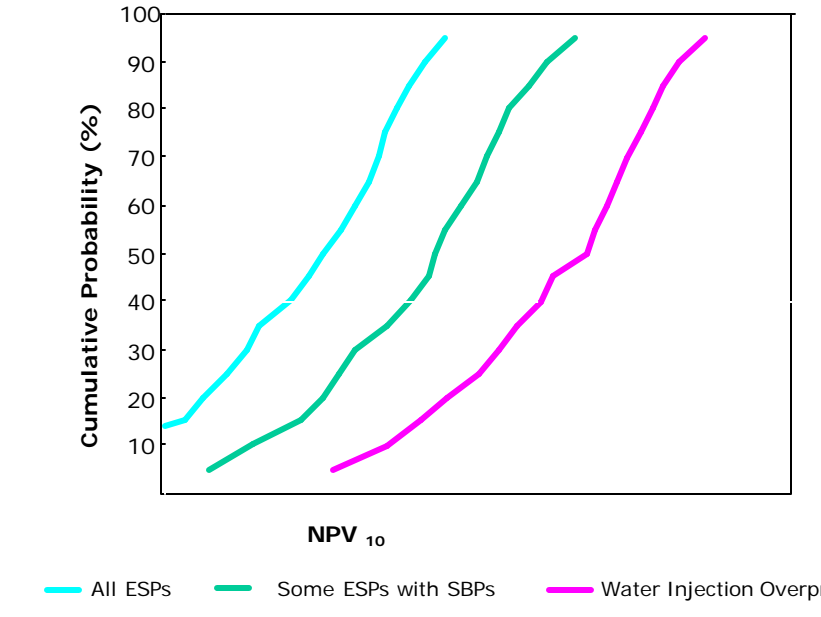
Value of De-Bottlenecking



Identification of Key Value Drivers



Strategy Analysis



- Comparing risked value of differing depletion strategies