

Precision...Decisions and the Workings in Between*

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Search and Discovery Article #40572 (2010)

Posted July 30, 2010

*Adapted from oral presentation at AAPG Annual Convention and Exhibition, New Orleans, Louisiana, April 11-14, 2010

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Abstract

Geotechnical and engineering staff expend considerable efforts to define and refine the technical characteristics of E&P opportunities and the associated uncertainties. They routinely go to considerable efforts, using the latest technologies and all their experience to provide robust and detailed descriptions of their investments. Decision makers utilize this information along with their experience and knowledge to make investment decisions. Technical teams often struggle to understand these investment decisions. Technical teams frequently operate under the misconception that all investment decisions are ‘rational decisions’.

This paper will explore some of the classical issues that arise in the gray space between the technical descriptions and the final decisions and illustrate why some decisions appear to be less than rational. These issues have been described by psychologists and economists; however this paper will describe them in terms of routine decisions made in the oil and gas industry. Finally, we will describe how decision makers can overcome many of these psychological factors by altering the context they use for their decisions. We will illustrate how many project based decisions can be influenced by the psychological issues where decisions based on a portfolio perspective have greater protection from these classical pitfalls.

Precision...Decisions and the Workings in Between

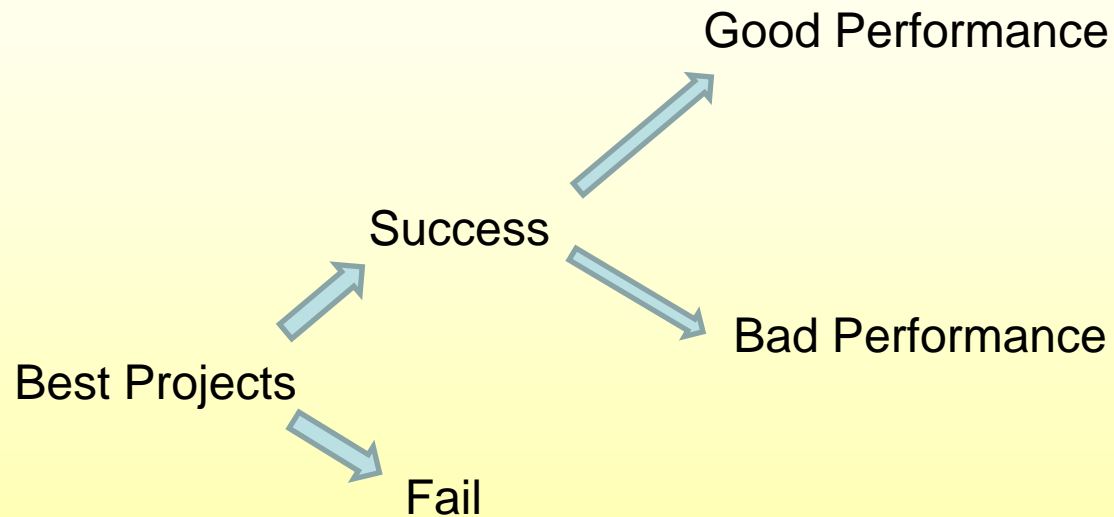
John I Howell III



PORTFOLIO DECISIONS

STRATEGY. DECISIONS. SUCCESS.

Decisions



Best Projects \neq Good Performance



Projects vs. Portfolios

Project based decisions

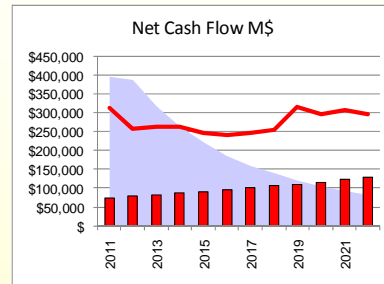
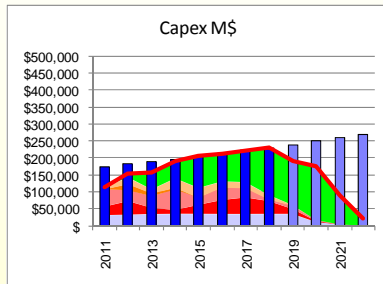
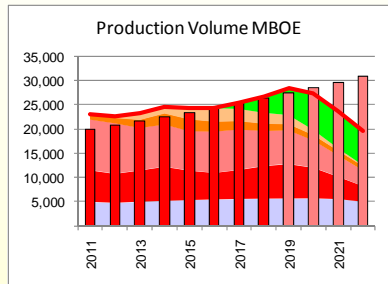
- Value focused
- Volume, NPV
- Ps, Enpv
- P/I, IRR, Finding Cost
- Is this a good project?

Portfolio based decisions

- Performance and value focused
- Volume, NPV
- Ps, Enpv
- Multi-year assessment
- Multi-metric assessment
- Does this project improve business performance?

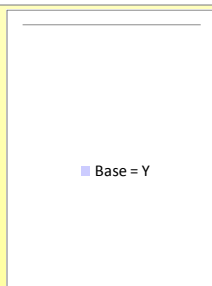
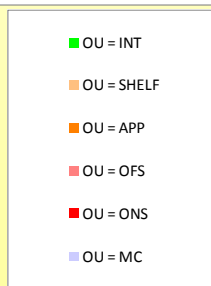
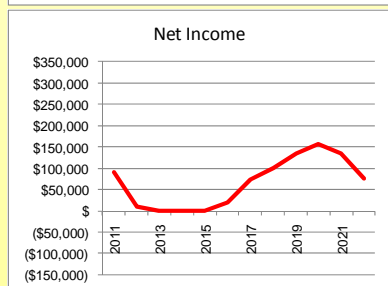
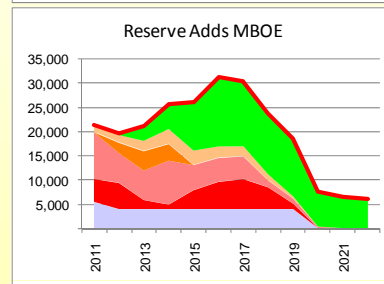
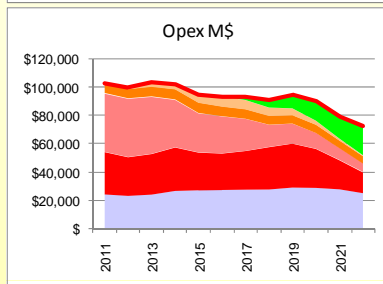
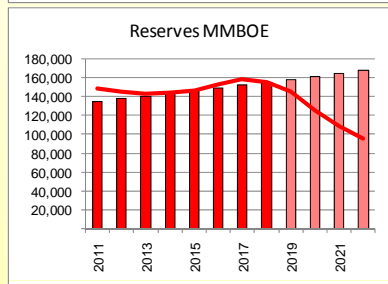


Basic Portfolio Representation



Expected Outcome

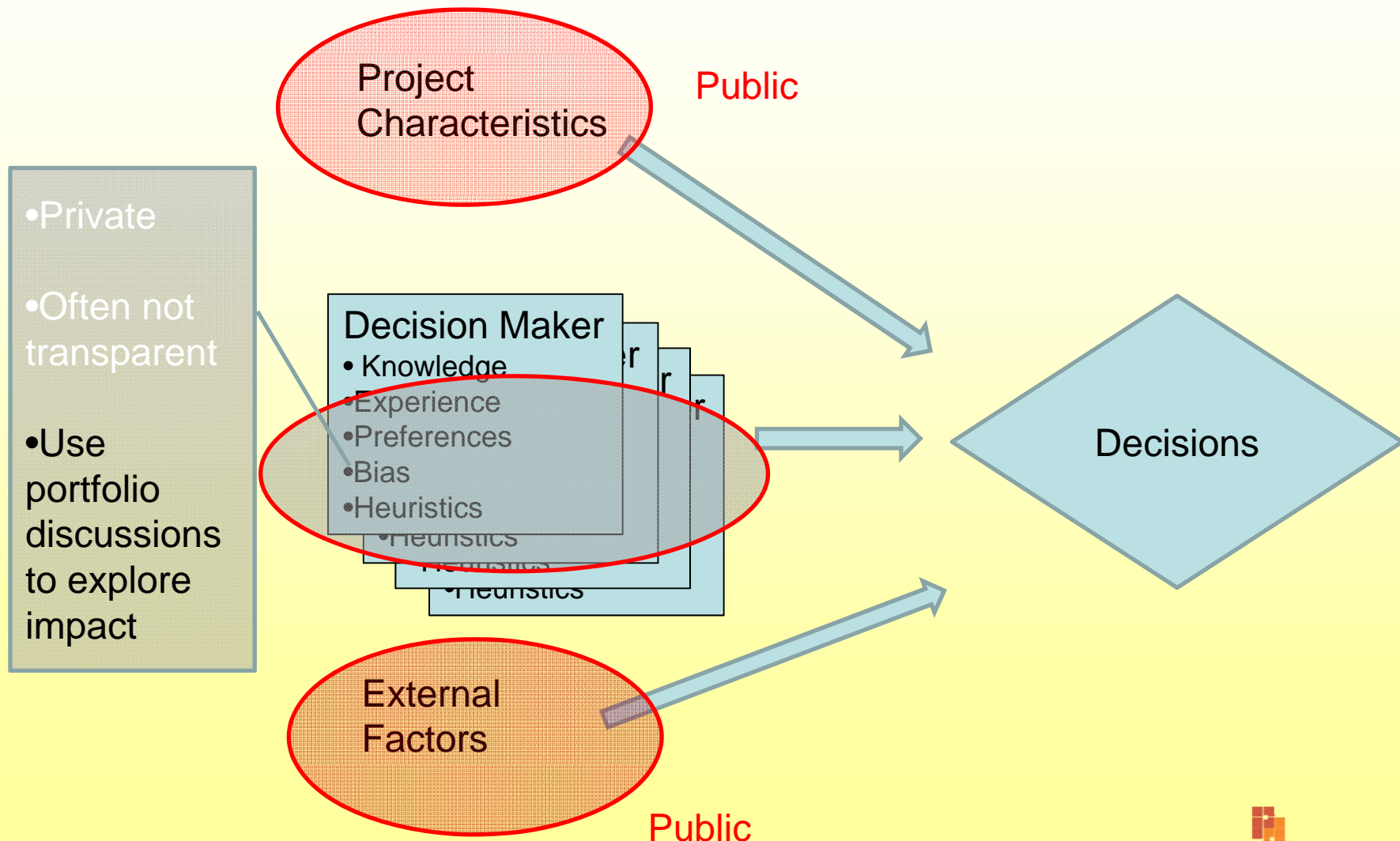
Goals



•Select projects to honor goals and maximize NPV

NPV = 2.657B

What influences a decision?



Three Projects

Project Types

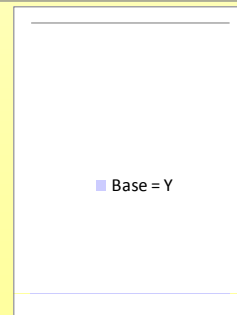
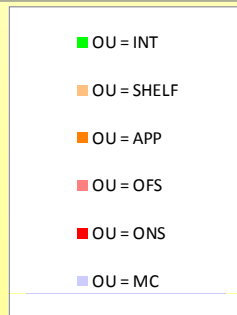
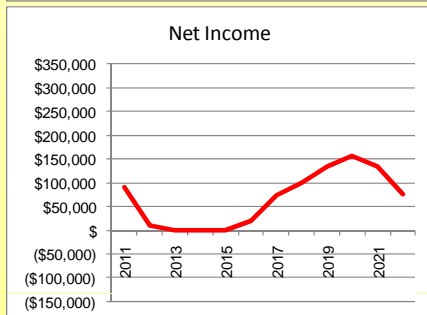
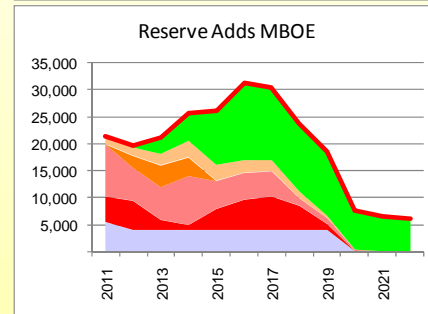
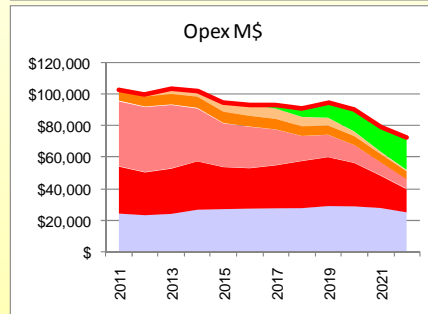
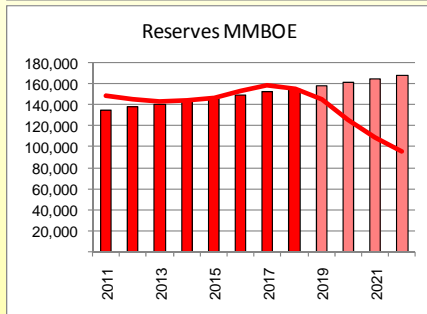
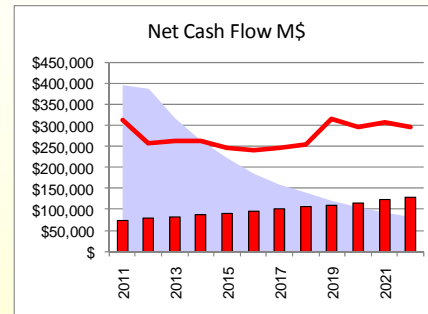
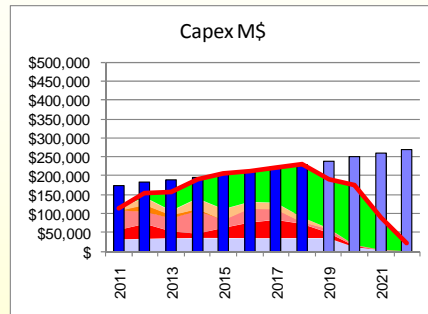
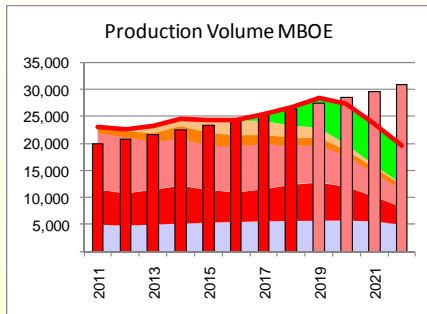
- High rate of return project
 - NPV = 35
 - IRR = 140%
- Negative Enpv project
 - Enpv = -4MM
 - Shelf project
- Large scale
 - $P_s = .2$
 - NPV = \$1.2B

Project based decisions

- Too Small, don't invest
- Never invest in negative NPV projects
- Invest in this project



Base Portfolio



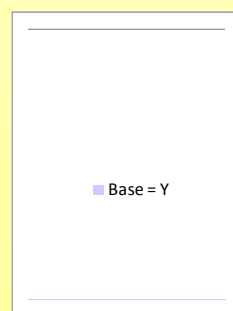
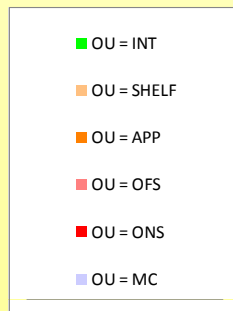
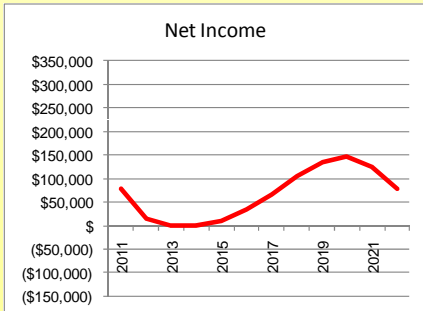
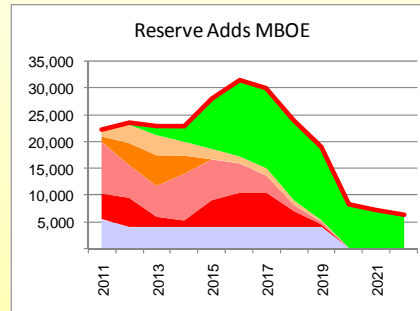
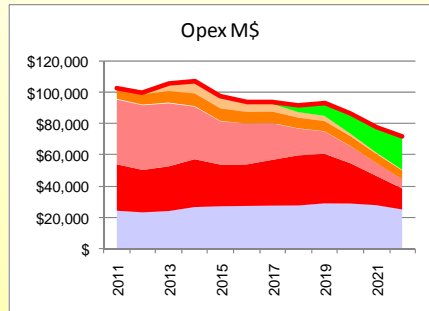
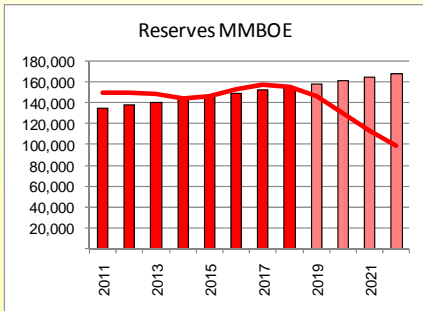
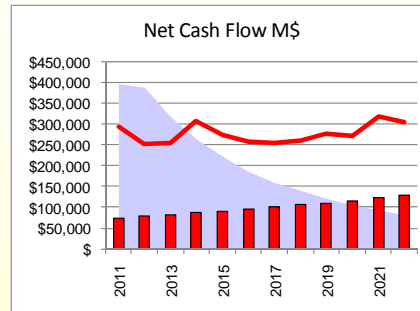
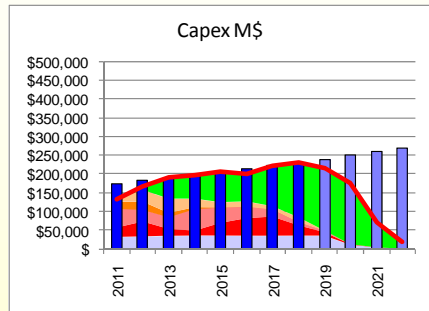
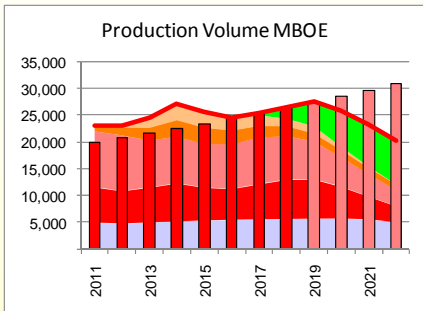
NPV = 2.657B

Critical Constraints

Production 2016-18
Reserves 2013-15, 18
Capex 2014-18
Net Income 2013-15

Cannot spend all capital in 2011-2013 due to net income impact (DDA and Dry Hole)

High Rate Optimal Portfolio



NPV = 2.709B

High rate project is selected

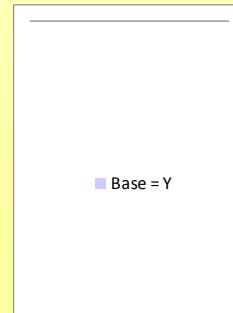
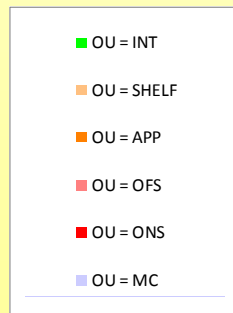
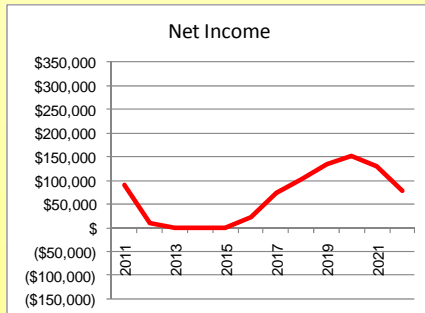
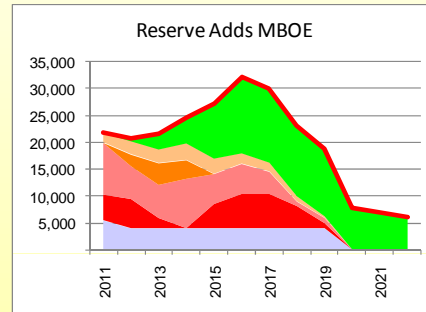
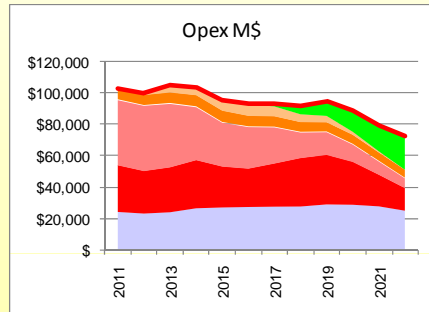
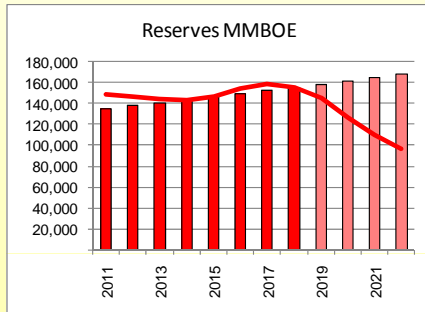
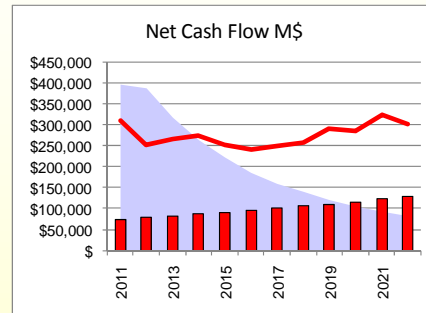
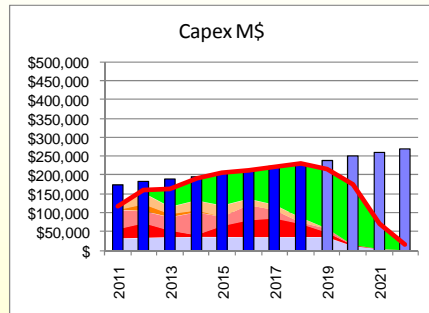
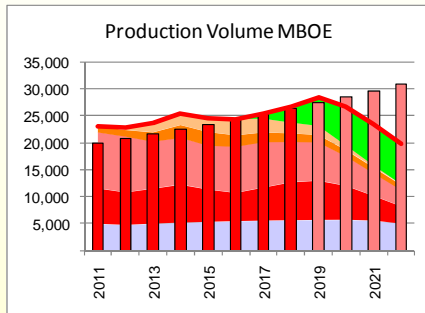
NPV of high rate is \$35M

NPV improvement is \$52MM over base

Accelerates more profitable projects and defers International

Halo Effect is dangerous

Negative NPV Optimal Portfolio



NPV = 2.664B

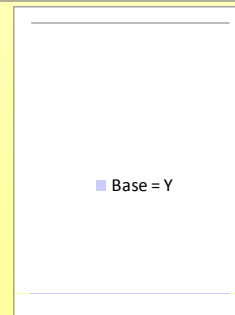
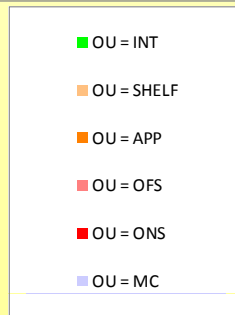
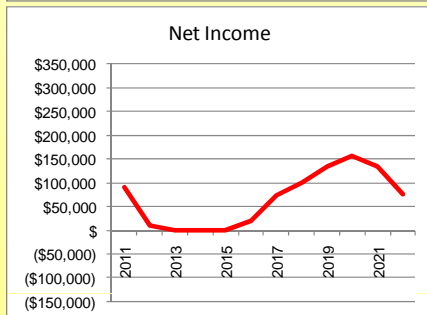
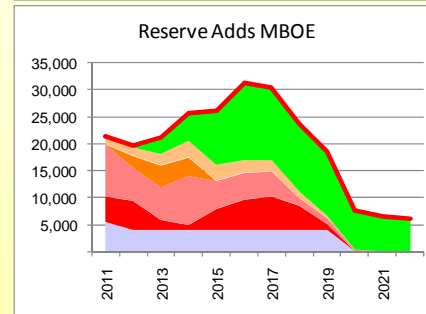
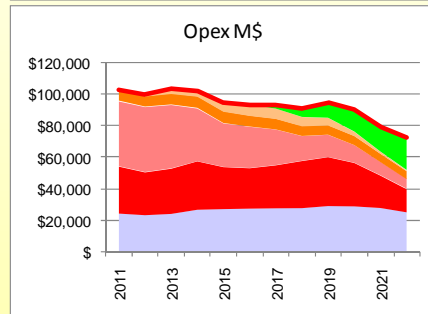
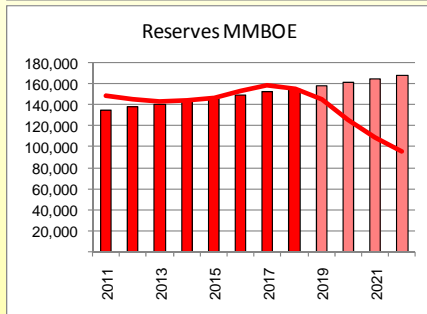
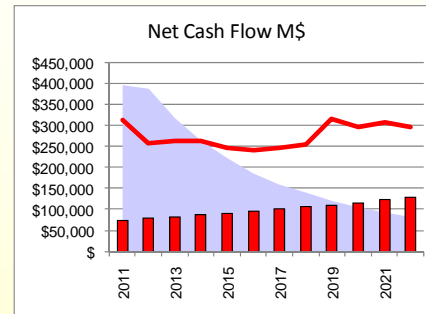
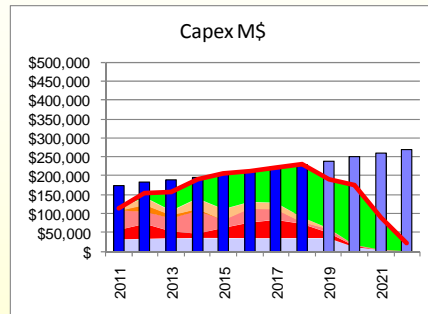
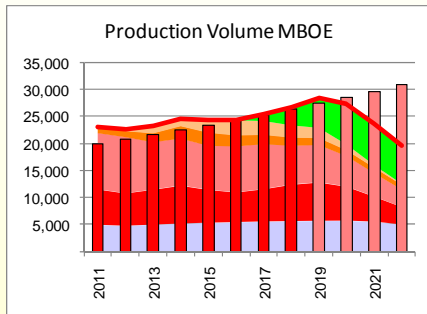
Negative NPV project was selected

Negative NPV project selection enhanced the portfolio value. It did not erode it

Accelerates profitable projects and defers International projects

Simplifying decisions can be dangerous. Heuristics are not always correct

Base Portfolio

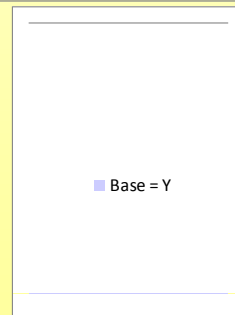
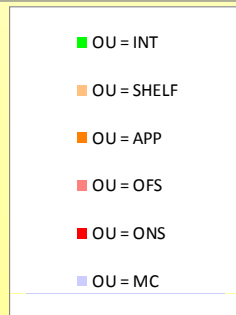
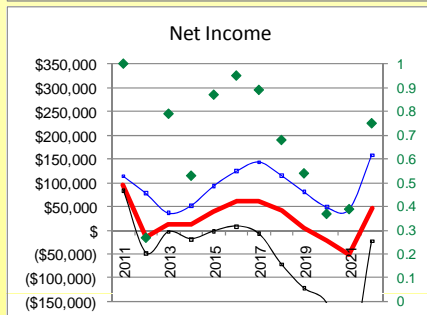
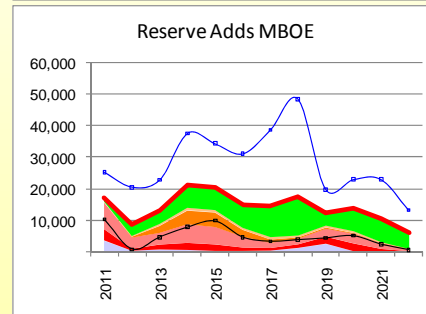
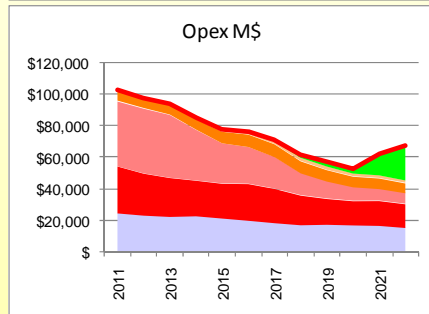
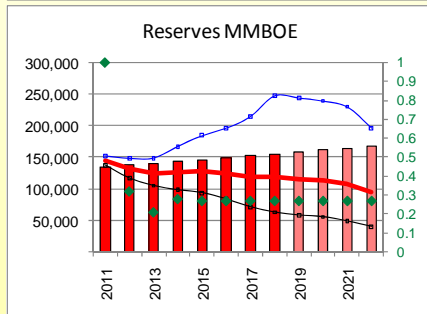
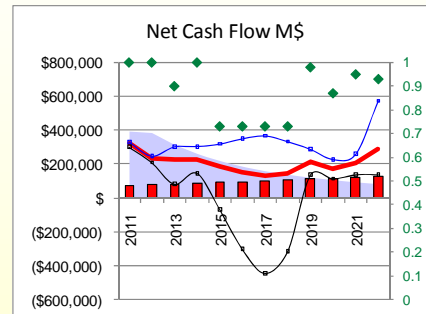
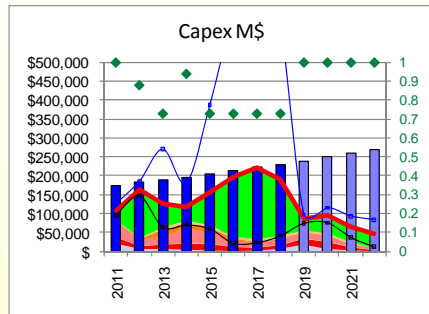
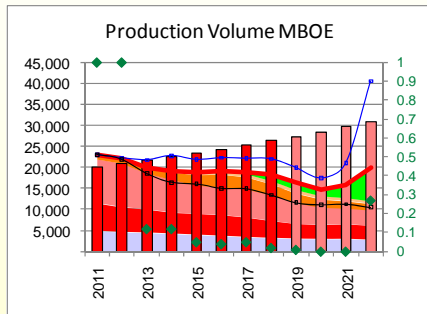


NPV = 2.657B

Critical Constraints

Production 2016-18
Reserves 2013-15, 18
Capex 2014-18
Net Income 2013-15

Large Project



NPV = 2.390B

Large Project forced in

Portfolio is infeasible

- Production
- Reserves
- Net Income

Large scale project erodes value because of its high capital demand in early years with long delays in production

Overconfidence and Satisficing can be dangerous



Decisions

Project Type	Project Decision	Portfolio Decision	Insights
High Rate	No	Yes	Portfolio value of asset can be much greater than actual value
Negative NPV	No	Yes	Not all projects have to contribute positively to all components of the portfolio Simplifying decisions makes them easier but often wrong
Large Scale	Yes	No	You can get too much of a good thing
			Good projects can result in bad performance



Portfolio Perspective on Decisions

- Expands the decision makers context
- Allows decision makers to assess the interactions (portfolio value)
- Describes uncertainty in a useful context for decision makers
- Provides a context for decision makers to test their decision making habits
- Differentiates between good projects and good investments



Portfolio Decisions

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