Portfolio Management in an Upstream Oil & Gas Organization

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- Background and Needs that Led to The Project
- The Implemented Solution:
  - The Portfolio Management Process
  - The Portfolio Management System
- Benefits and Impact on The Organization
- Learnings and Conclusions

The Gulf of Mexico has been a key growth area for exploration and production for several oil and gas companies in the U.S.

- Companies have increased their investments in the Gulf:
  - Decline in reserves in onshore areas
  -
  - Partnerships allow for the sharing of risk and critical expertise

Companies lease blocks from the Minerals Management Service (MMS) through participating in lease auctions

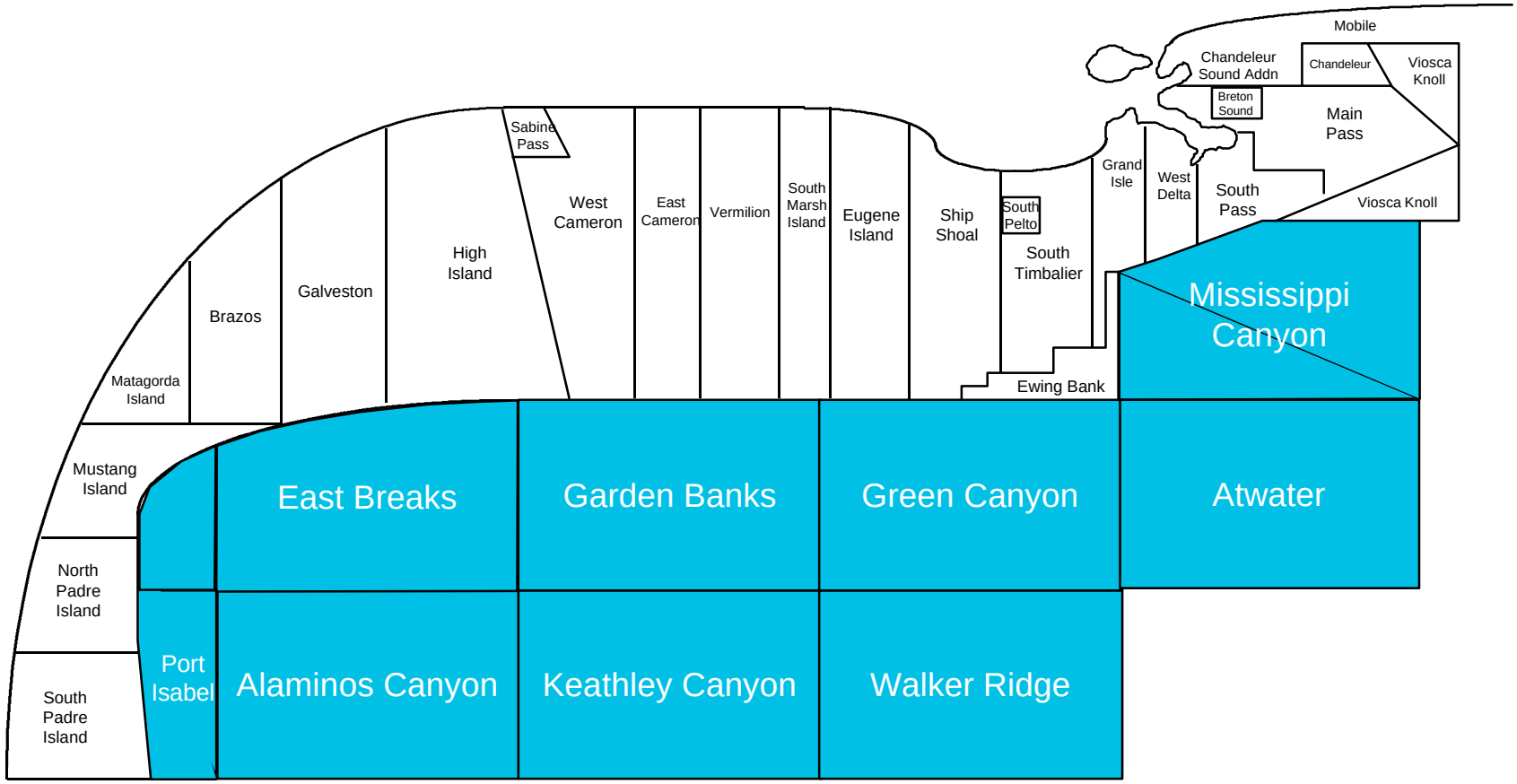
Lease holders must drill prospects before lease expiry (mostly 10-year terms).

Discoveries can then be held for production beyond the lease expiry date

Lease expirations mean that undertaking the highest value projects first is not always the best action.

Shell Offshore Inc. (SOI) is the Shell Oil subsidiary responsible for offshore exploration and production in the Gulf of Mexico.

SOI has a large portfolio of assets spread across mature and frontier areas in the Gulf of Mexico.



SOI is one of the largest leaseholders in the Gulf of Mexico and owns 15% of the leased acreage in water depths over 1500 feet.

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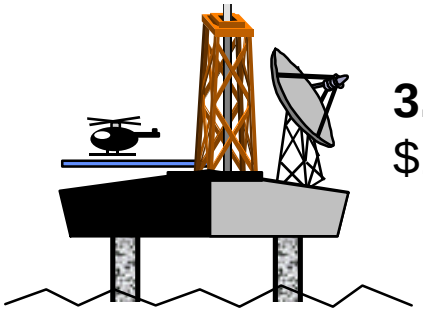
A typical asset that reaches production goes through a lifecycle that takes up to ten years, with increasing investment as it progresses.

1. Screening & Scoping:
< $0.5 million

2. Purchase Lease:
$0.2 - $30 million



3. Exploratory Drilling:
$10 - $40 million

4. Development & Production:
$0.3 billion - $1.5 billion

Managing a growing portfolio of opportunities in the face of resource constraints, lease expiries, and technical uncertainty has become very complex.

- Some critical resources are often severely constrained:
  - Drilling rigs
  - Scientific staff for prospect evaluation
- Projects at different stages in the asset life cycle create uncertainty about future resource needs.
- Asset teams within the same business unit compete and battle for the same resources:
  - In several organizations, there is a bias to overanalyze individual prospects without understanding portfolio implications
  - Difficulty in comparing asset plans across teams without a formal portfolio management process
- Assets are continually added to the portfolio as new prospects are identified.

In 1996, the SOI Leadership Team asked us to jointly develop and implement a portfolio management process and system that would achieve the following:

- Facilitate the allocation of resources across the portfolio:
  - Provide comparability among decisions and assets across the portfolio
  - Help determine optimum allocations of resources to meet various portfolio objectives
  - Evaluate whether present resource levels are appropriate and support resource planning activities
- Provide insights into numerous portfolio-wide issues:
  - Leasing strategy, portfolio balancing, technology investments, etc.
  - Identify critical portfolio issues requiring management's focus
- Be easy to use and update

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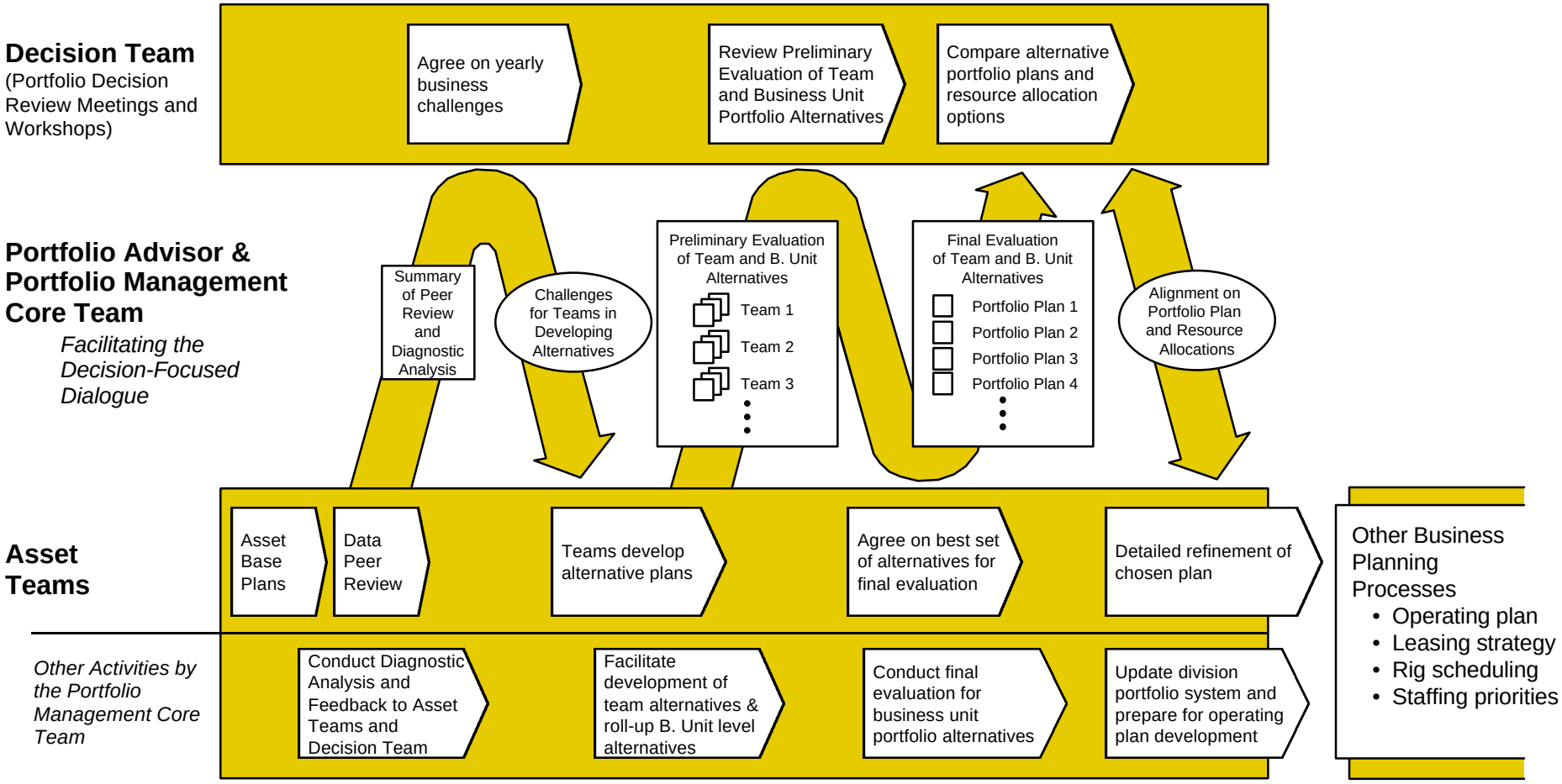
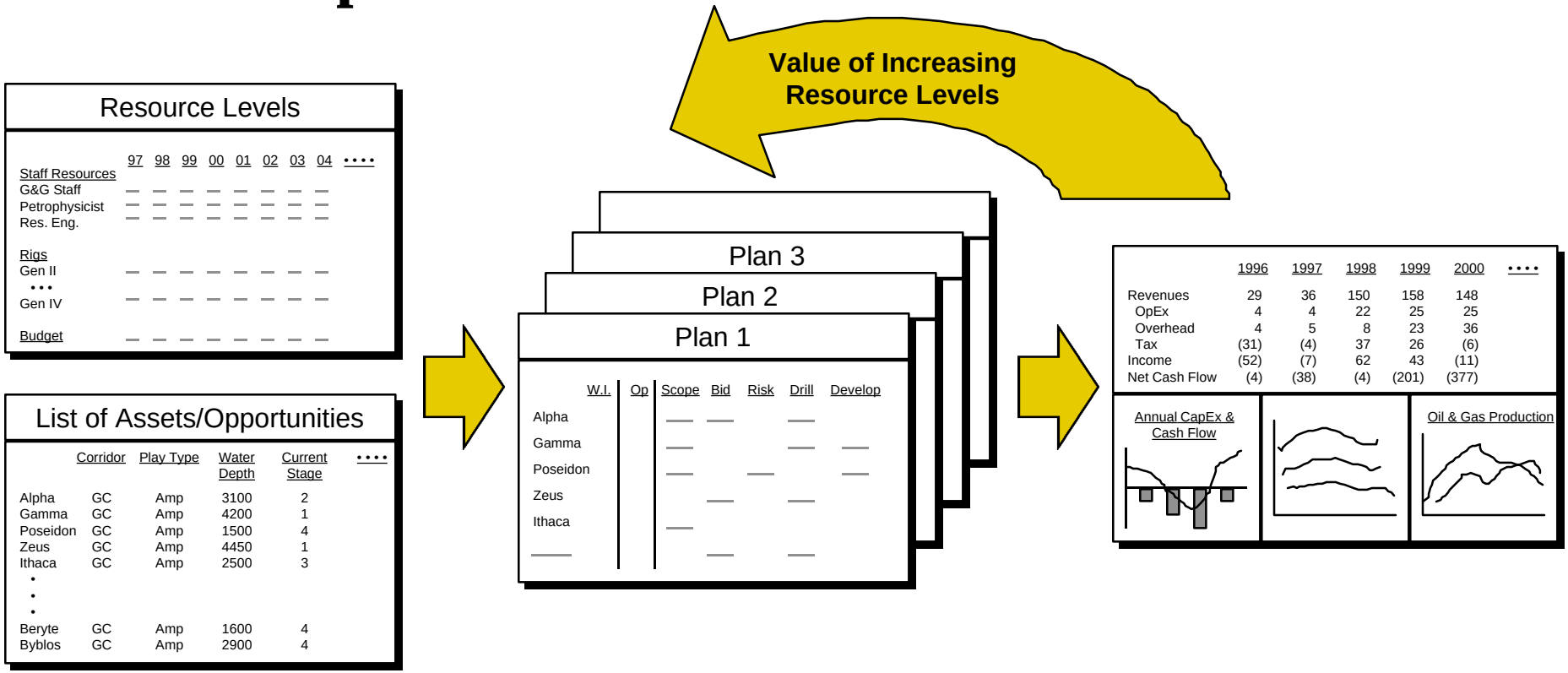
The solution we developed and implemented built on several years of strategy development projects in the industry and joint efforts in decision analysis.

- The roll-out of the process and the system required a strong familiarity with the dialogue decision process
  - Additional training was necessary in some cases
- The design and development of the system required extensive assessments that built on the results of previous joint SDG-SOI efforts:
  - For example, assessment of functional relationships that use asset-specific parameters instead of direct assessment of cost variables
  - Required an in-depth understanding of the internal exploration and development process
- During the last phase of system development, we tested the system in two separate portfolio strategy efforts
- We formed and trained a portfolio management core team that is now the keeper of the process and system within SOI

The designed portfolio management process provides a forum for decision-focused dialogues between senior management and asset teams.



The process for managing a portfolio of assets is iterative and requires the evaluation of several alternative plans.



- **Map Out Opportunities**
- **Develop Alternative Plans**
- **Evaluate Plans**
- **Check Resource Requirements and Constraints**

Review/Modify Plans

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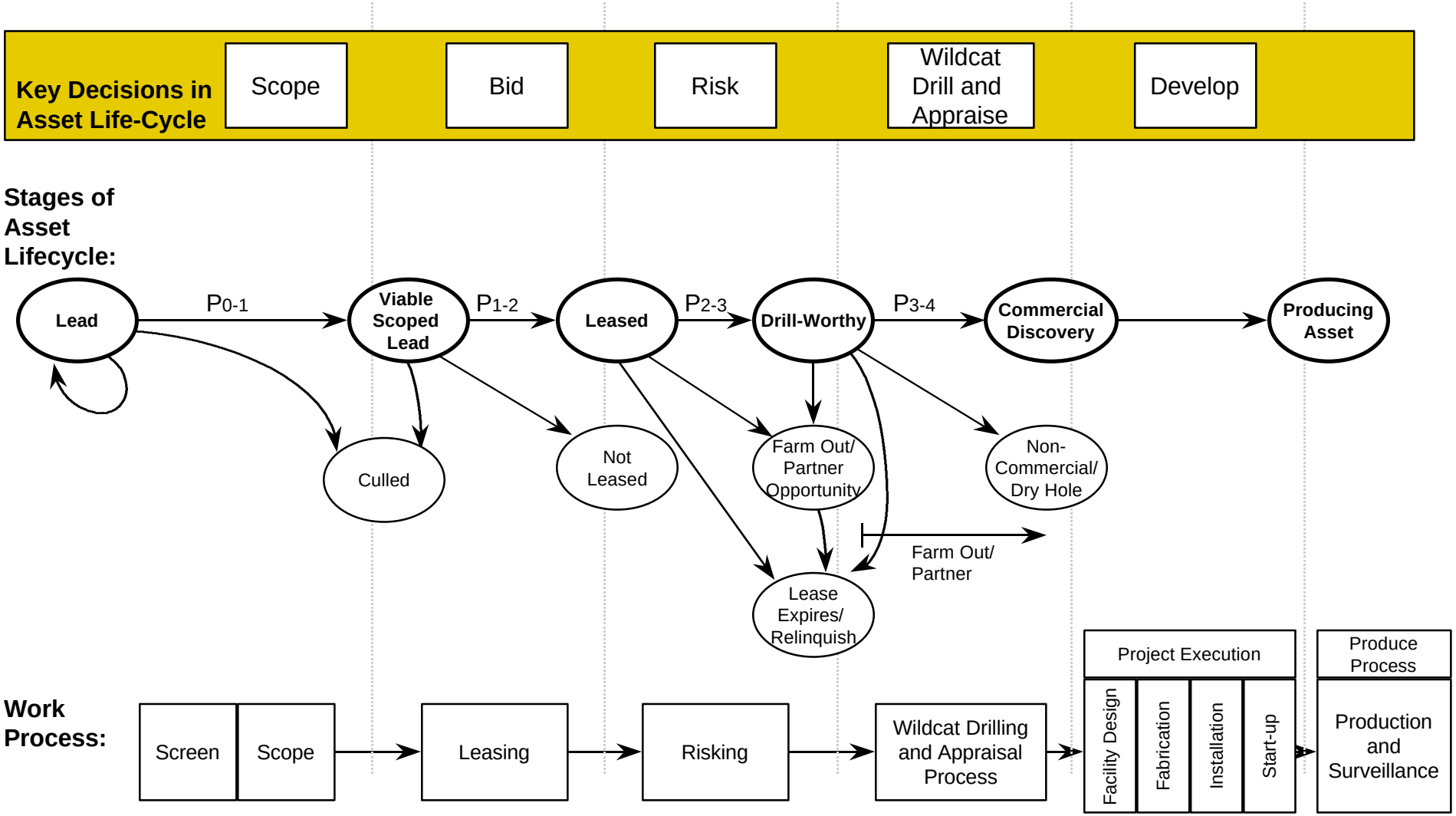
The portfolio management system supports the following set of decisions and analyses:

- Evaluation of portfolio strategic alternatives
- Lease sale decisions:
  - Evaluating different leasing strategy alternatives
- Asset activity timing decisions:
  - When to scope, lease, risk, drill, develop or start producing a specific asset / collection of assets
- Development configuration decisions
- Ownership structure and operatorship decisions
- Resource level decisions:
  - Determine critical staff resources required for a given portfolio strategy
  - Facilitate rig contracting decisions

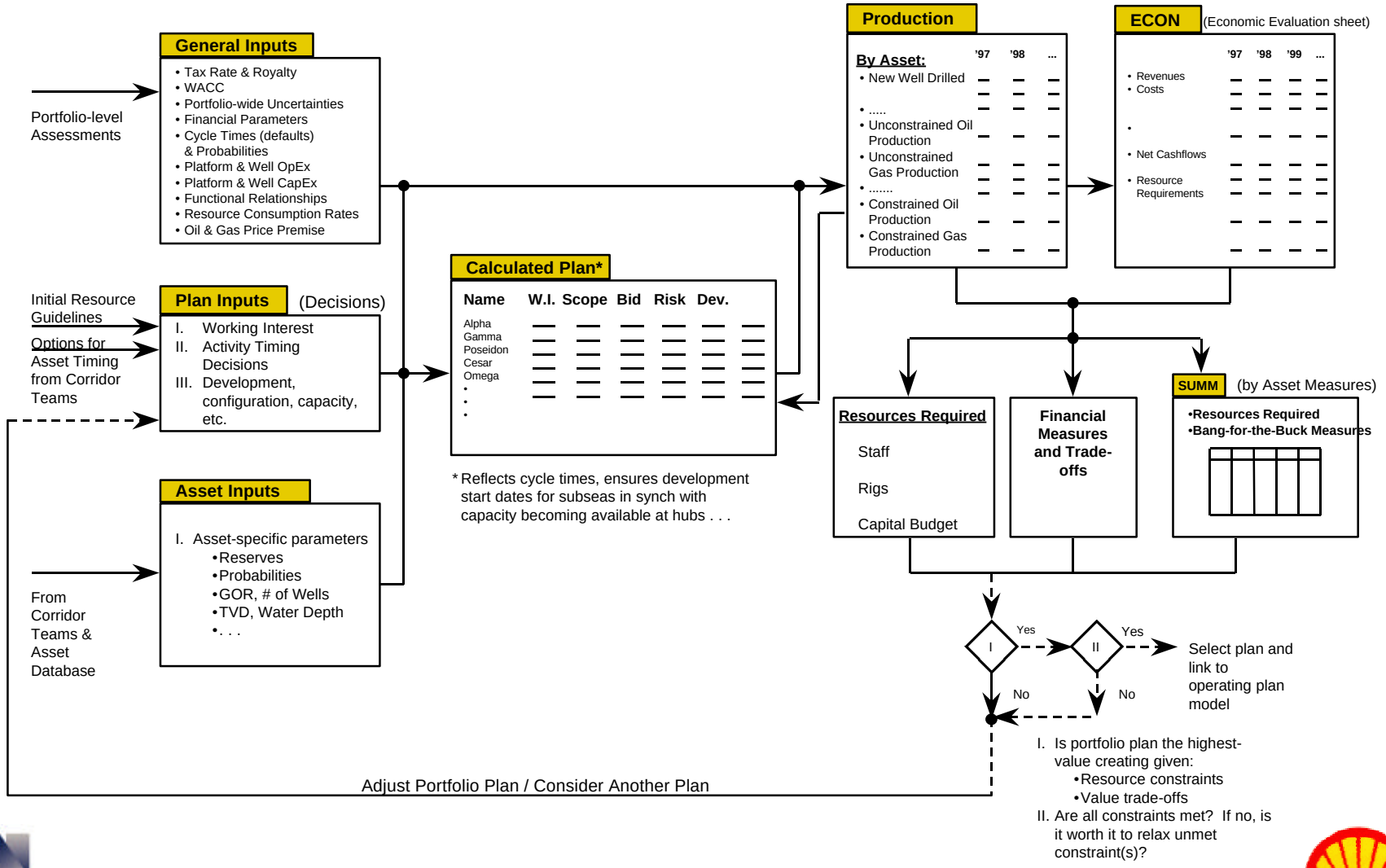
The system architecture builds on a model of the asset life cycle and the key decisions in the life cycle.



The basic structure of the system consists of asset-by-asset computations.

- The basic unit of activity is an asset
  - Stages: Lead, Scoped Lead, Leased prospect, Drill-Worthy, …
- Production logic includes both gas and oil capacity constraints for processing:
  - All wells within a development are treated similarly
- Development options include TLP, FPF, Shallow Water Hub Facility, Subsea, and other future proprietary development systems:
  - Specify tieback location for subseas
  - Specify processing capacity (oil and gas) for hubs
- The system is linked to decision analysis software packages for conducting range sensitivity analysis and probabilistic analysis.

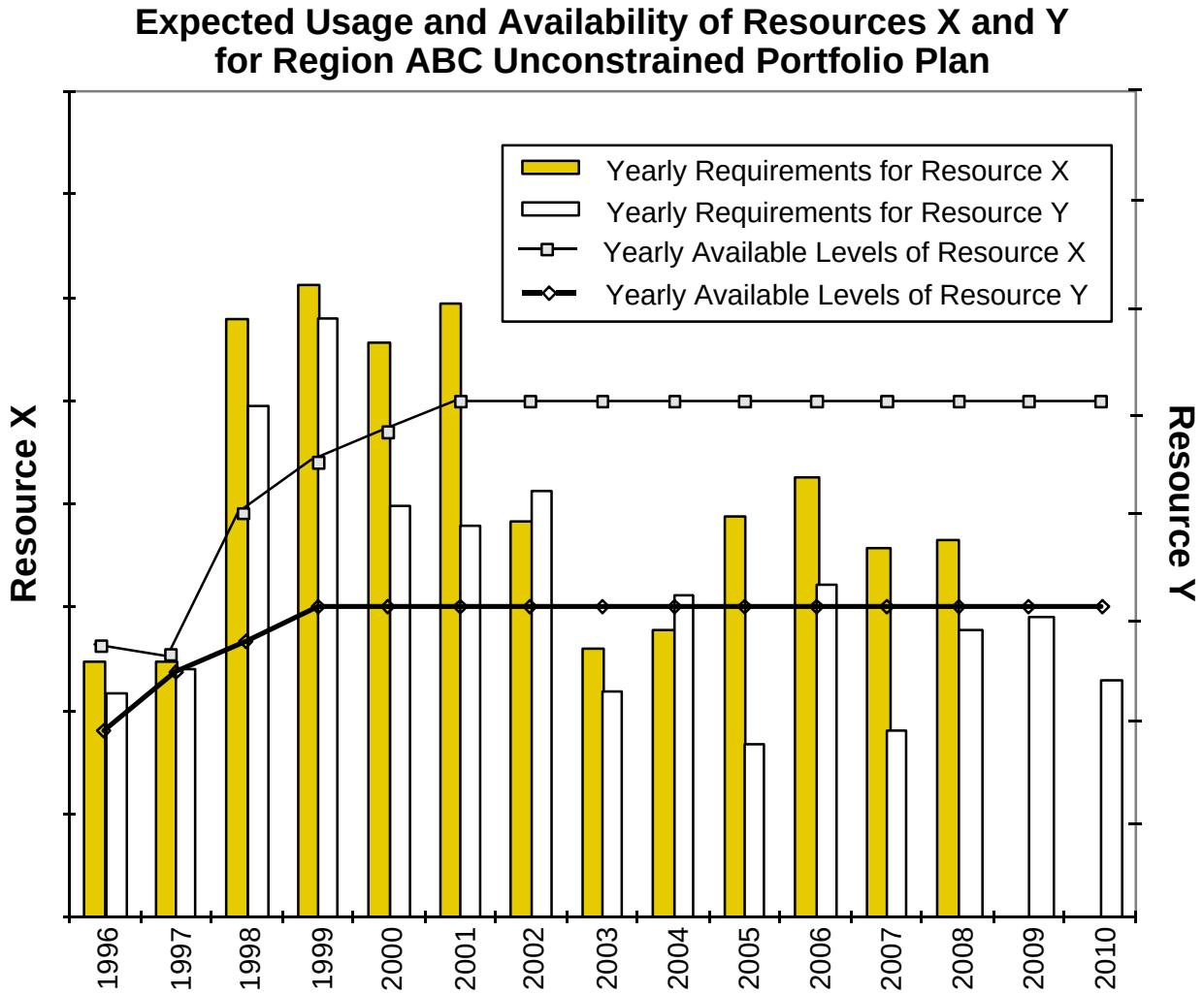
The system creates a plan for a single asset team or an entire business unit and uses portfolio globals to compute total economics and resource use.



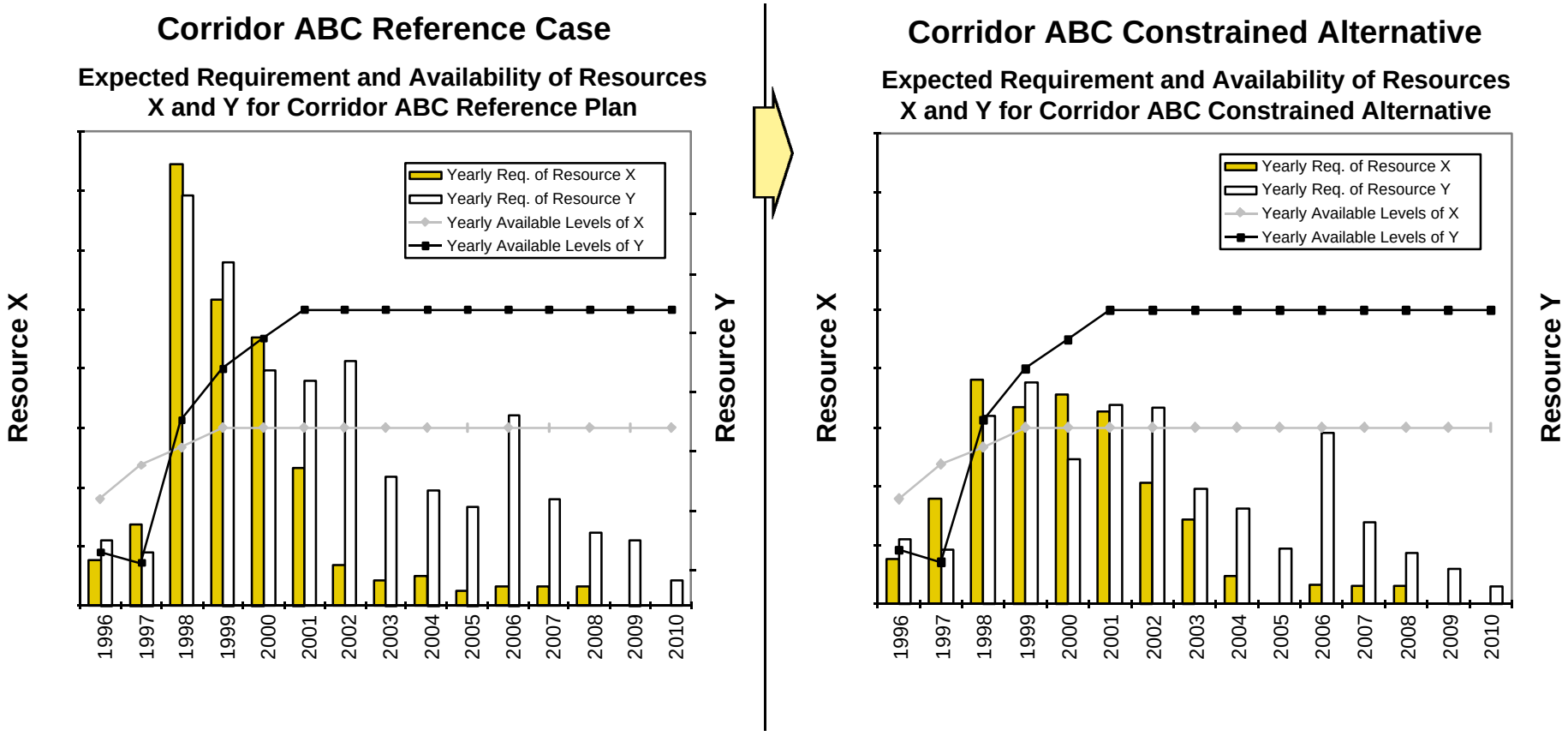
Today's discussion will touch upon a sample of uses and features of the system.

- Tracking measures across the portfolio by asset or any group of assets
- Allocating resources and using bang-for-the-buck measures
- Identifying key value drivers
- Business unit strategy development
- The use of the system as a workbench for decision analysts to conduct tailored analyses such as valuing a technology investment.

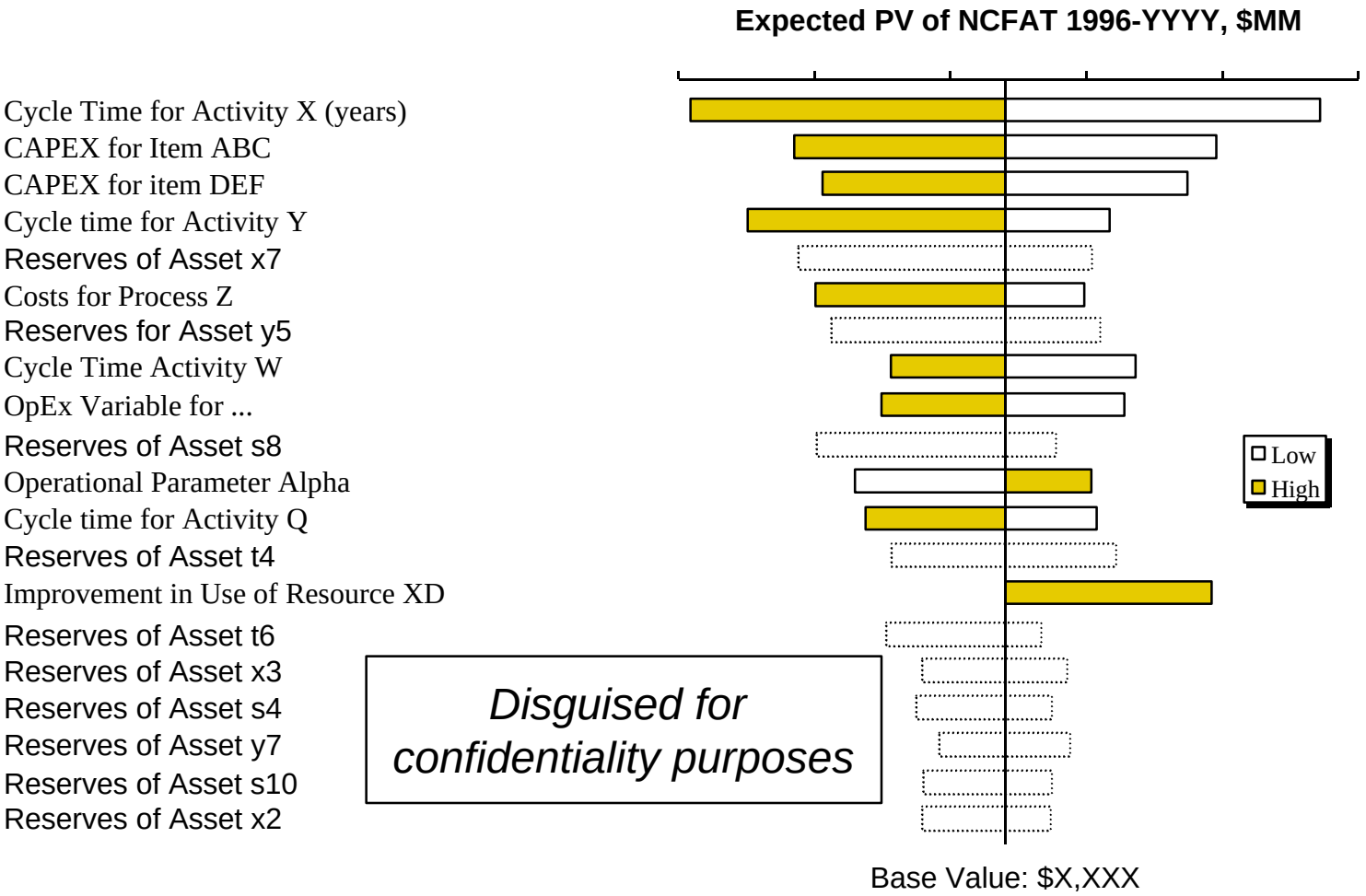
The system calculates expected requirements of various resources, for each portfolio plan, and compares requirement levels to resource availability.



Given resource constraints, the system facilitates the development of an optimal plan through prioritization of assets within each stage of the life cycle.



The portfolio management system supports range sensitivity analyses on any set of portfolio-wide and asset reserve uncertainties.



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The portfolio management process and system have provided many benefits to decision-makers and facilitated the creation of significant shareholder value.

- Enabled a systematic approach to business unit strategy development:
  - Senior management and asset teams are both engaged in the process
  - Commitment to action increases as a result of shared understanding of the value implications of the different alternatives
  - Decisions impacted investments in the hundreds of millions of dollars
- Cut the cycle time in developing regional strategies (team-level strategies) from about three months to two weeks in some cases.
- Replaced non-value-based decision rules driven by expiry dates or other urgencies.
- Helped management ensure implementation success by tracking resource requirements.

Since mid 1997, the portfolio management process and system have been integrated in SOI's business processes and used in strategy development and implementation.

- Annual strategy renewal and budget building for SOI are facilitated by using the process and system
- The process and system are an integral part of day-to-day decision-making:
  - Planning of drilling inventory, leasing decisions, divestitures, etc.
- This has led to keeping the system up-to-date on a continuous basis:
  - Enabled the organization to examine any urgent investment decision or acquisition opportunity from an overall portfolio perspective.
  - Encouraged asset team leaders to consult frequently with the portfolio advisor.
- The redesign of the decision-making process at multiple levels of the organization has led to significant cultural change.

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Successful implementation of a decision analytic solution for ongoing use requires special attention to the needs of multiple stakeholders in the organization.

- "It is easy to make a case for action for implementing portfolio management at the strategic level, but to keep the data up-to-date, you need to link the portfolio management effort to implementation and tactical level decisions."
  - We recognized this upfront and designed the solution accordingly
- A DA solution has to be useable at multiple levels in the organization by design.
- The total solution consisted of:
  - The tailored process
  - The system including dedicated analysis modules
  - Training, user support, and detailed user manual
  - Other user-specific applications that were built to link to the system.