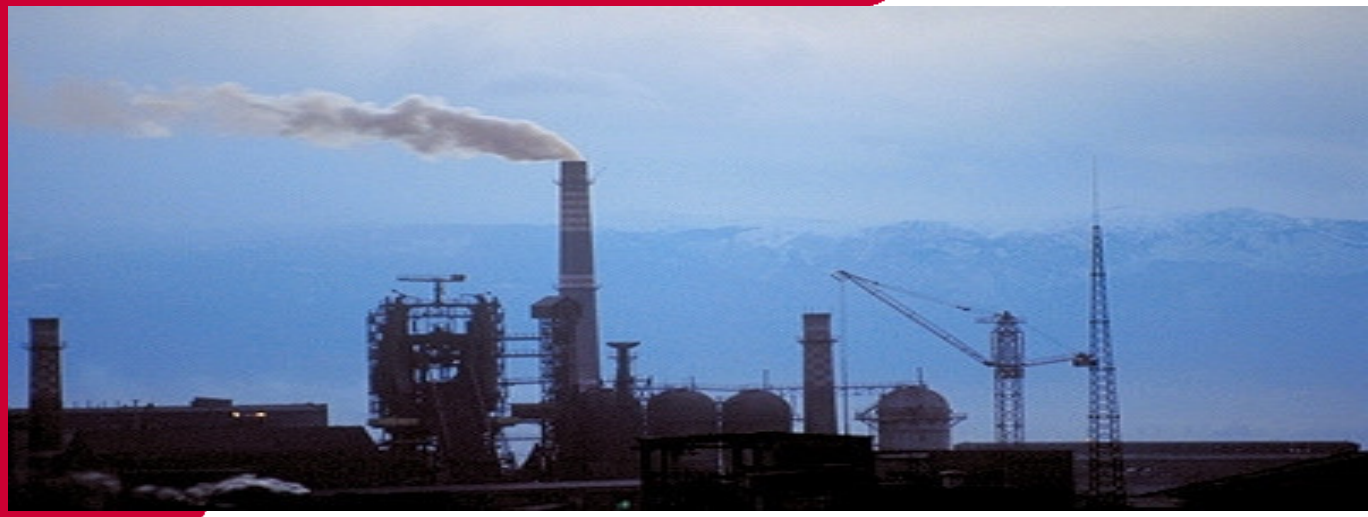


Enterprise Operational Efficiency

- Leveraging to Reduce Costs

Mike Sparkman
CSC Houston Energy Practice

March 18, 2003

The Business Imperative

From Annual Reports of Major Energy Companies...

"We will build value by getting more from existing assets through pursuit of Operational Excellence." -
John Drosdick, Chairman, CEO & President, Sunoco

"Our business is cyclical and we have no control over the prices of our basic products or the raw materials...used to make those products. For that reason, we must...concentrate on business fundamentals over which we do have influence and control. (One of these fundamentals is) Operational Excellence. We strive constantly to achieve the highest levels of operational efficiency." – Lee R. Raymond, CEO and Chairman – Exxon Mobile Corporation

"The company is working diligently to standardize practices and systems so it has the flexibility needed to take advantage of anticipated consolidation in the industry. Xcel Energy's game plan for the future reflects the same approach: maximizing existing assets, while preparing for future opportunities." –

Wayne Brunetti, Chairman, President and CEO, Xcel Energy

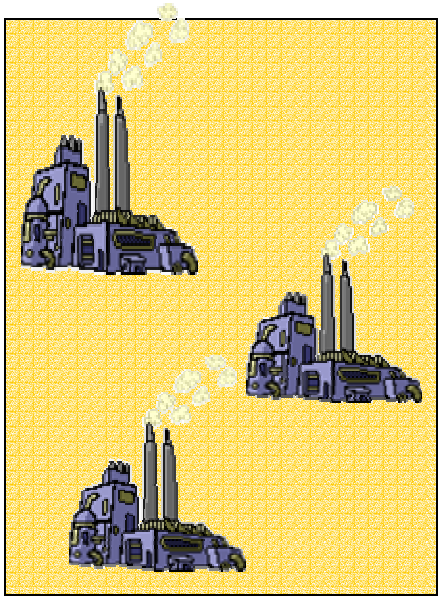
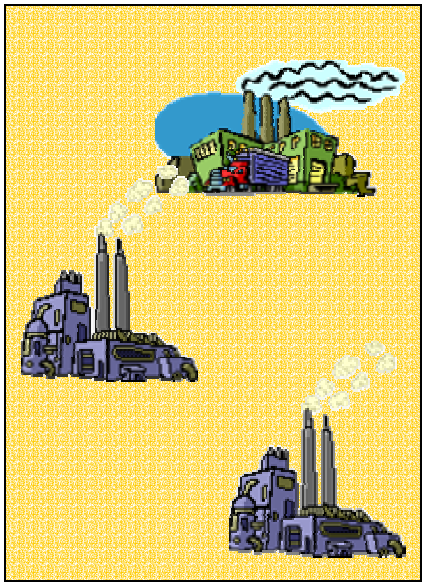
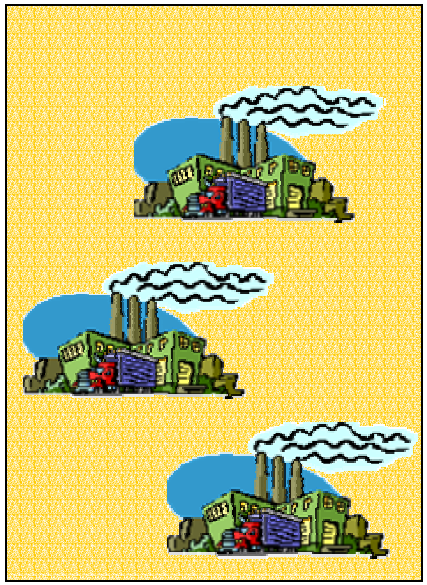
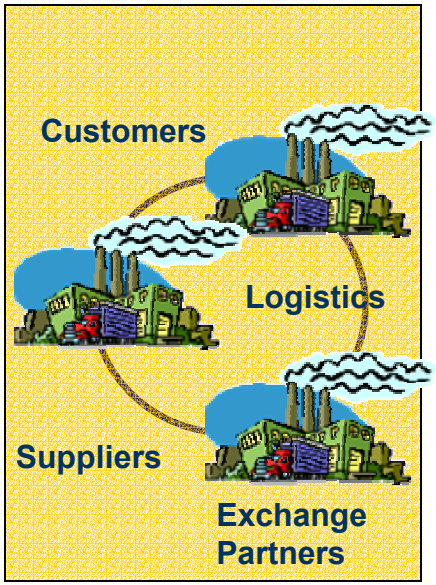
"We believe that Chevron/Texaco must be world-class in...:

operational excellence through safe, reliable, efficient and environmentally sound operations;cost reduction by lowering unit costs through innovation and technology;"

Dave O'Reilly, Chairman of the Board and CEO, Chevron/Texaco

The Stages of Operational Excellence…

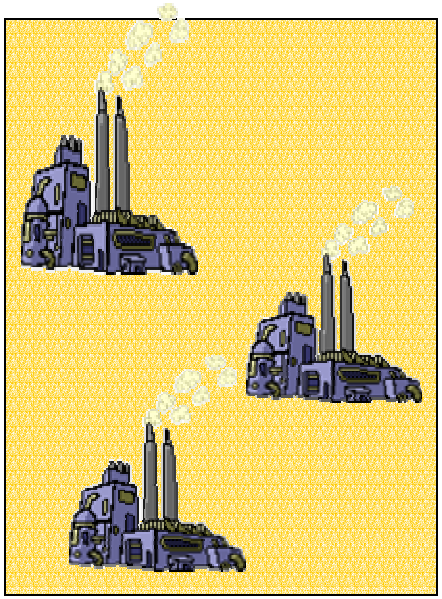
We have identified four stages of operational excellence – the ultimate goal being complete integration with all market participants. Whether refining, chemical, generation or pipeline few U.S. companies have past "Stage 2"…

"Blow and Go"	"Isolated Efficiency"	"Enhanced Commonality"	"Market Integration"
			
Stage 1	Stage 2	Stage 3	Stage 4

The Stages of Value Integration- Stage 1

Companies in Stage 1 are highly plant centric and are production focused with a "run to failure" approach to reliability. Information links between processes, including sales, and other plants are minimal.

"Blow and Go"



Stage 1

Challenges:

- Sales commitments are not always met due to unplanned outages
- Greater instance of production bottlenecks
- Supply is not efficiently linked to customer demand
- Market reaction time is low
- Turnaround cycles are more costly and take longer
- Information technology costs are high due to redundancy and lack of commonality
- Maintenance experience is lost with retirement of key personnel

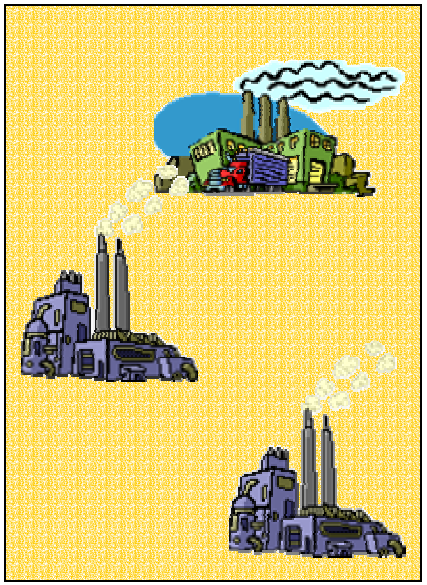
Management Profile:

- Speed to Market - Low
- Costs - High
- Risk - High
- Management Capability - Low

The Stages of Value Integration- Stage 2

In Stage 2 a few plants lead the way toward operational efficiency by introducing streamlined workflows, new technologies and inventive management techniques. They tend to be the exception rather than the norm and their innovation may remain isolated from other plants. This is especially the case for recent acquisitions.

"Isolated Efficiency"



Stage 2

Challenges:

Some of the same challenges as stage 1 but to a slightly lesser degree. Other challenges are:

- **Reception of "best practice" techniques across plants, especially for newly acquired plants**
- **Supply is still not efficiently linked to customer demand**
- **Information technology costs are still high due to redundancy and lack of commonality**
- **Management does not have critical capability to effectively manage across plants**

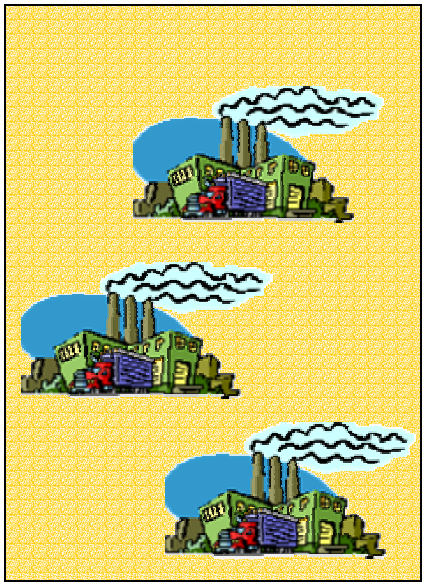
Management Profile:

- **Speed to Market - Low**
- **Costs – Med to High**
- **Risk – Med to High**
- **Management Capability - Low**

The Stages of Value Integration- Stage 3

Stage 3 moves the peg toward applying common standards for work flows, information technologies and delivers consistent information to all levels of management. Management techniques are put in place to enhance operational improvements to further drive down cost and risks.

"Enhanced Commonality"



Stage 3

Challenges:

In this stage challenges mainly focus around integrating operations across plants to optimize production flows, supply and logistics. Continuing issues are :

- **Regional and product line efficiencies are not optimally matched to customer demand**
- **Supply and logistics are not efficiently linked to customer demand**
- **Management does not have critical capability to effectively manage across plants**

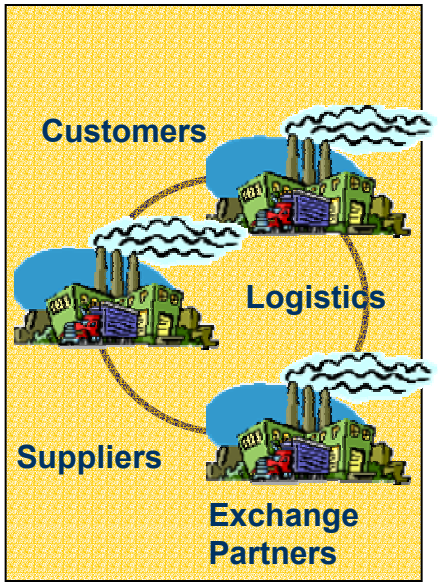
Management Profile:

- **Speed to Market – Med to High**
- **Costs – Med to Low**
- **Risk – Med to Low**
- **Management Capability - Med**

The Stages of Value Integration- Stage 4

Stage 4 begins with sharing operational information across plants and then extending it into the market place – collaborative links with customers, suppliers and delivery. It also enables the company to more effectively operate on a global basis and launch new market strategies. Management's view now has an enterprise versus unit based view of operations.

"Market Integration"



Stage 4

Challenges:

Most of the previous issues are eliminated. Remaining are those related to market changes and acquisition of assets operating in Stages 1-3.

- **Creating a "dashboard" view for management of the market and the collective plant performance**
- **Instituting management techniques that focus on an enterprise view of operations**
- **Expanding the model to overseas operations**

Management Profile:

- **Speed to Market –High**
- **Costs –Low**
- **Risk –Low**
- **Management Capability - High**

Too Many Silos, Too Much Redundancy

Across any given portfolio of assets/plants many of the same processes are performed on a plant by plant basis. The result is a redundancy of activities and resources and operational gaps that threaten the fulfillment of market demand.

Market Driven

- Demand Management
- Sales and Marketing
- Market Trading
- Production Planning
- Scheduling and Logistics

Operations Driven

- Production
- Maintenance Management
- Reliability Analysis
- Environmental, Health and Safety
- Procurement and Supply Management

Leveraging Assets Across the Portfolio

Leverage. The goal is to eliminate redundancies, apply best practices uniformly and integrate processes to service multiple plants.

Demand Management

Sales and Marketing

Market Trading

Production Planning

Scheduling and Logistics

Production

Reliability Analysis

Maintenance Management

Environmental, Health and Safety

Procurement and Supply Management

The Operations Critical Path

The path to cost reductions and speed to market begins by integrating the building block processes of asset management and sharing them across the plant fleet.

Demand Management

Sales and Marketing

Market Trading

Scheduling and Logistics

Production Planning

Production

Reliability Analysis

Maintenance Management

Procurement and Supply Management

Delivering New Capabilities - Operations

Linking and leveraging the Production/Reliability critical path enhances current capabilities and delivers new ones:

For Plant Management…

Downtime Analysis

- Turnaround time optimization
- Downtime root cause
- Downtime prediction
- Cross plant benchmarking

Downtime/ Production Scheduling

- Lost production opportunity detection
- Production planning optimization

E H & S

- Incident reporting and remediation time optimization
- Root cause analysis
- Incident avoidance

Inventory/Supply

- Multi-Site Inventory Usage
- Warranty management
- JIT equipment/parts ordering
- Inventory level reduction

Quality Management

Integration of:
- Production output
- Quality
- Maintenance root cause analysis

"True" Predictive Maintenance

- Consolidation of disparate forecasts
- Completeness of prediction
- Cross plant benchmarking

Critical Asset/ Monitoring

- Proactive vs.. reactive cost analysis/ justification
- Risk based inspection
- Reliability centered management

Contractor Management

- Consistency of performance
- Specialists needs
- Resource scheduling
- Equipment tracking

Delivering New Capabilities – Market

…And For Market and Corporate Management

These are the capabilities delivered to company executives outside of the plant – the CEO, CFO, COO, VP of Business Development, VP of Procurement and others. It provides them with an enterprise view of operations and allows them to make better decisions regarding:

- Targeting customer needs
- Shareholder satisfaction
- Merger and Acquisition decisions
- Lowering costs related to suppliers and other third parties
- Accelerating production and market delivery
- Optimizing spot market purchases
- Global operations
- Industry rankings

The Target KPIs

KPI's are applied to highlight the success of the leveraged processes and serve to reinforce actions taken. Examples:

Stores/Maintenance parts Management indicators

- Inventory Accuracy and Frequency
- Percentage of Stock outs
- Inventory Turnovers
- Percentage of Inactive Inventory
- Percentage of Growth of Line Items
- Percentage of Growth in Number of Suppliers…

Routine Maintenance indicators

- Work Input Level (By Craft, Priority and Type)
- Backlog Level (By Craft, Priority and Type)
- Standing Work Orders as Percentage of Total Hours
- Man Hours per Work Order
- Daily Schedule Completion
- Work Generated by PM/PdM Task
- Percentage of Maintenance Rework
- Percentage of Emergency Work…

Organizational structures indicators

- Ratio of Company Employees to Contractors
- Ratio of Production Employees to Maintenance Employees
- Maintenance Employees per First Line Supervisor
- Maintenance Employees per Planner…

Overview KPI

- Budget Compliance (Actual versus Forecast)
- Plant-wide Overall Equipment Effectiveness (OEE)
- Maintenance Costs as a¨Percent of Replacement Asset Value
- Maintenance Dollars perTon Produced
- Percent Absenteeism
- Safety, Environmental and Regulatory Performance/Compliance
- Training Hours or Dollars as a Percent of Overall Hours or Dollars Expended
- Employee Turnover

Equipment performance indicators

- Overall Equipment Effectiveness (OEE)
- Equipment Downtime
- Equipment Capacity, Utilization, Running Speed or Performance Efficiency
- Mean Time Between Failure (MTBF) for Pumps, Motors, Compressors, etc.
- List of Worst Performing Equipment
- Set-up or Change-over Times
- Start-up and Shut-down Times
- Monthly Costs for Each Type of Equipment…

The Enabling IT Infrastructure

A core IT infrastructure servicing multiple plants can tie all tie together critical applications through a flexible architecture driven by the latest workflow technologies. ERP systems are optimized and critical triggers and alarms are automated.

Passive RF tag on equipment

Workstation Applications

Synchronization Server

Database Server

WLAN Access Point

Mobile Computing Devices With Sensors

Radio Receivers

EAI/BPM Layer

Parts and Equipment Vendor Collaboration

CMMS

Reliability Management

Portal and Decision Support

Process Historian

Trading, CEMS, other

Real Time System (RTS)

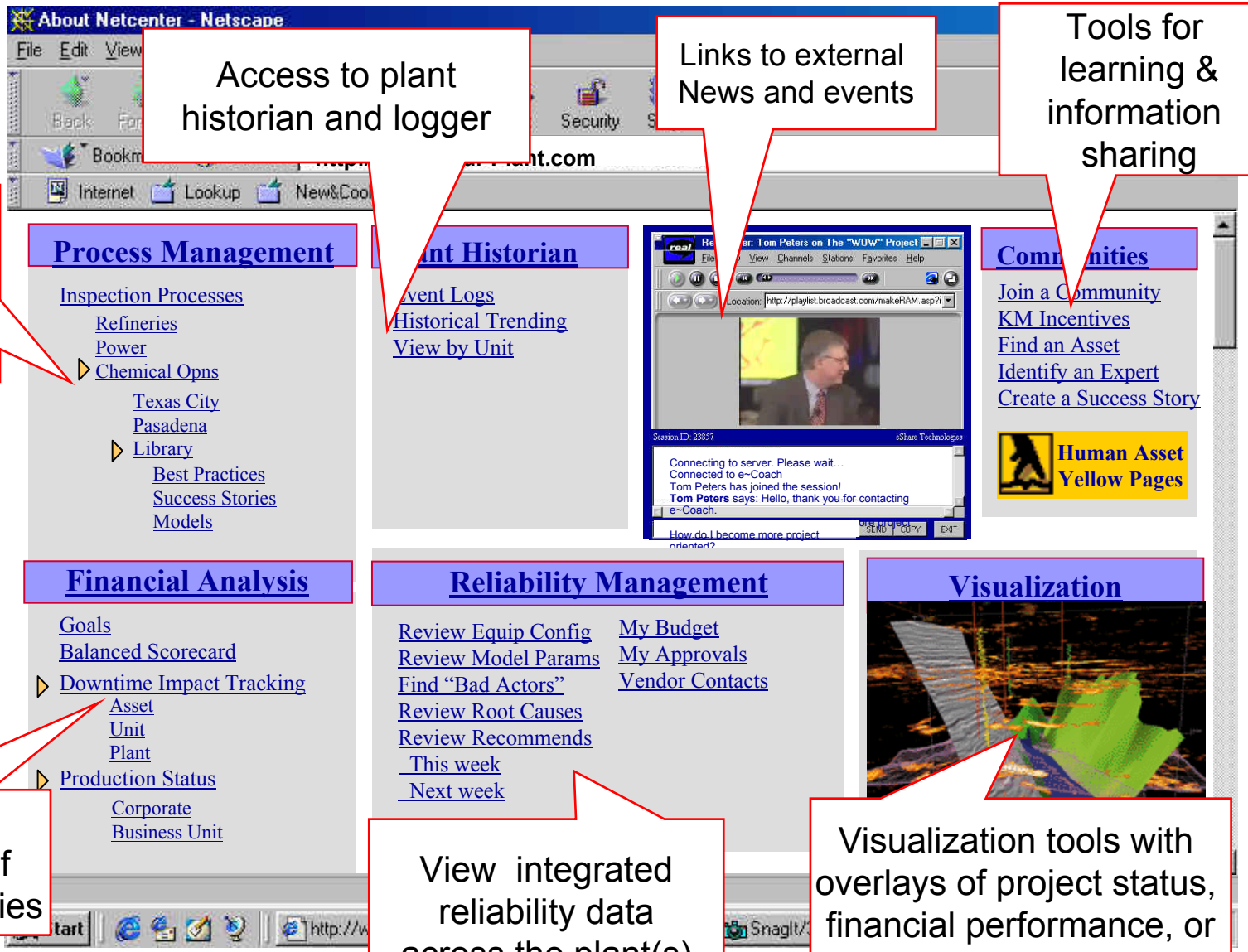
Operations Visibility via Portal Technologies

Proactive management of the maintenance processes

Access to plant historian and logger

Links to external News and events

Tools for learning & information sharing



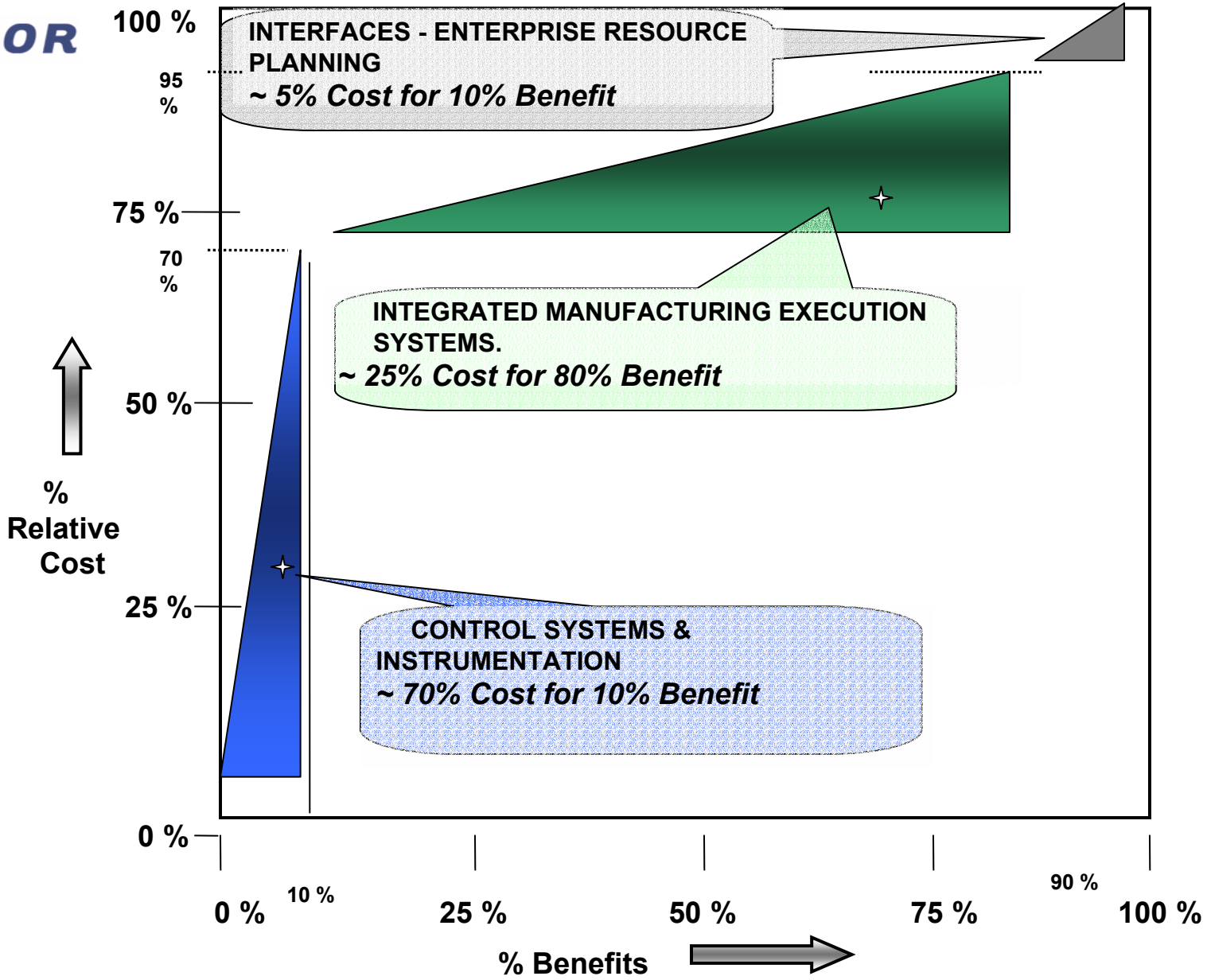
Manage financial results of maintenance activities

View integrated reliability data across the plant(s)

Visualization tools with overlays of project status, financial performance, or production histories

Cost/Benefit of Focusing on Operations

FLUOR



Some of the Financial Benefits

Key Issues

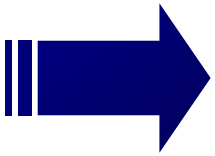
Closing the gap between market planning and outage management

Integration of plant acquisitions; plant rationalization

Turnaround management
- Reducing unplanned outages
- Reduce turnaround cycle time and costs
- Optimize turnaround schedule

Business process and IT "cleanup"
- Reducing redundant/siloed processes
- Rationalizing IT applications across plants
- Applying best practices across plants

Workforce Management
- Aging workforce
- Siloed knowledge; knowledge sharing

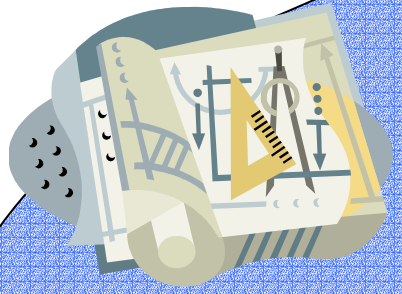


Targeted Benefits

- Improve production efficiency – 0.5% - 1%
- Increase plant availability
- Optimization of the plant portfolio
- Significant reduction in unplanned outages
- 20%- 30% reduction in maintenance costs
- 20% - 30 % reduction in application maintenance costs
- Increased workforce productivity – 0.5% - 1%
- 10% Reduction in parts inventory
- Reduce contractor hours
- Lower cost asset acquisition

How to Get to Market Integration

Reaching "Market Integration" does not need to be a painful, big bang approach. Every step taken will deliver value by lowering costs, reducing risks and improving management capabilities. The good news is that the key enablers are available...



Key Steps:

- Identify critical areas for improvement and strategy directed
- Clean up conflicting workflows and redundant applications
- Map solution to critical area and justify
- Model on limited but high value basis
- Confirm benefits and rollout to other units

Key Tools:

- Management/operation tiered process design
- Enterprise/multi-plant governance and management techniques
- Integrated technologies – traditional and emerging- in a highly integrated architecture

Go ahead, we're listening.SM

CSC.COM CONSULTING • SYSTEMS INTEGRATION • OUTSOURCING