Technology Framework - Benefits

Annual Savings

Actionable
Information – KPI's

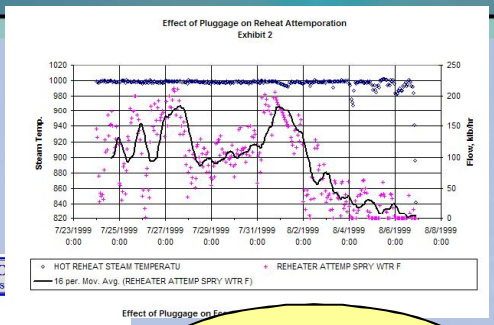
Discrete data
Limited value

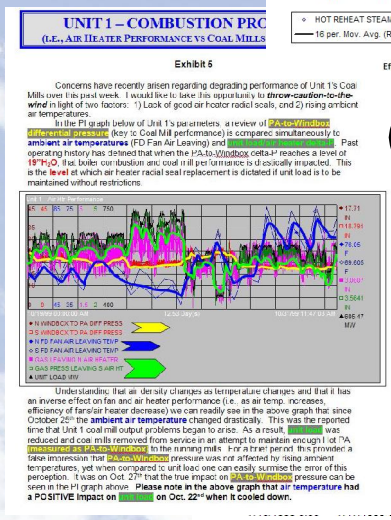
Distributed OSIsoft PI Historians
Large Population of Data

Data Analysis
$3,000,000

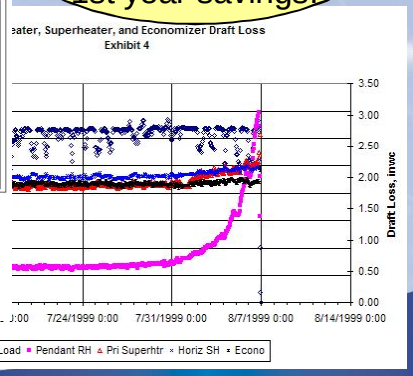
Raw Data Analysis

- Post trip analysis
- Process monitoring
- Optimization
- Early warning
- Alarming





$ 1,890,000
One Plant
1st year savings!



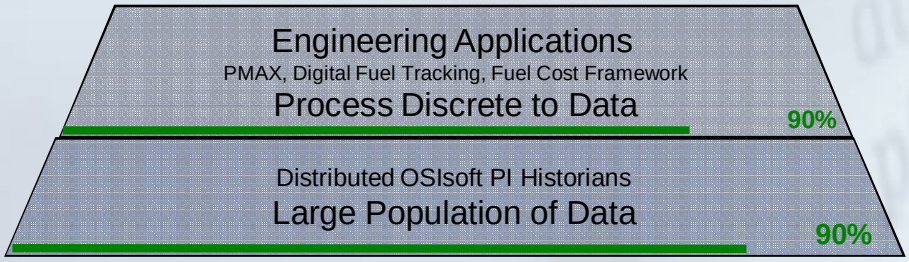
OSIsoft.

VALUE NOW, VALUE OVER TIME

Technology Framework - Benefits

Annual Savings

Actionable
Information – KPI's



Discrete data
Limited value

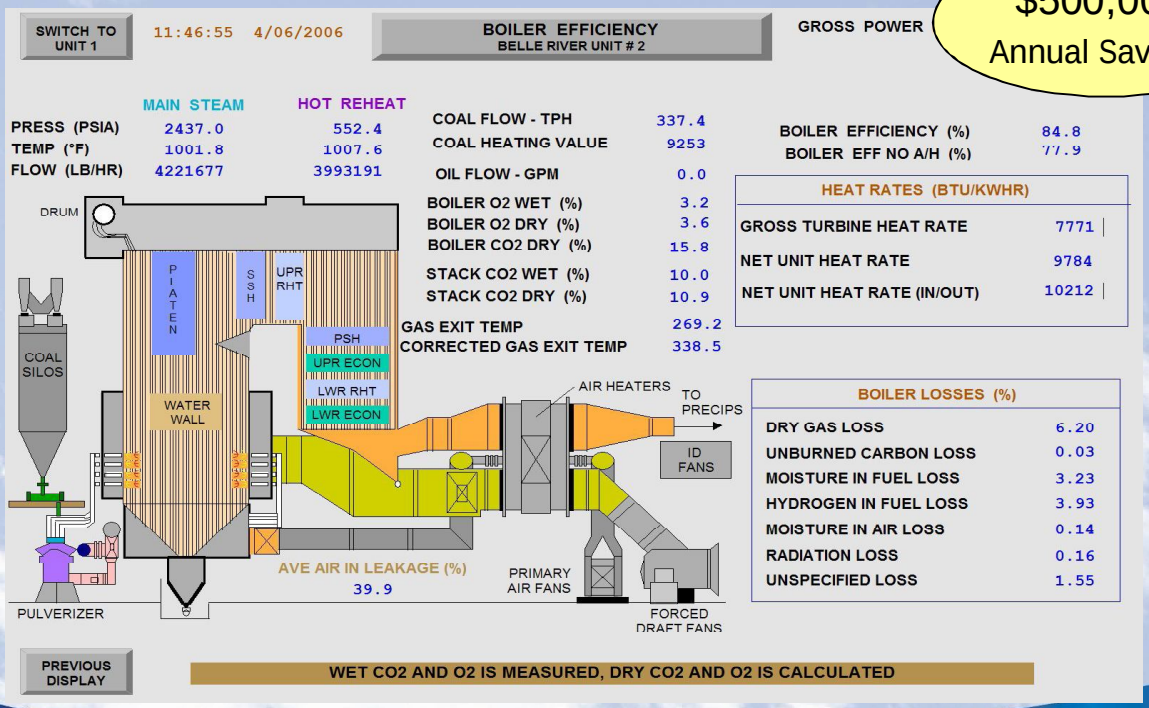
Process Analysis
$4,500,000

$3,000,000

Fleet Performance Analysis (PMAX)

Thermal Performance Calculation Engine

$500,000
Annual Savings!

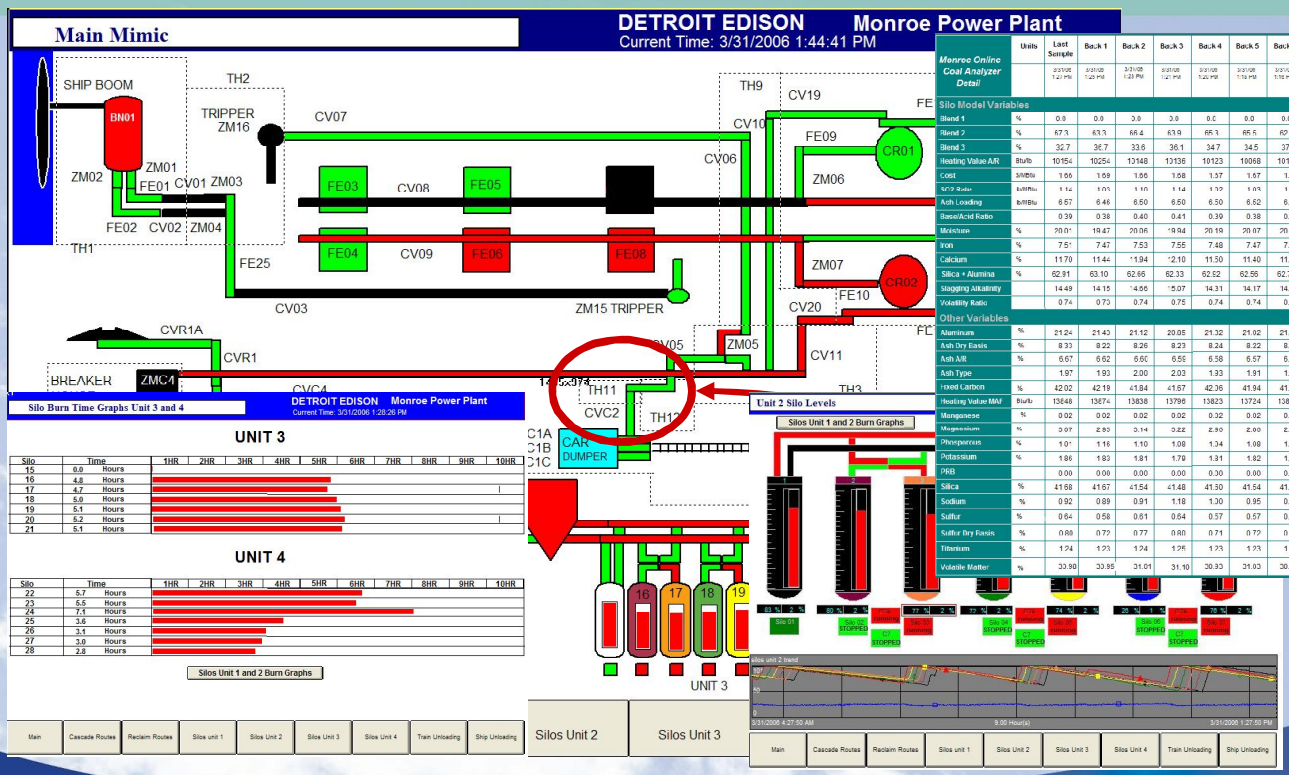


OSIsoft.

VALUE NOW, VALUE OVER TIME

Digital Fuel Tracking System

$1,200,000
Annual Savings!

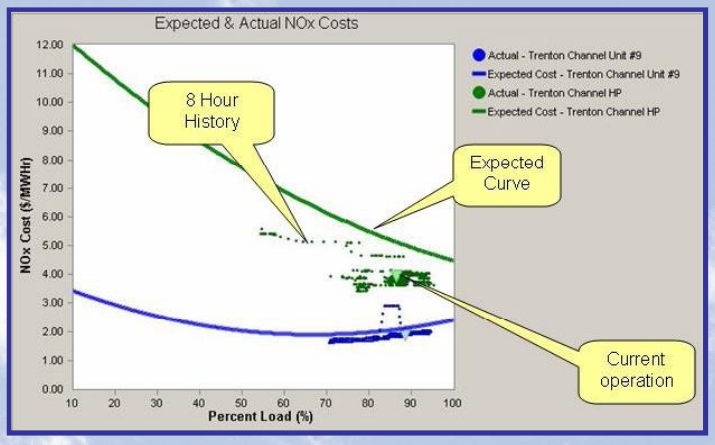


OSIsoft.

VALUE NOW, VALUE OVER TIME

NOx Emissions Strategy

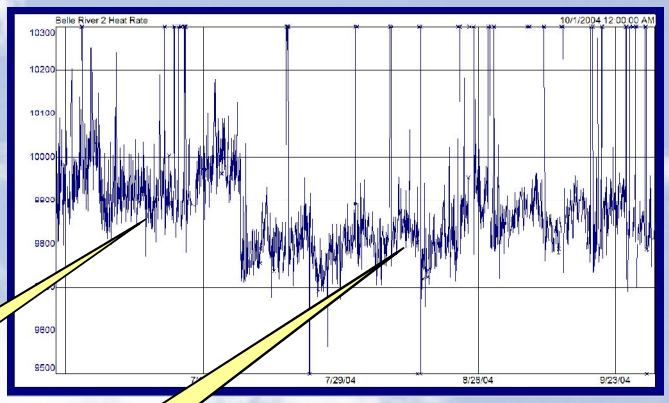
$2,200,000
Annual Savings!



NOx Reduction with Improved Heatrate

Before Implementation

After Implementation



Primary focus is NOx reduction only

Focus on operating near NOx budget curve

OSIsoft.

VALUE NOW, VALUE OVER TIME

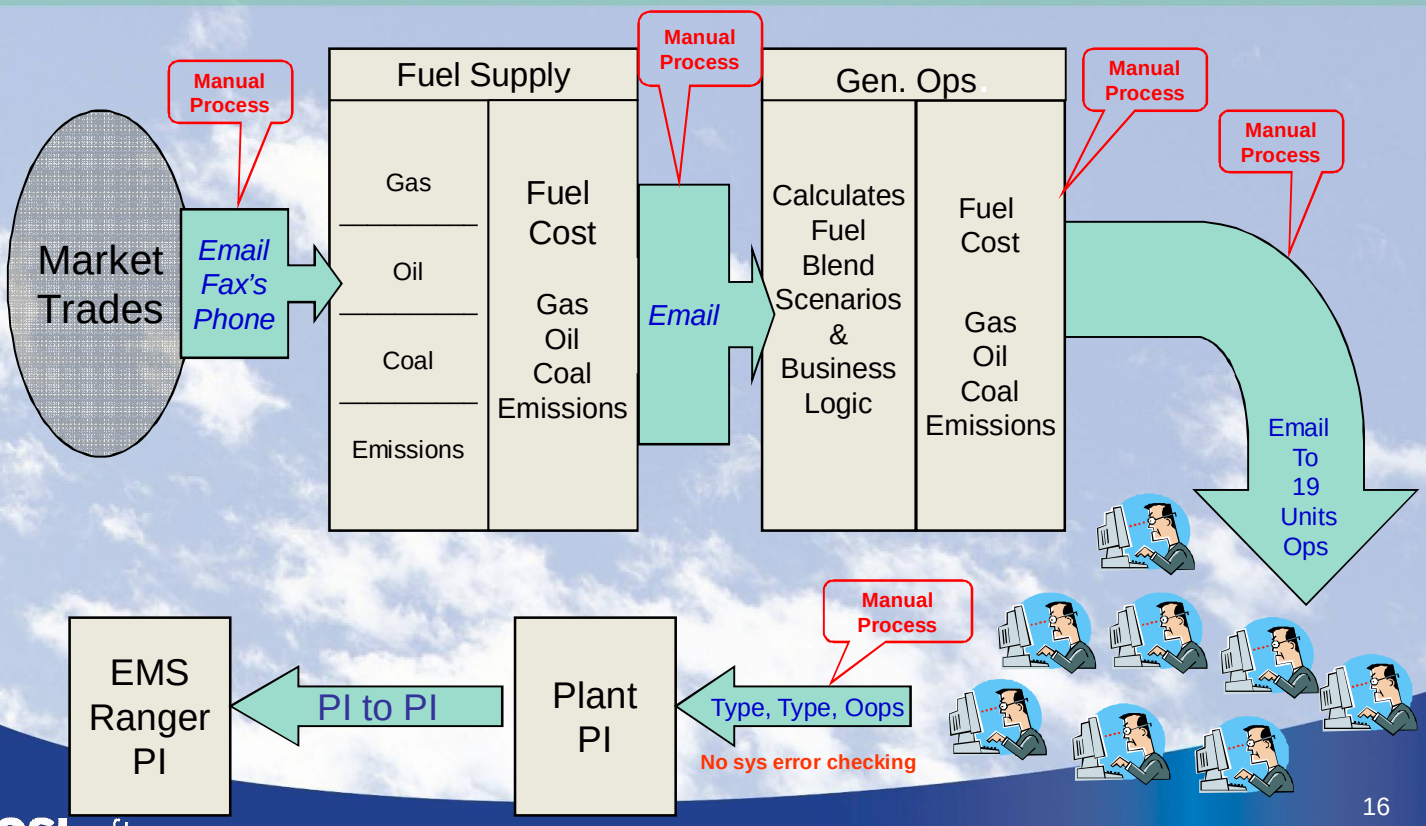
Energy Management System (EMS)

- The Plant Energy Management System is used to automatically control unit dispatch
- Implements data validation on all fields
- Performs several calculations based on PI data to determine validity of inputs.
- Transported to EMS Ranger via PI

OSIsoft.

VALUE NOW, VALUE OVER TIME

Before Fuel Cost Framework

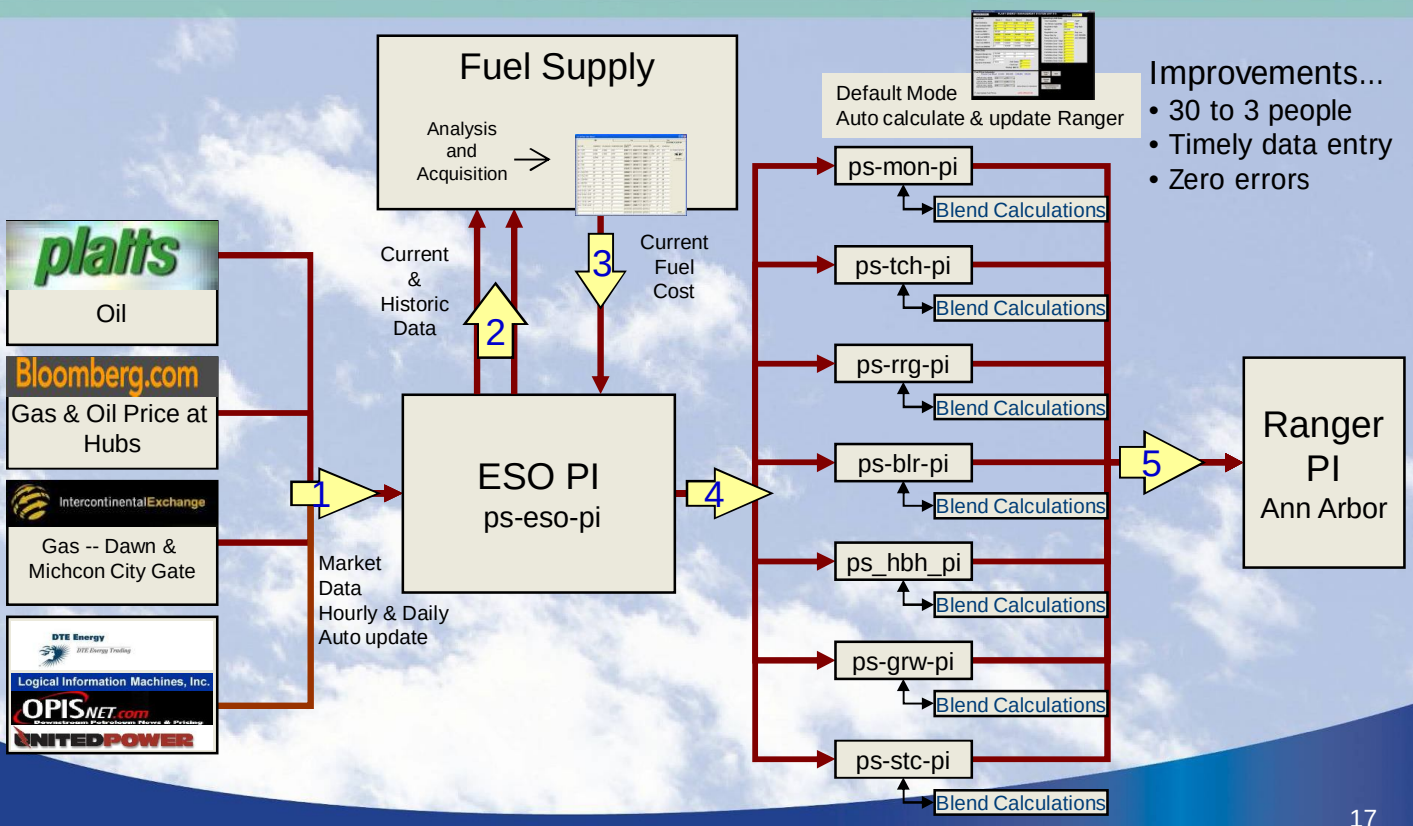


OSIsoft.

VALUE NOW, VALUE OVER TIME

Fuel Cost Framework

$530,000
Annual Savings!



OSIsoft.

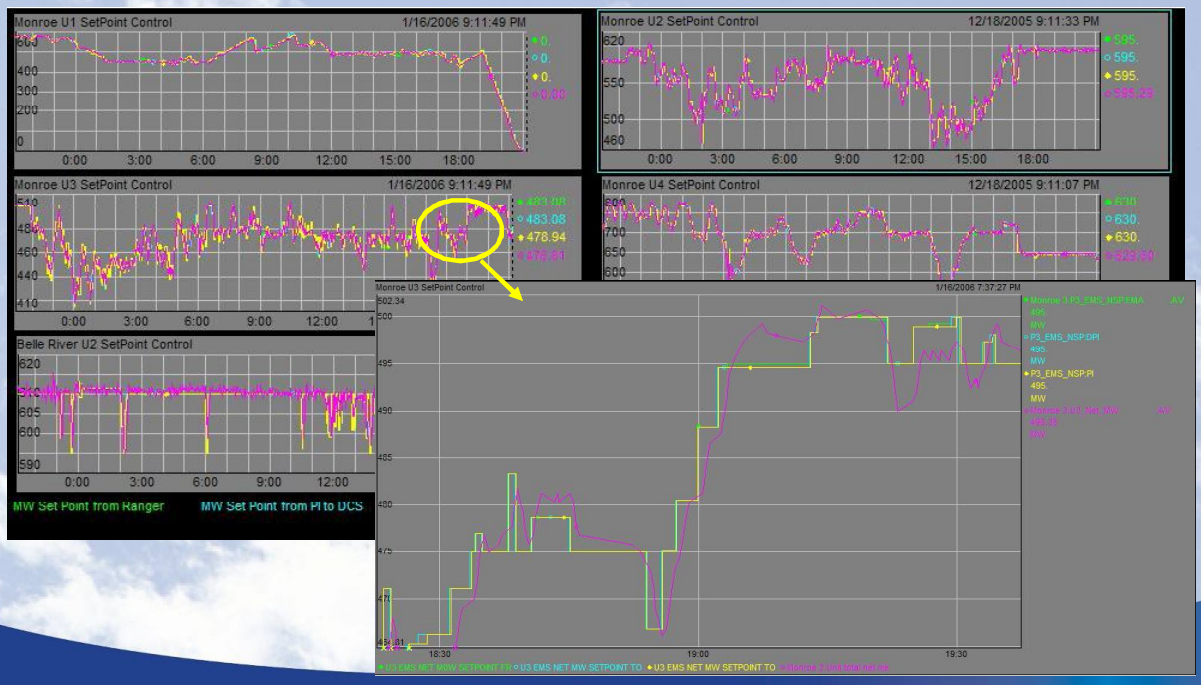
VALUE NOW, VALUE OVER TIME

PI to PI (AGC)

$200,000 Savings!

AGC – Automatic Generation Control

5 largest Fossil units & Peaking Units are ramped through PI Set Point control



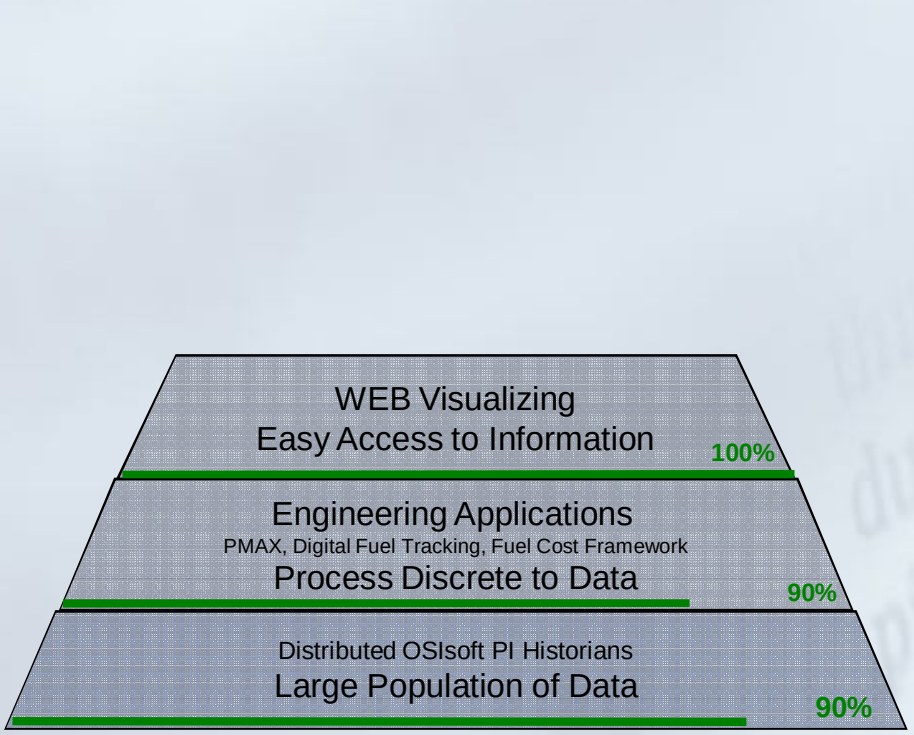
OSIsoft.

VALUE NOW, VALUE OVER TIME

Technology Framework

Annual Savings

Actionable
Information – KPI's



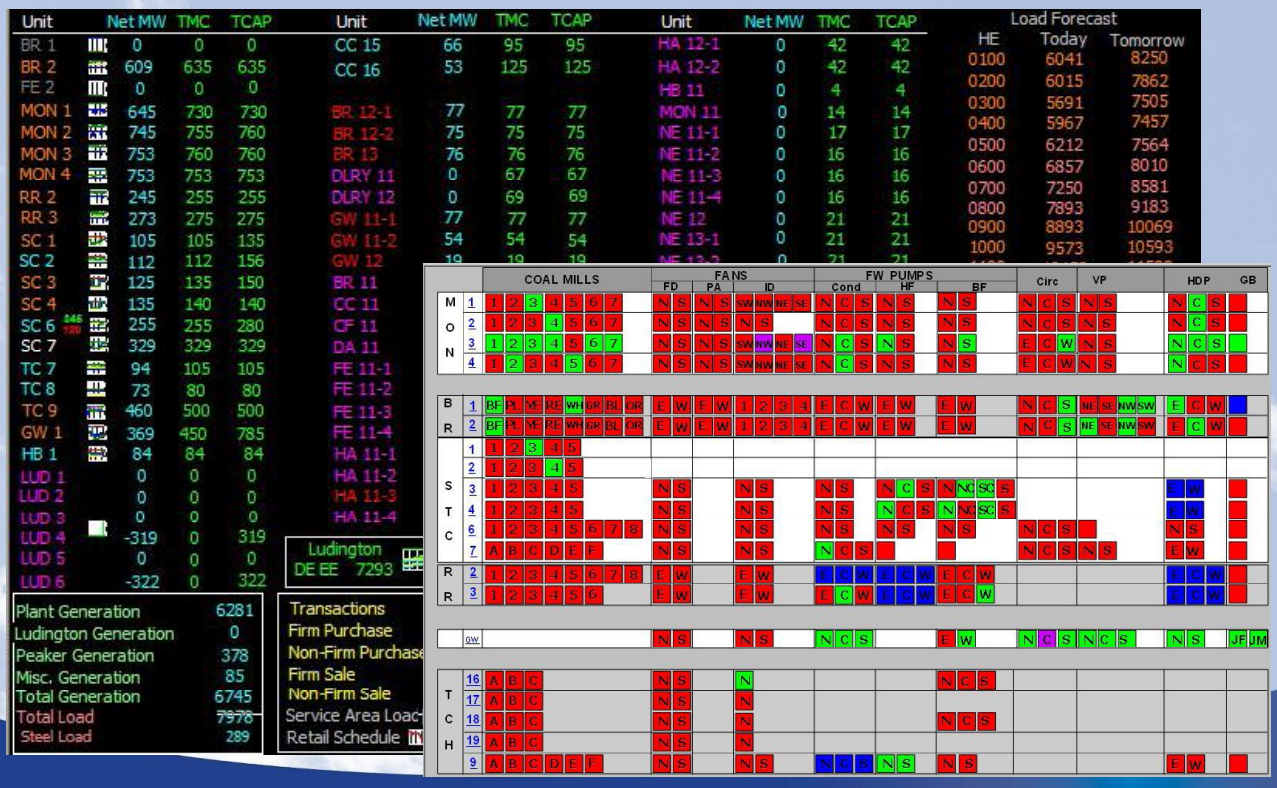
Discrete data
Limited value

Easy Visualization
$5,500,000

$4,500,000

$3,000,000

Fleet Status – PI WEB enabled

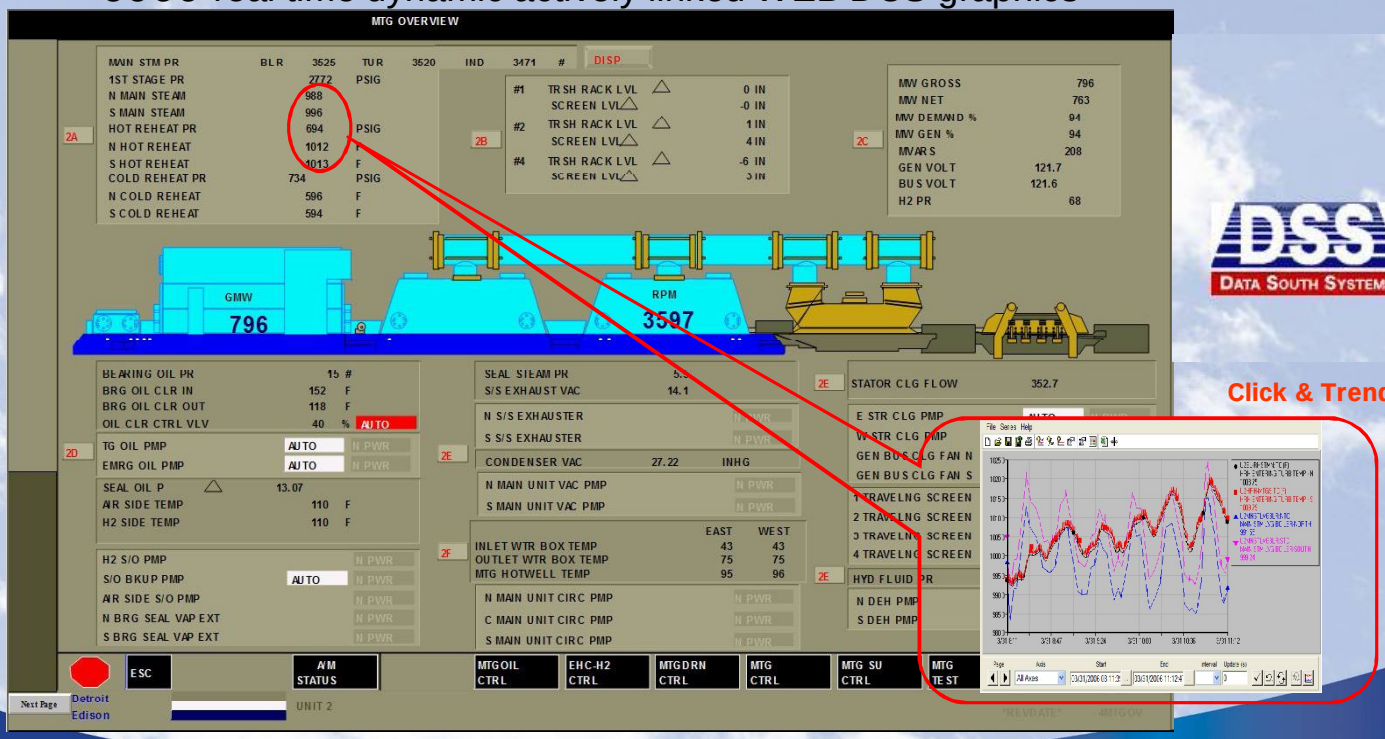


OSIsoft.

VALUE NOW, VALUE OVER TIME

Real-Time DCS Operator Displays

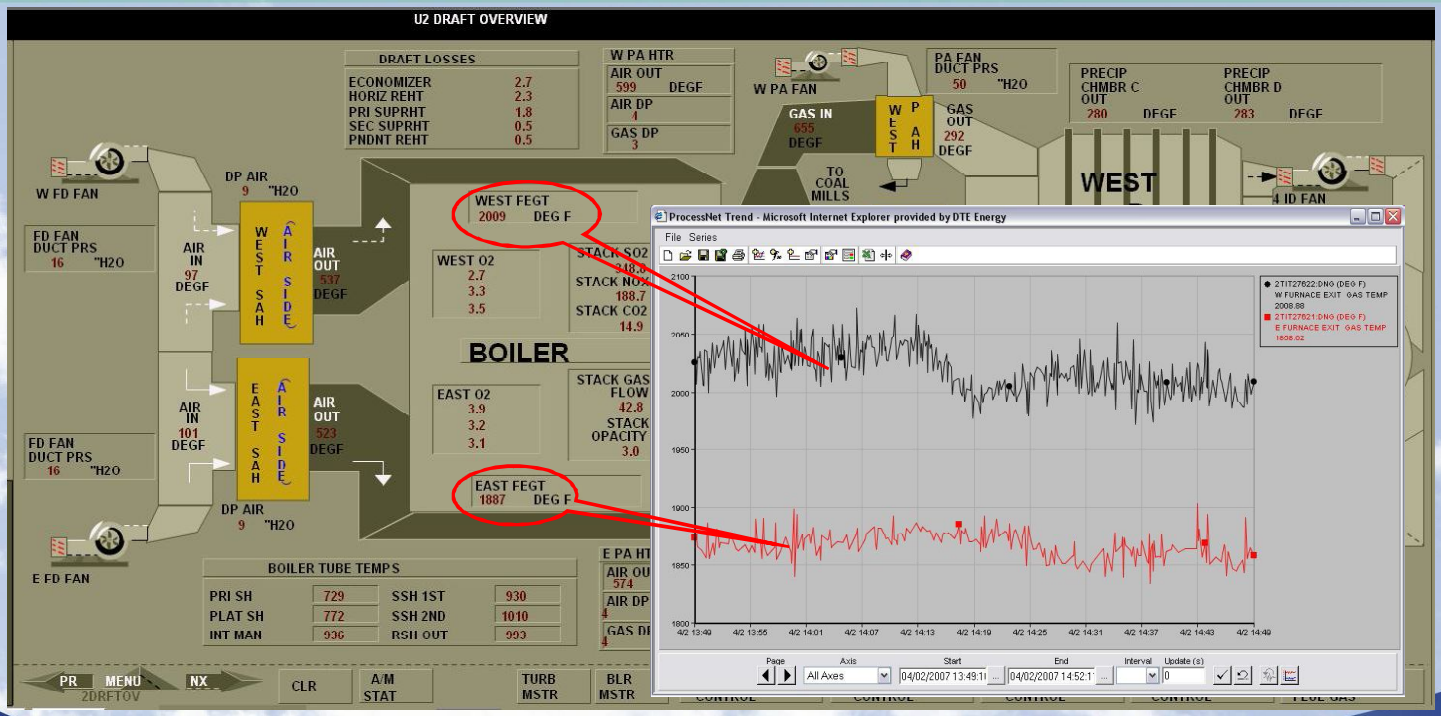
6000 real time dynamic actively linked WEB DCS graphics



OSIsoft.

VALUE NOW, VALUE OVER TIME

PI enabled - Event Re-play



Re-play events using historical PI data

OSIsoft.

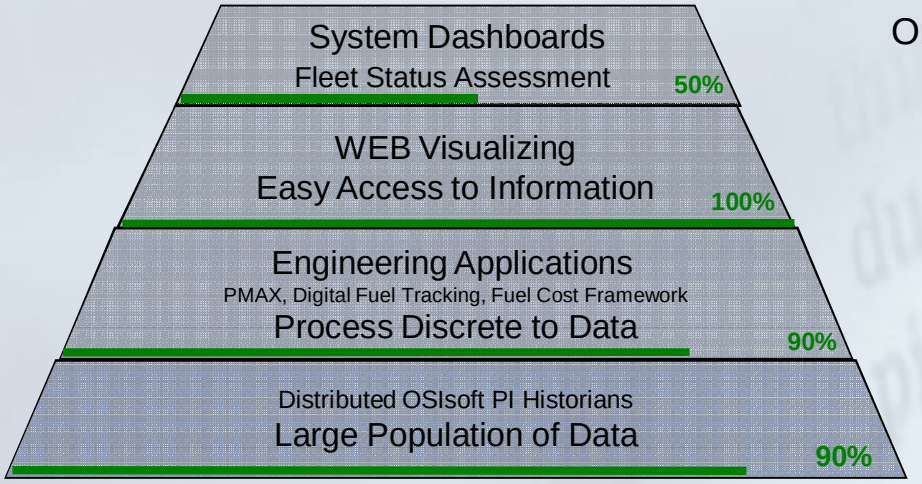
VALUE NOW, VALUE OVER TIME

Technology Framework

Annual Savings

Actionable
Information – KPI's

Discrete data
Limited value



Organized Drill Down

$1,000,000

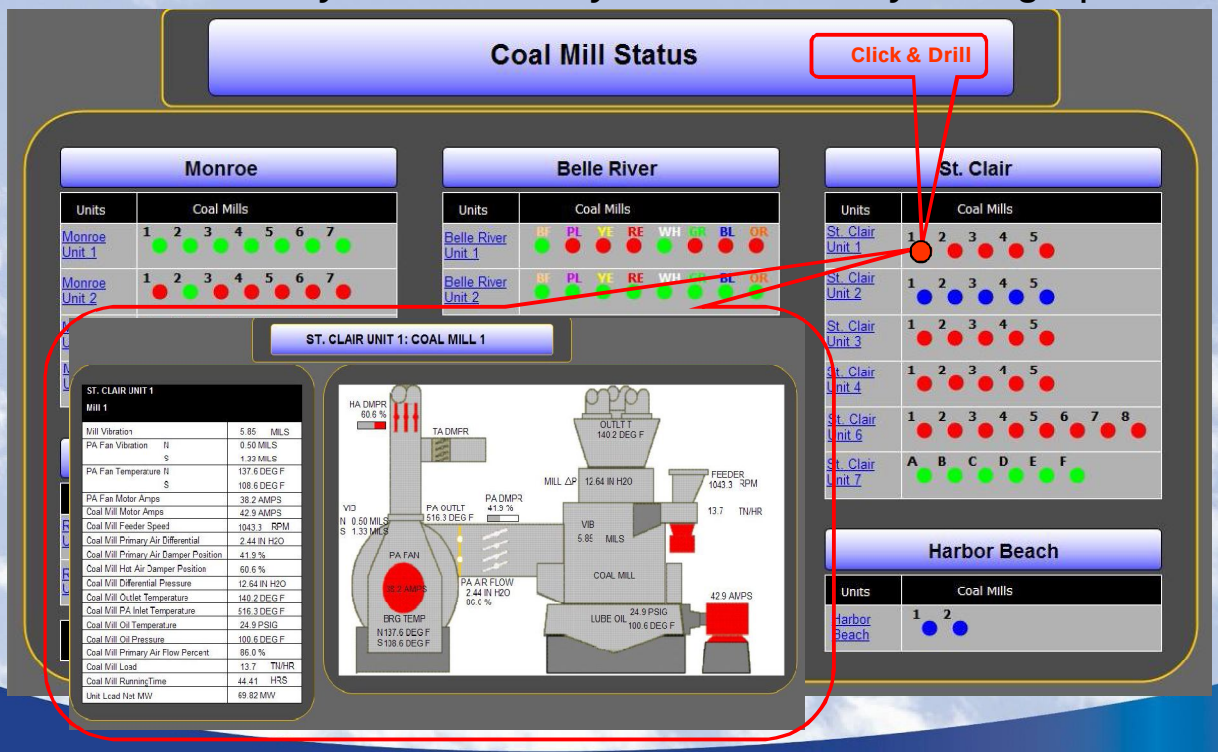
$5,500,000

$4,500,000

$3,000,000

System Dashboards – PI Enabled

2000 real time dynamic actively linked WEB System graphics



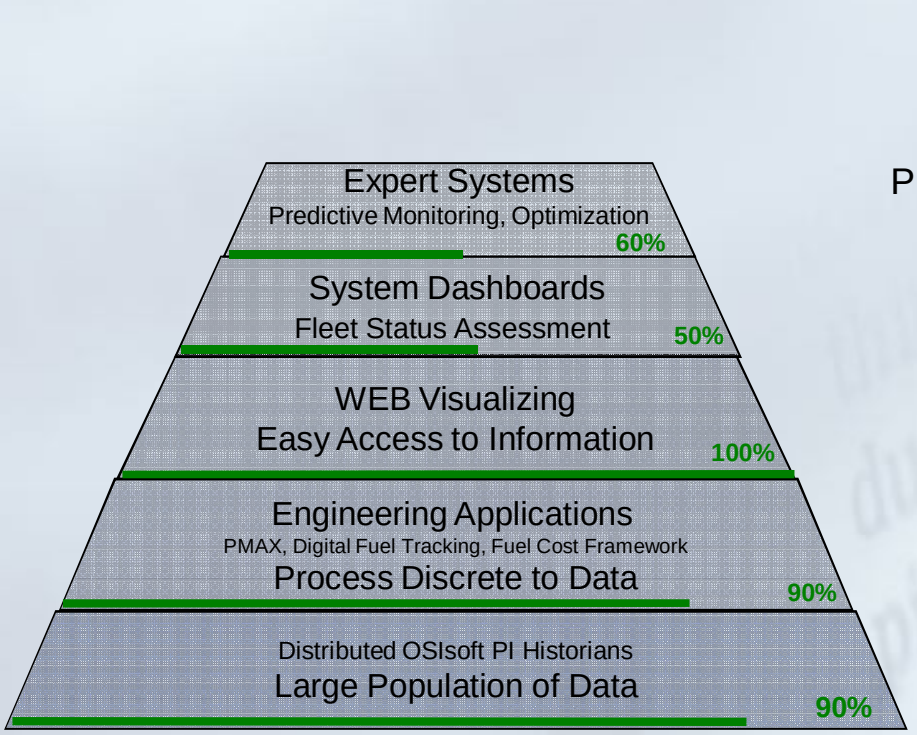
OSIsoft.

VALUE NOW, VALUE OVER TIME

Technology Framework

Annual Savings

Actionable
Information – KPI's



Discrete data
Limited value

Predictive – Optimize
$8,000,000

$1,000,000

$5,500,000

$4,500,000

$3,000,000

Expert Systems

- Equipment & Process Monitoring
  - Fleet wide implementation 2006
  - A Primary Performance Center Application

$7,769,680 Annual Savings!

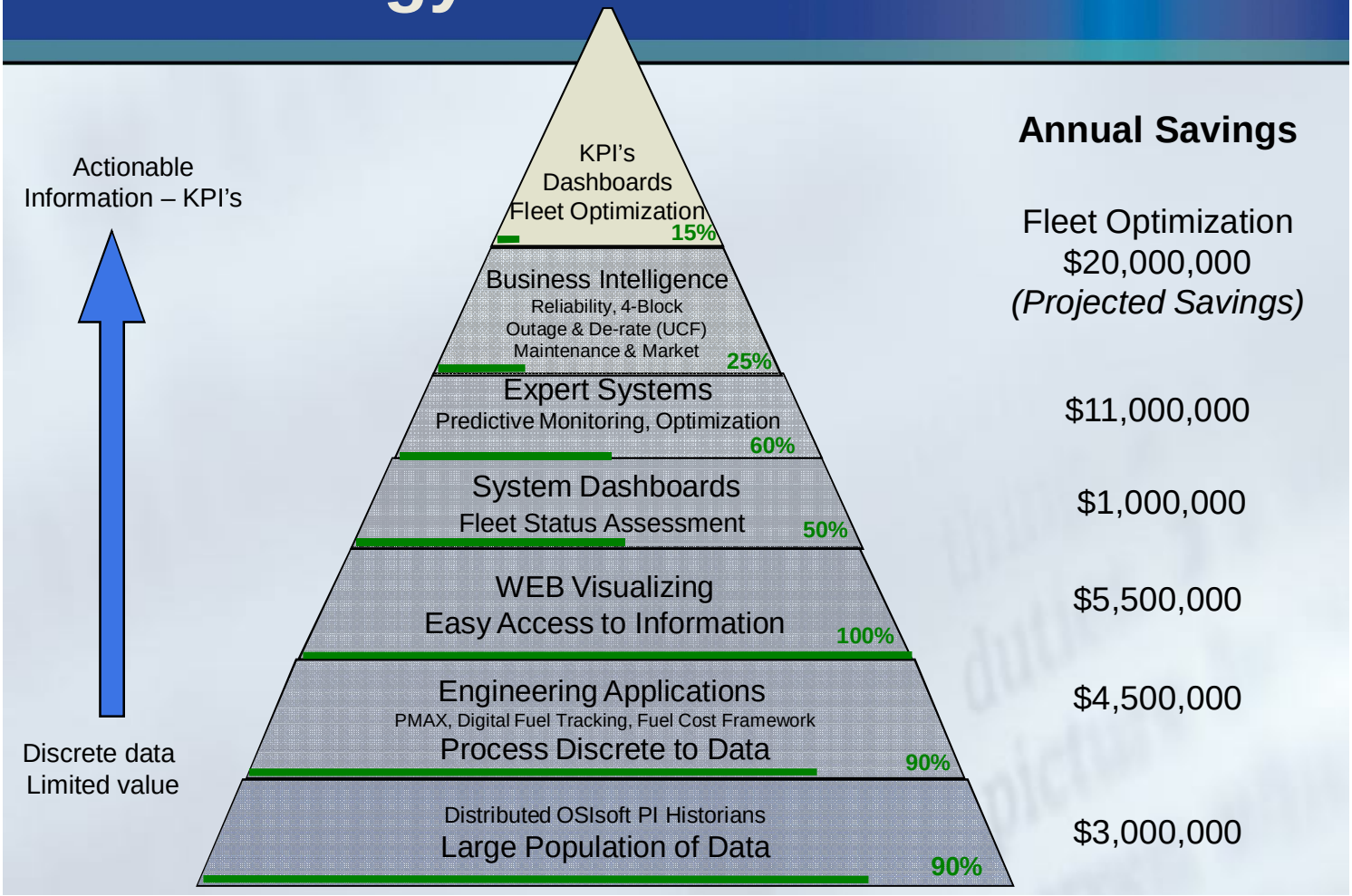
- Combustion Optimization – NeuCo
  - Startup on St Clair Unit 7
  - Installation in progress on Belle River 2
  - Planned for Monroe Units 1-4

$330,000/unit Annual Savings!

OSIsoft.

VALUE NOW, VALUE OVER TIME

Technology Framework



Annual Savings

Fleet Optimization
$20,000,000
(Projected Savings)

$11,000,000

$1,000,000

$5,500,000

$4,500,000

$3,000,000

Unit Capacity Framework (UCF)

Process Flow

Day Ahead

Real Time

Power Plants

Performance Center

Merchant Center

Market

Midwest ISO
We manage power.

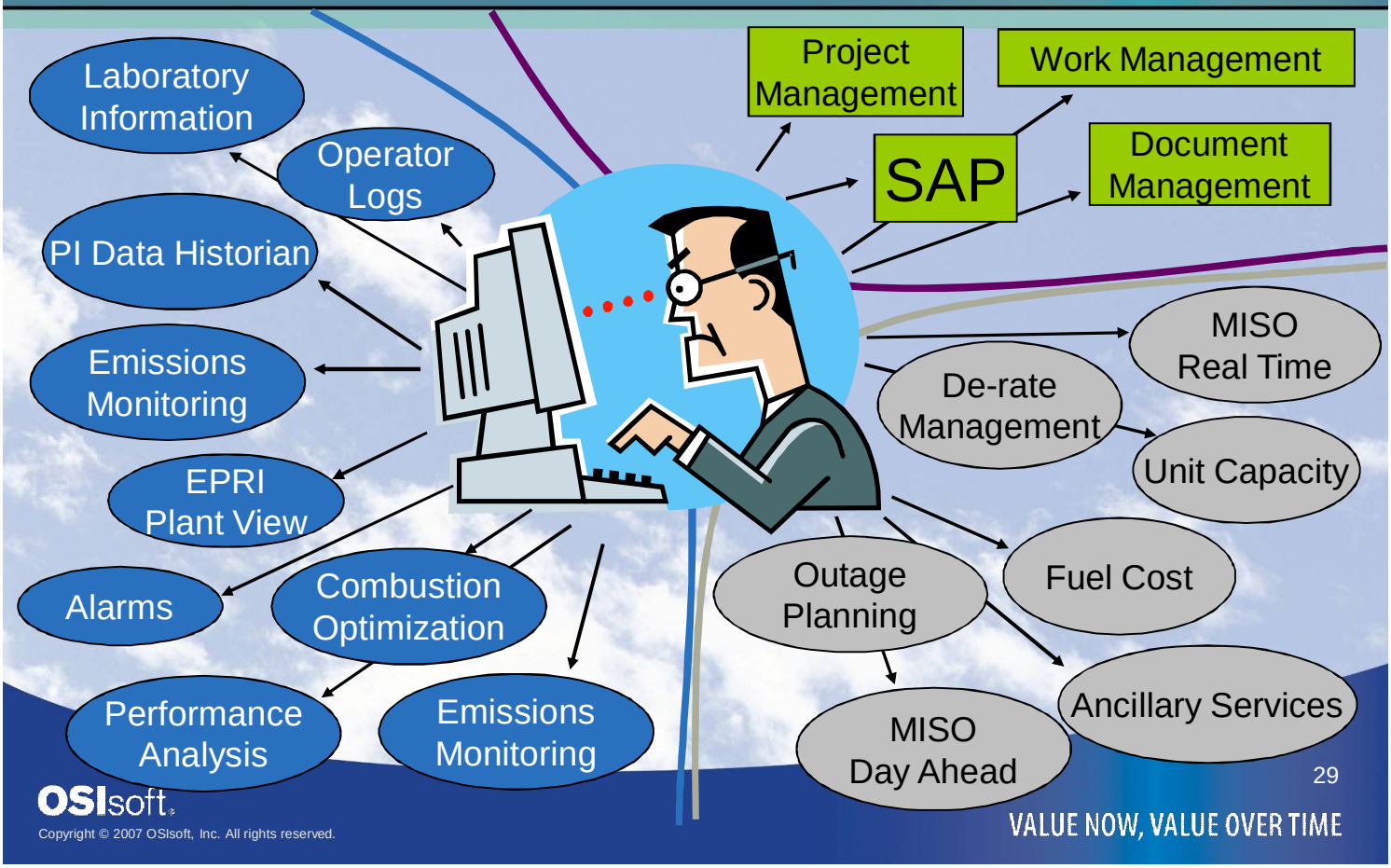
Market Strategy

Market Feedback

OSIsoft.

VALUE NOW, VALUE OVER TIME

No Shortage of Information!



OSIsoft.

VALUE NOW, VALUE OVER TIME

Analysis Framework

Standard GUI
Single Method

Analysis Framework:
Integrated applications environment: Consistent framework for data, analysis, reporting and consistent user graphical interface.

- PI Data Historian
- EPRI Plant View
- Emissions Monitoring
- Alarms
- Operator Logs
- Laboratory Information
- Performance Analysis
- Emissions Monitoring
- Combustion Optimization

- Work Management
- Project Management
- Document Management
- SAP

- MISO Real Time
- De-rate Management
- Unit Capacity
- Outage Planning
- MISO Day Ahead
- Fuel Cost
- Ancillary Services

OSIsoft.

VALUE NOW, VALUE OVER TIME

Process Cost Drill Down

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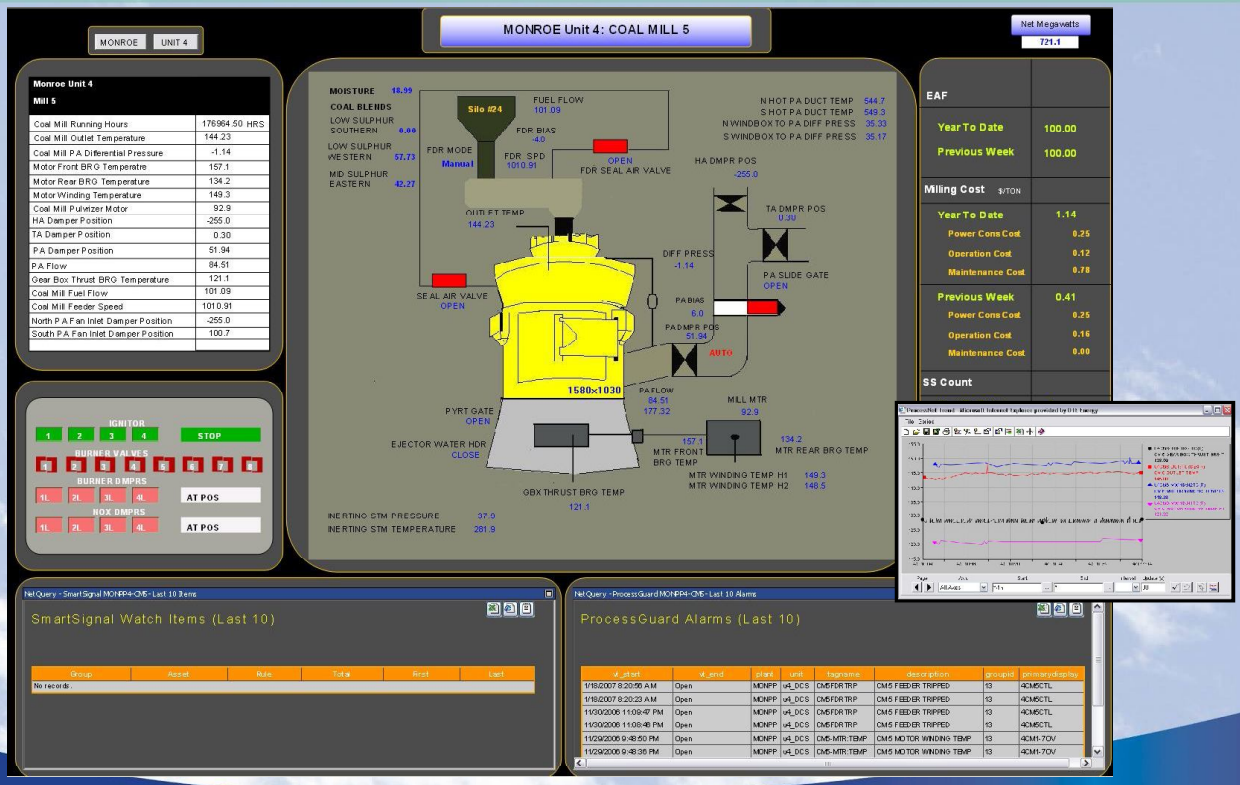
VALUE NOW, VALUE OVER TIME

Expanded System Dashboard



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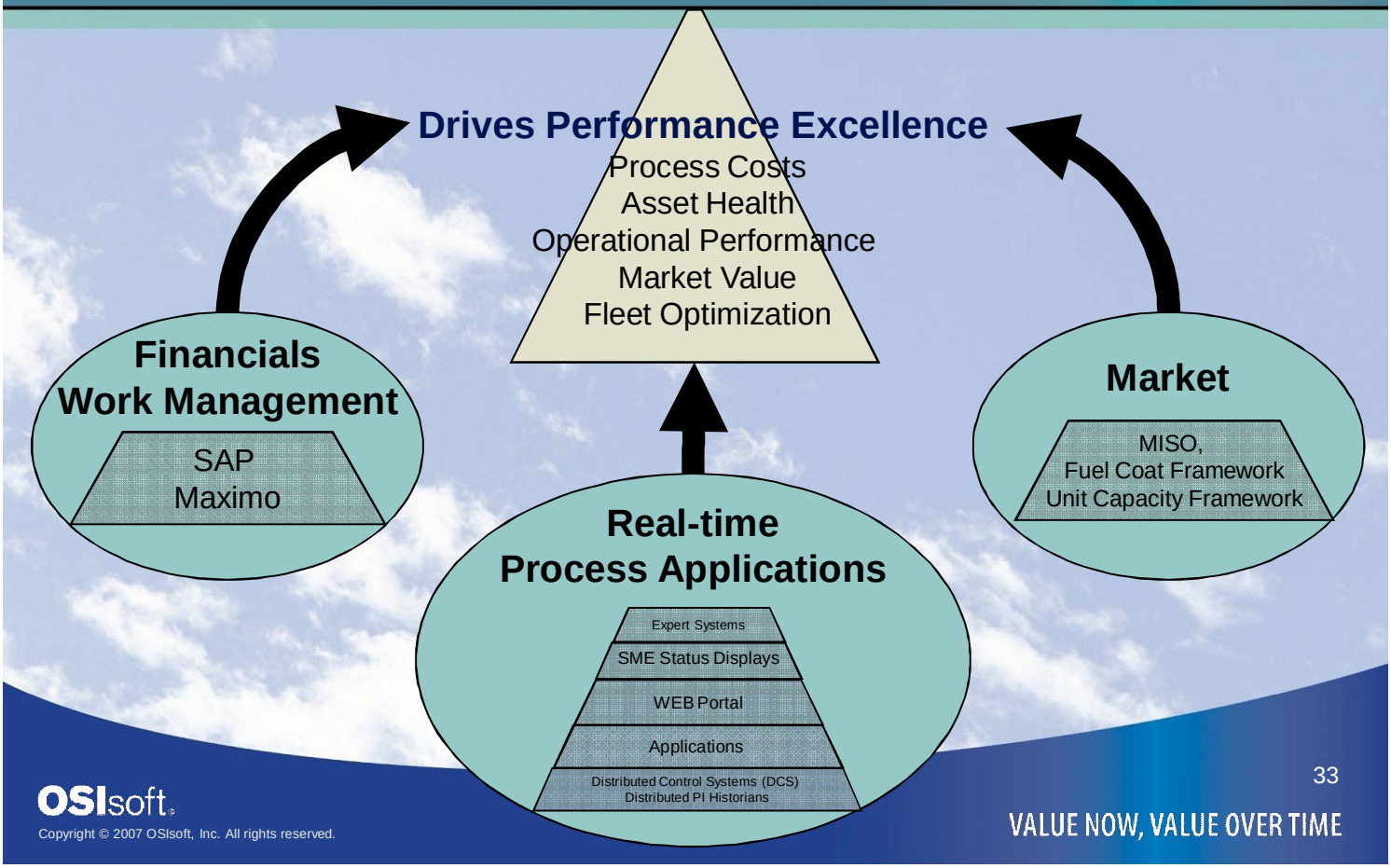
VALUE NOW, VALUE OVER TIME

Total Fleet Management



OSIsoft.

VALUE NOW, VALUE OVER TIME

POWER & UTILITIES

The Value of Real time

Pertamina Downstream

Assets

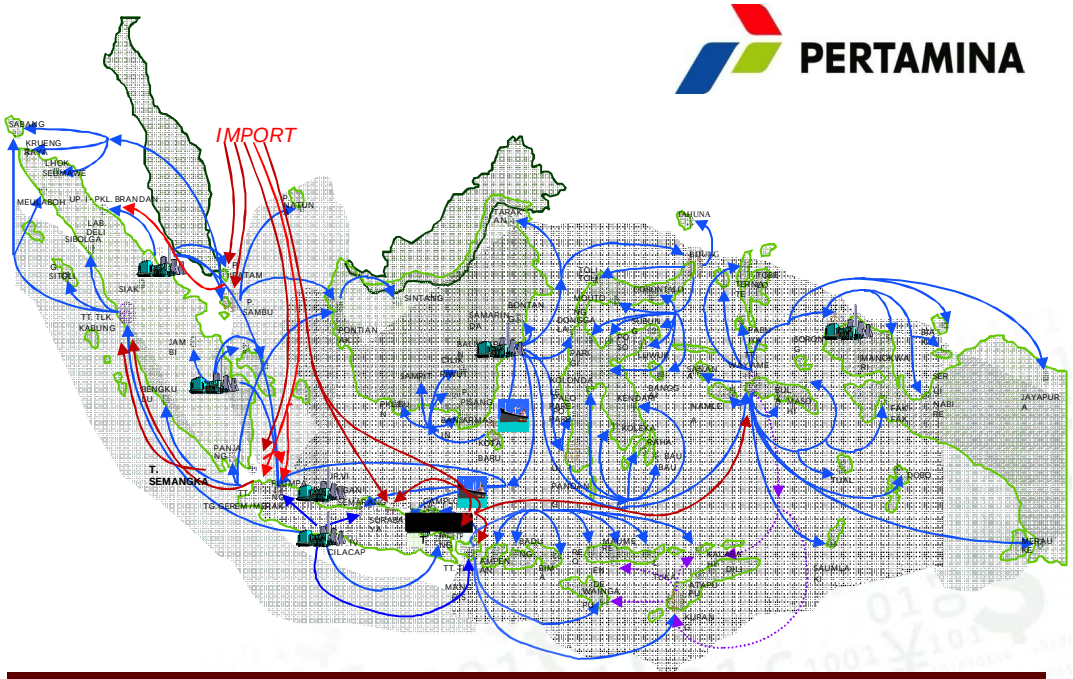
6 Refineries :
1,034 Million bbl/day

120 + Depots

98 Vessels

3,400 Fuel Stations

Sales Volume :
1,200 Million bbl/day
(92 % Market Share)



PERTAMINA

One of the most complex Downstream Supply Chains in the world

CHALLENGE / PROBLEM DETAILS (early 2007)

Process, People, Structure

- Business process based on functional units, planning based on functional target, no one is accountable for downstream margin.
- “Legacy” structure, rigid interfaces between Refining & Marketing, creating silos within the organization.
- No single point of coordination for Supply operations.

Systems

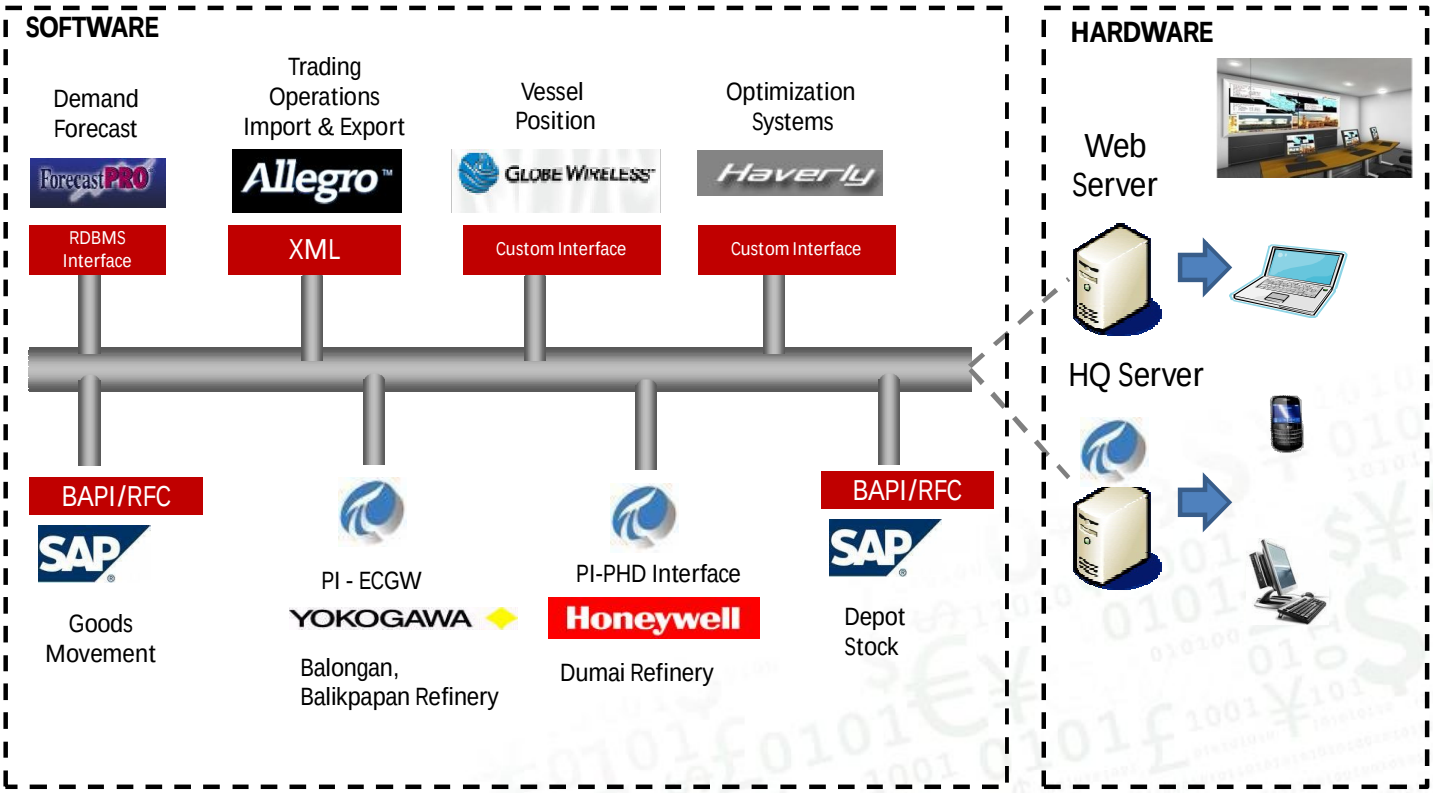
- Lack of integrated system for planning optimization and scheduling
- No coherent single view of downstream timely operational data
- Unable to track Plan vs Actual

Integrated Downstream Dashboard

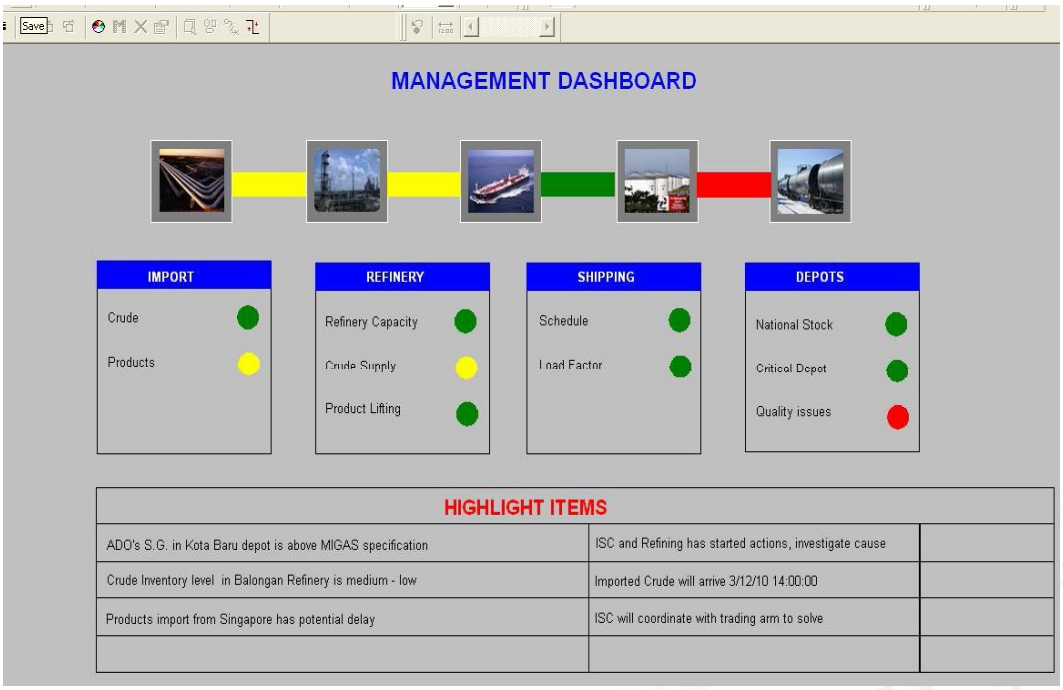
Objectives :

- Consistent single view of entire downstream supply chain
- Integrated real time data from Crude Purchases to Secondary Distribution
- Decision making support (normal operations, supply chain disruptions)

Integration Architecture



Main Dashboard Display



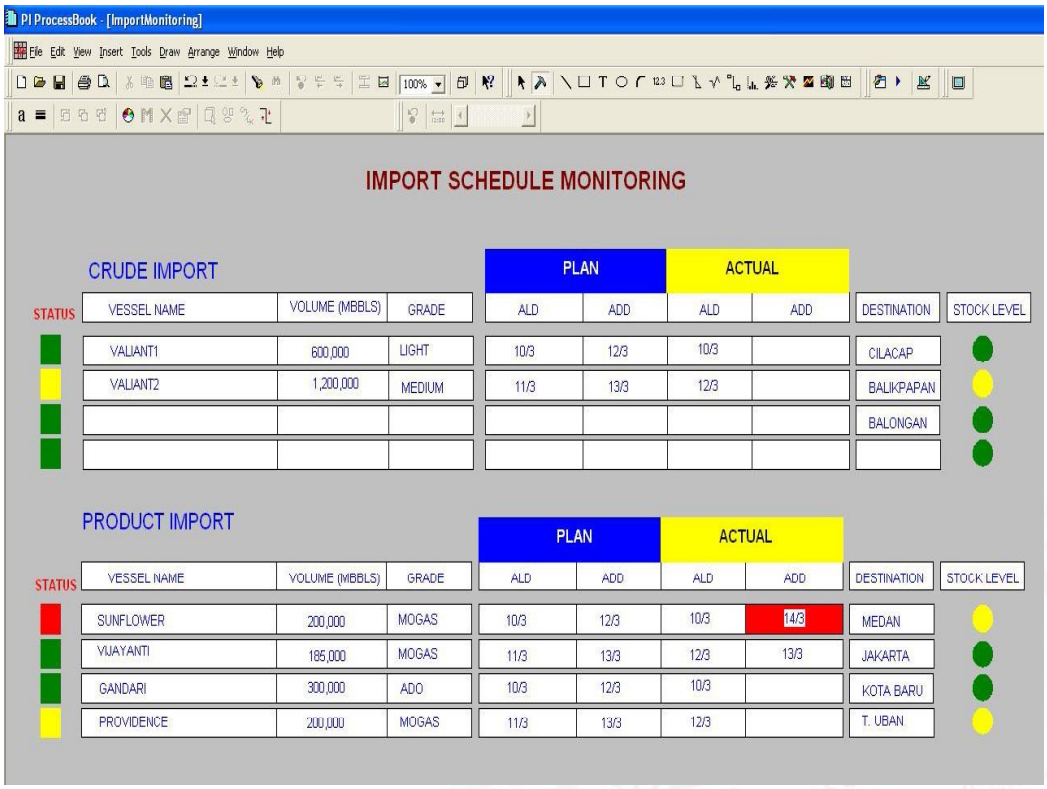
Objective

- Management view of Entire Supply Chain

Features

- Easy to understand "traffic lights"
- Highlighted items
- Drill down capabilities

Crude and Product Imports



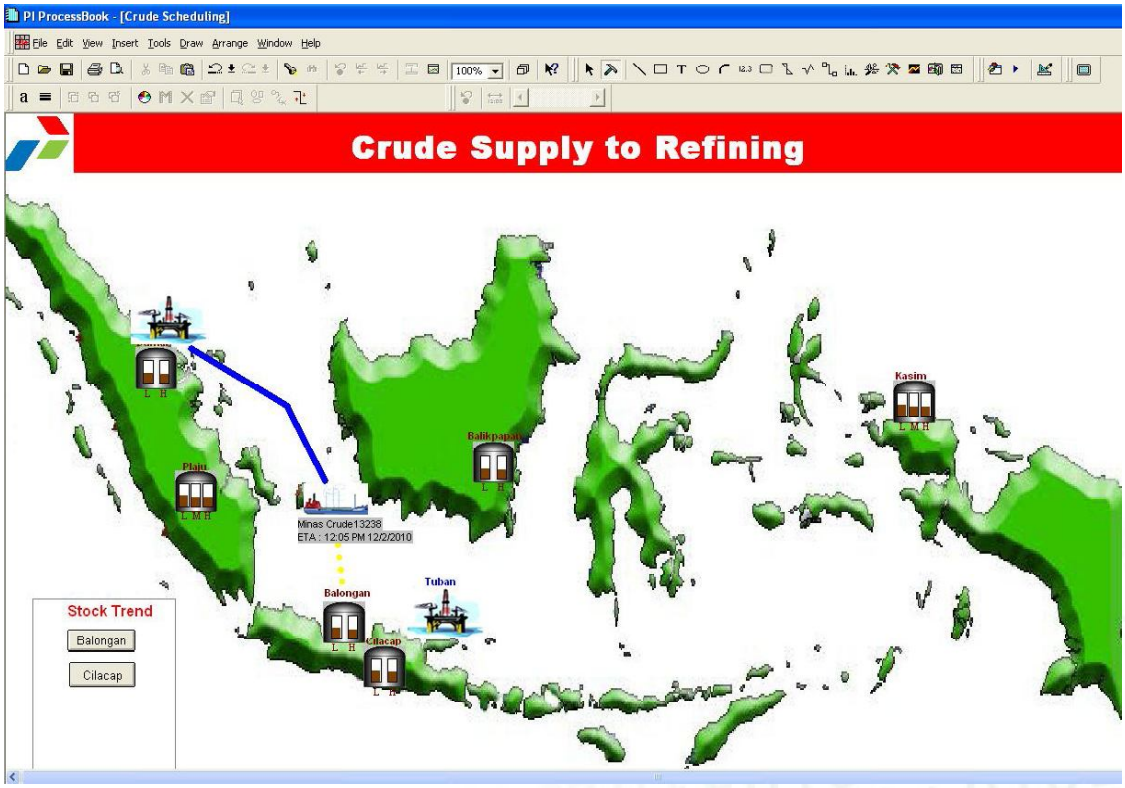
Objective

- Track Crude & Products Imports Schedule

Features

- Tracks ETA of incoming shipments
- Tankage and Jetty Availability
- Summary of committed and pending cargoes

Crude Supply to Refinery



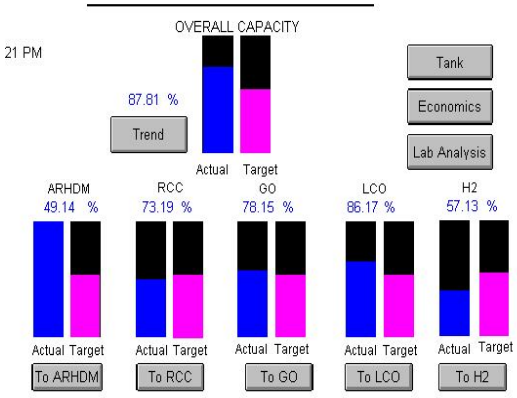
Objective

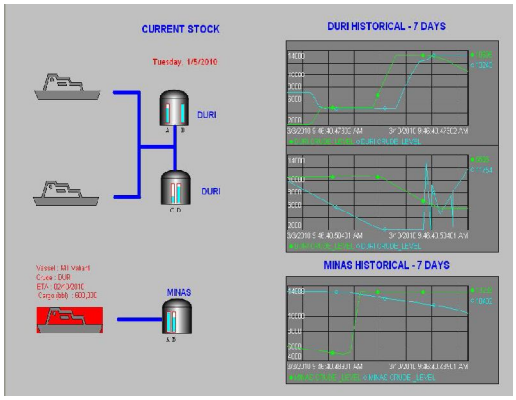
- Track shipments
- Maintain Crude stock levels

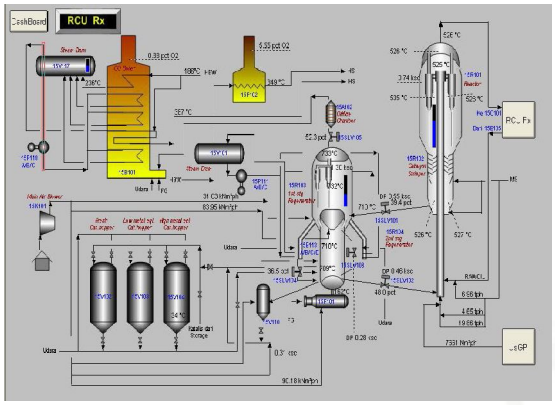
Features

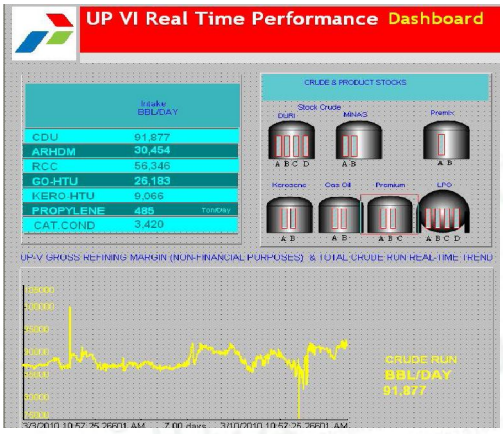
- Plan vs Actual
- Refinery upsets notification
- Vessel alarms

Refinery Operations









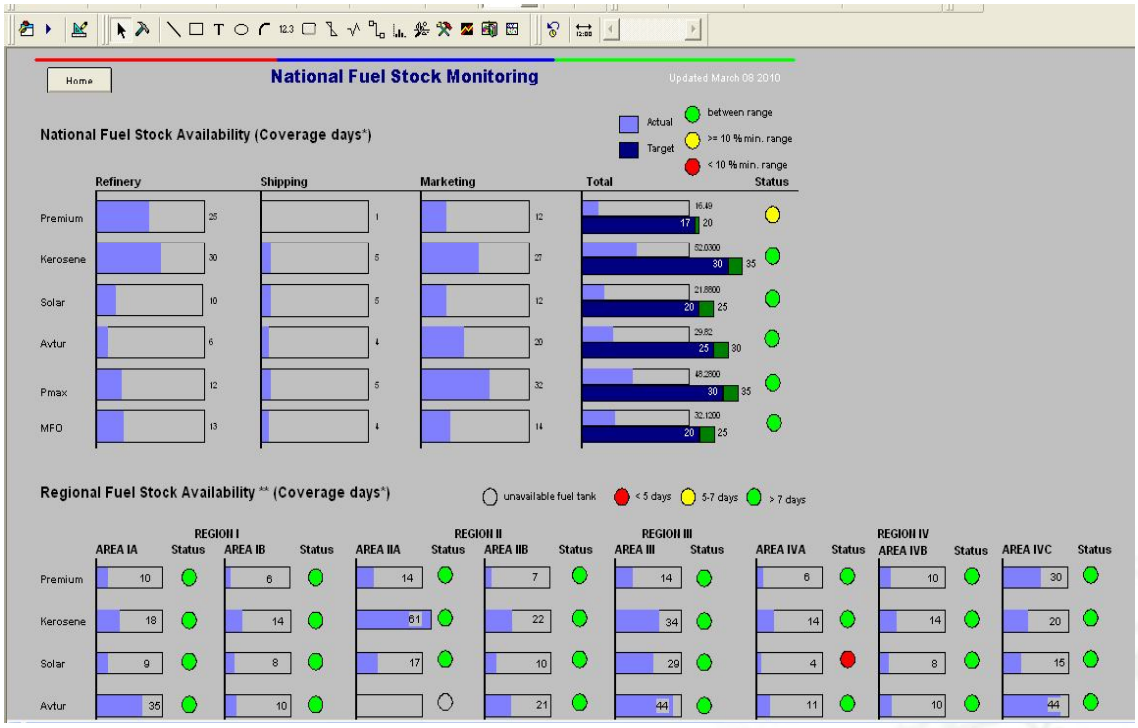
Objective

- Real time monitoring refinery operations

Features

- Plan vs Actual Production
- Stock levels of crude and finished products
- Detail DCS level view
- Refinery Problem EWS

National Stock

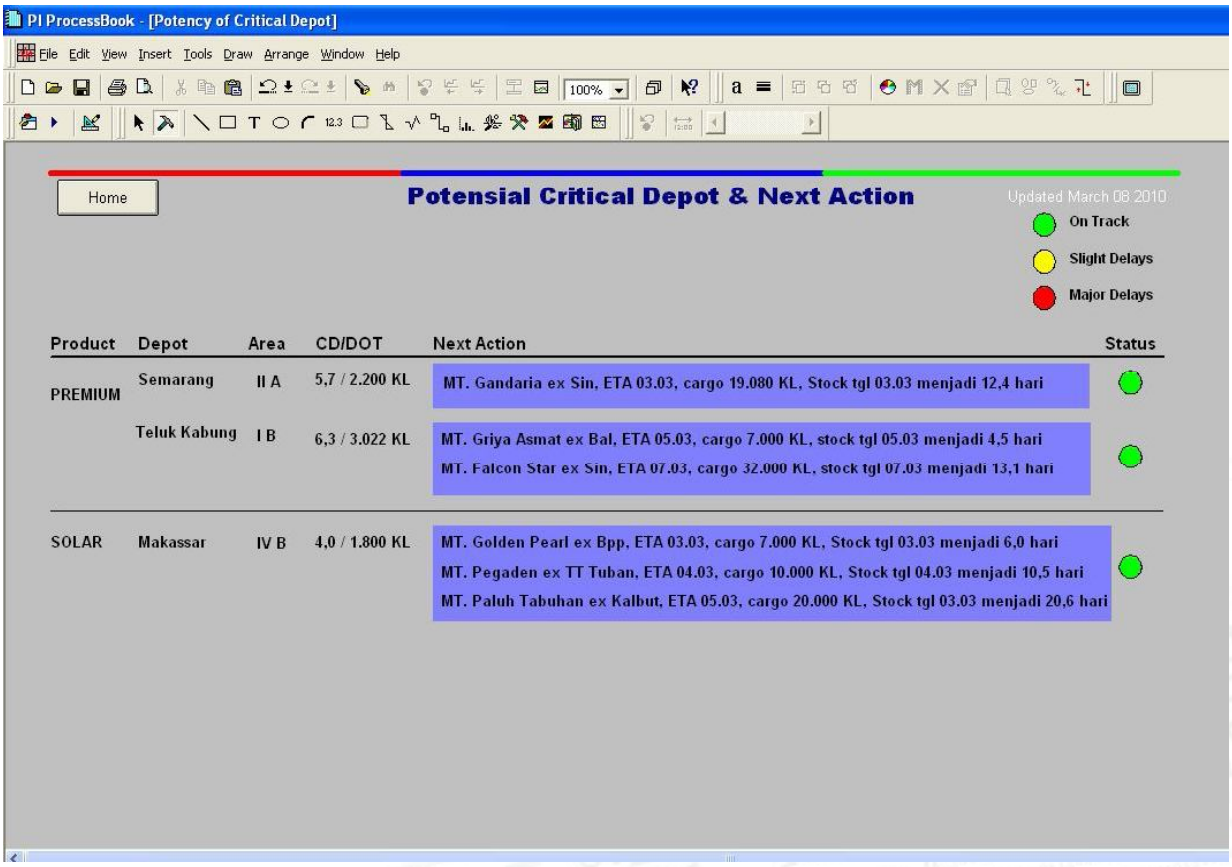


Objective

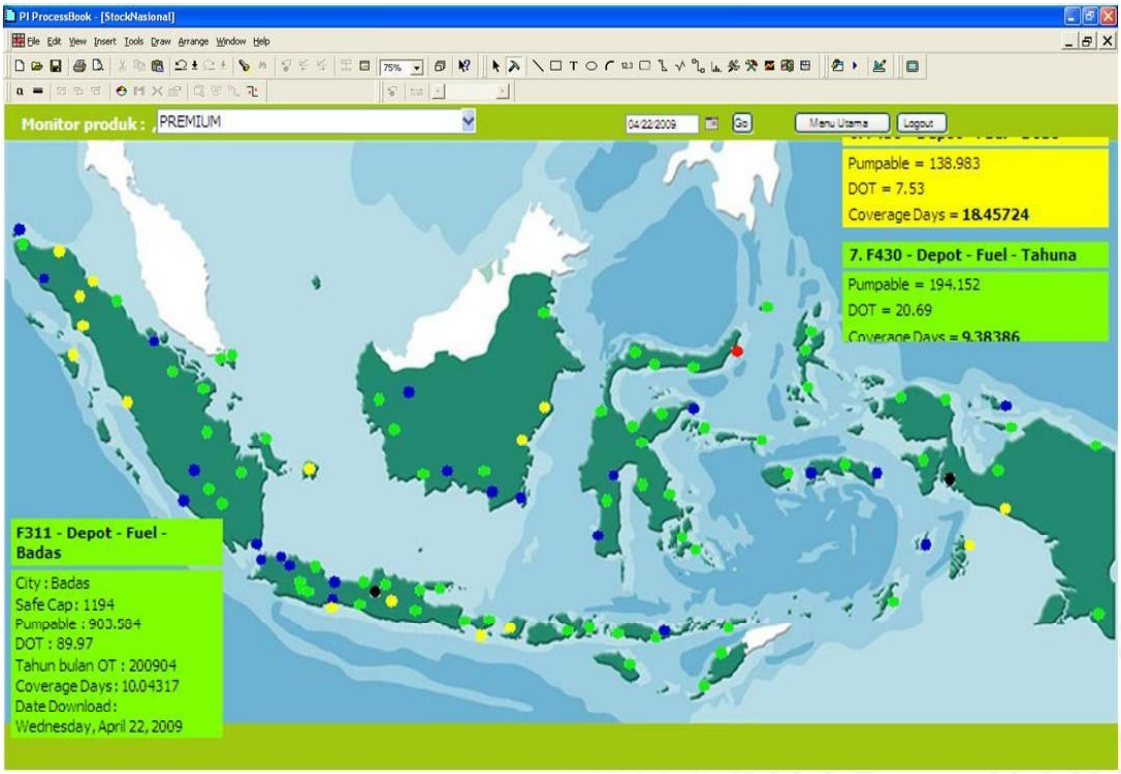
- Maintain National fuel stock levels
- Management View

Features

- Identify potential critical depots
- Actions taken
- Deviation highlights



Supply To Marketing



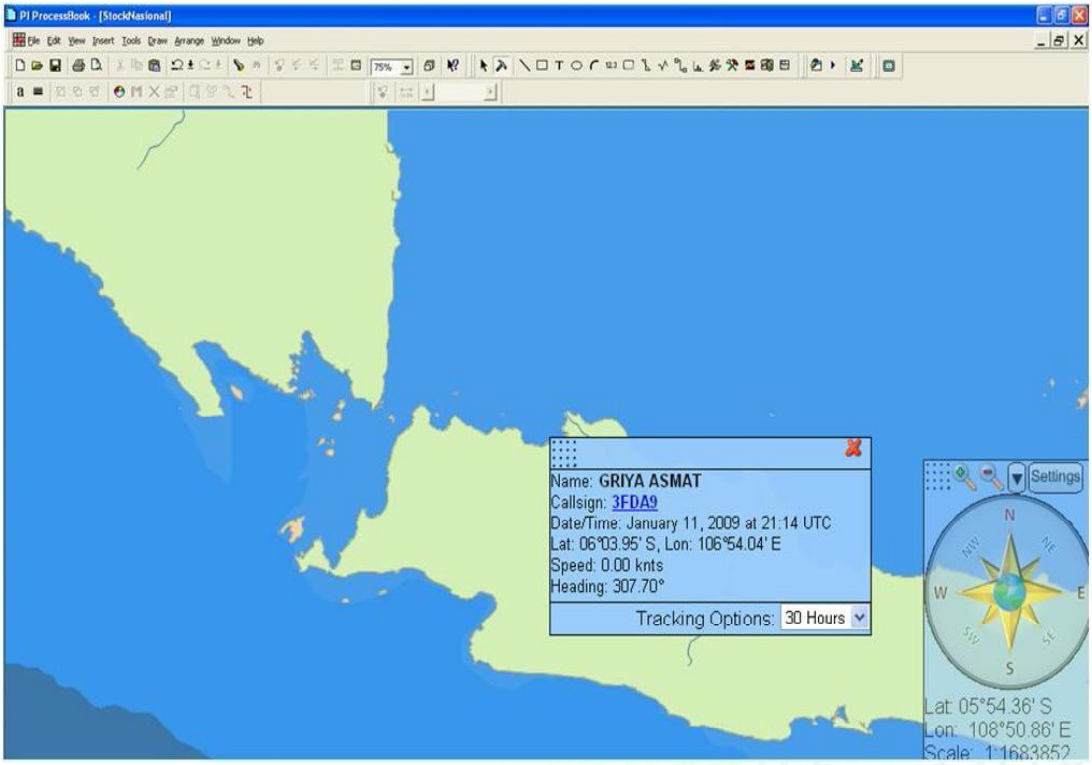
Objective

- Maintain National fuel stock levels

Features

- Identify potential critical depots
- Top 10 critical depots
- Single click to access detail depot data

Vessel Tracking



Objective

- Real time vessel position monitoring

Features

- Track Shipments
- Real time updates of ETA
- Vessel deviation highlights

Does real time data matter ?

Case Examples :

Unscheduled
Refinery shutdown

Confirm w Refinery
Total Loss Production

Check
Current Stock

Trading Arm
Confirms cargo
availability

Import
Arrived

Result

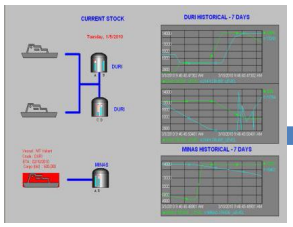
- Stock maintained, critical depots avoided
- "Prompt " cargo avoided -> **US$ 1 -2/barrel difference**

00:00 00:05 02:00 06:00 48:00

Does real time data matter ?

Case Examples :

Incoming import crude unable to unload -> no ullage



Coordinate with other Refineries

Check Refinery Stock & Economics

Divert vessel

Crude Import Arrived

Result

- Imported crude unloaded & processed
- **Demurrage avoided (US$ 40-50,000/day)**

00:00 02:00 05:00 07:30 36:00

SUMMARY – Integrated Downstream Dashboard

	BEFORE - 2007	AFTER - 2009
Working Environment	4 Operating Group, Separate floors	Single floor, in Control Room
Planning process	Functional Silos	Integrated planning and operations from end to end
Data Timeliness	Outdated, not synchronized data	Real time and near real time data
Data Visibility	Limited view of supply chain data	Single coherent view
Monitoring tools	Manual monitoring - Excel	Track plan vs actual through Processbook, Web

BENEFITS

Tangible Benefits

- National stocks maintained at optimal level
- Reduced Critical Depots (stock outs) by 65 %
- Reduced Demurrage by 40 %
- Better loss monitoring & control

US$ 25 – 30 Million/Year

Intangible Benefits

- Better Team Work & Coordination
- Better Decision Making
- Faster response to supply chain problems
- Integrated end to end downstream visibility

"Downstream First" Mindset

Conclusions:

- Fleet Management requires a robust real-time data infrastructure as a *pre-requisite*
- *The Data Infrastructure should be*
  - Highly Available
  - Scalable
  - Extensible
  - Flexible
  - Portable
  - Secure
  - Usable