DTE Energy

Fleet Optimization
……. through Process Controls & Technology

Presented by **Sumanth K. Makunur**

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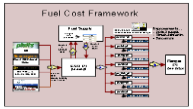
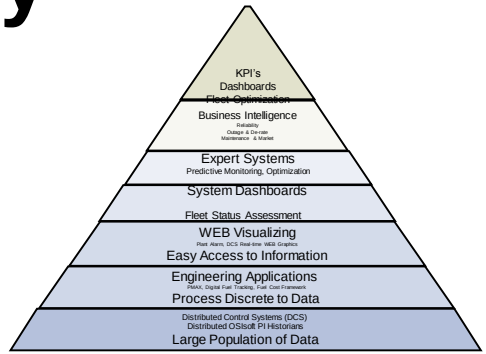
Today's Agenda

Process Controls & Technology

- Control & Technology Framework
- Application Examples
- Work in Progress
- Successes
- Questions & Discussion





PI Asset Framework

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

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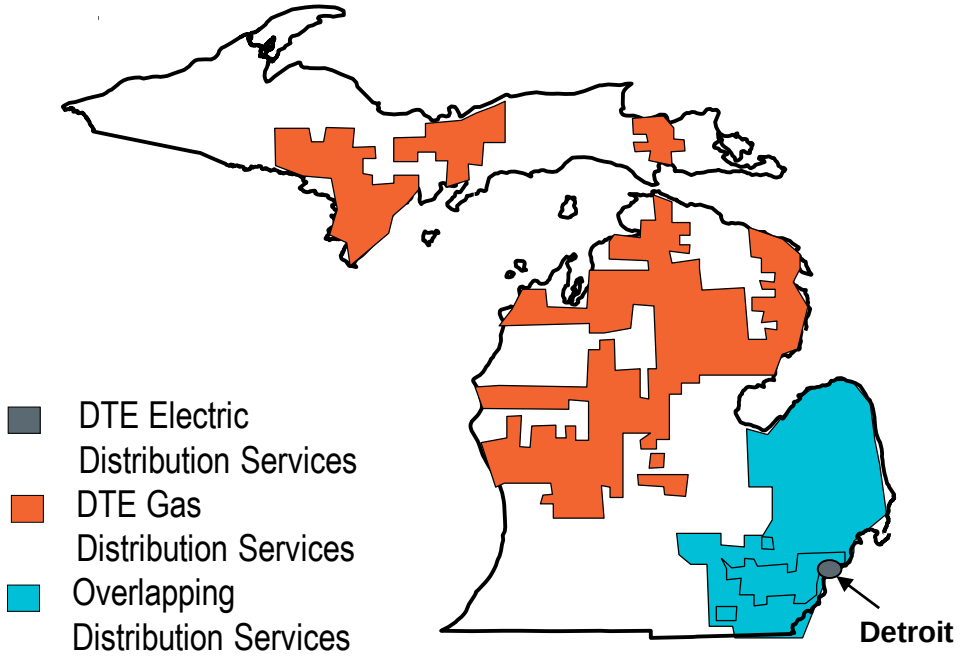
Profile of DTE Utility Business



DTE Electric

- Ninth largest electric utility in the U.S. with 2.1 million customers
- Over 11,080 MW of power generation, primarily coal fired
- 54,000 GWh in electric sales
- ~$8.79 billion in revenue

DTE Gas

- Fifth largest natural gas utility in the U.S. with1.2 million customers
- 170 Bcf of gas sales
- 12% of national gas storage capacity with 124 Bcf of regulated gas storage

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Power Plants & Performance Center

Monroe – 3,135 mw

Belle River – 1,260 mw

Trenton Channel - 730 mw

Performance Center – 11,588 mw

River Rouge - 527 mw

Greenwood – 785 mw

Generating Unit	Capacity Unit	Capacity Plant
Belle River 1	625	
Belle River 2	635	
Belle River		**1260**
Conners Creek 15	135	
Conners Creek 16	100	
Conners Creek		**235**
Fermi 2	**1110**	**1110**
Greenwood 1	**785**	**785**
Trenton Channel		**766**
Peakers	**1224**	**1224**
Totals:	**10554**	**10554**

Expanding Renewable Portfolio

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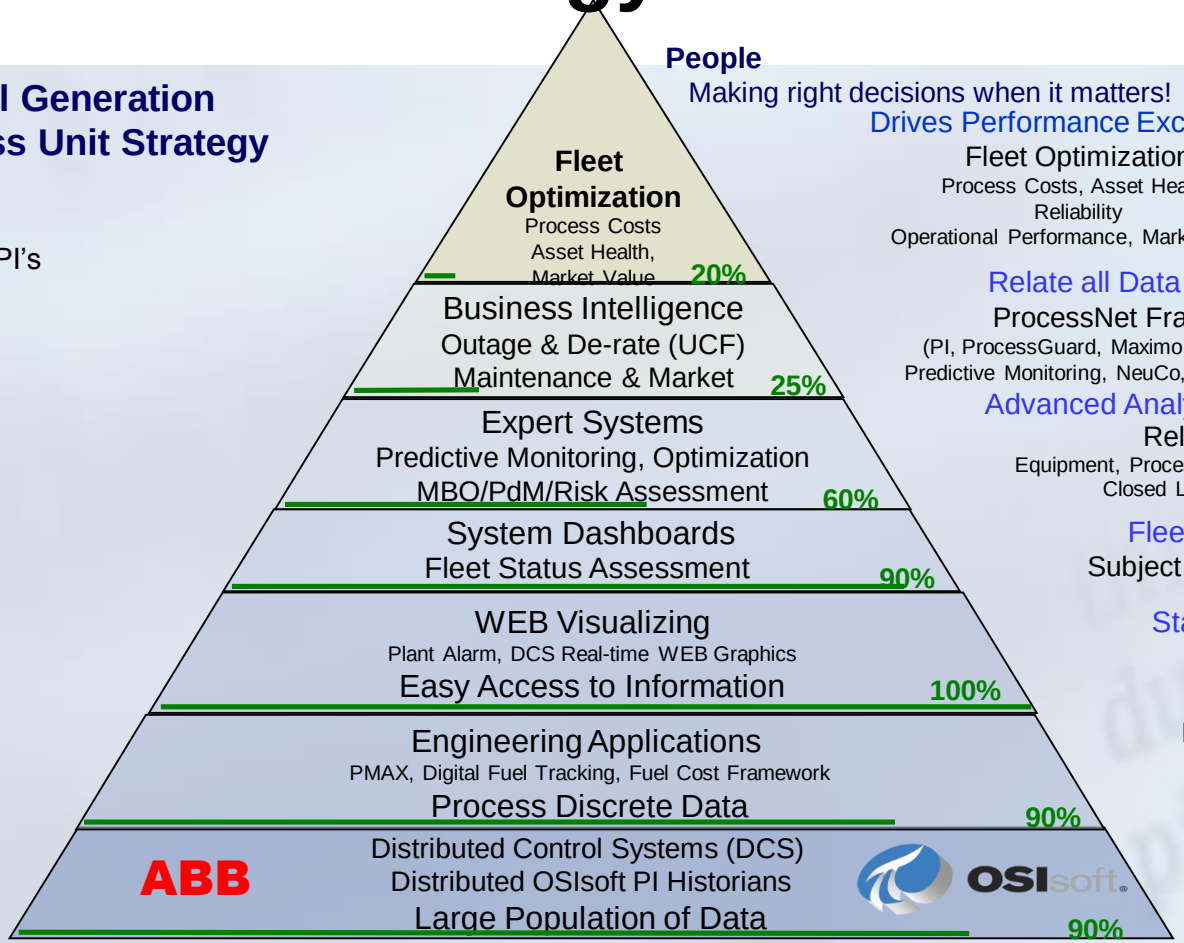
Control & Technology Framework

Fossil Generation
Business Unit Strategy

Actionable Information – KPI's

Discrete data
Limited value



People
Making right decisions when it matters!

Drives Performance Excellence
Fleet Optimization
Process Costs, Asset Health, Reliability
Operational Performance, Market Value

Relate all Data Sources
ProcessNet Framework
(PI, ProcessGuard, Maximo, SAP, UCF, P3M, Predictive Monitoring, NeuCo, LIMS, Plant View ..)

Advanced Analysis & Process Optimization
Reliability Academy
Equipment, Process, Performance, Reliability Models
Closed Loop Process Optimization

Fleet Drill down
Subject Matter Experts

Standard User Interface
WEB Visualization

Process Discrete Data
Engineering Applications
PMAX, DFTS, eNote, Fuel Cost Framework, Alarm Management

Post Event Analysis
DCS, PLC & PI

% Complete

The Performance Center

The Door into the Fleet

Performance Center – Mission

Equipment Performance Optimization of the Fossil Generation Portfolio through continuous "real time and **predictive** asset **condition monitoring**" to maximize the asset **market value**.

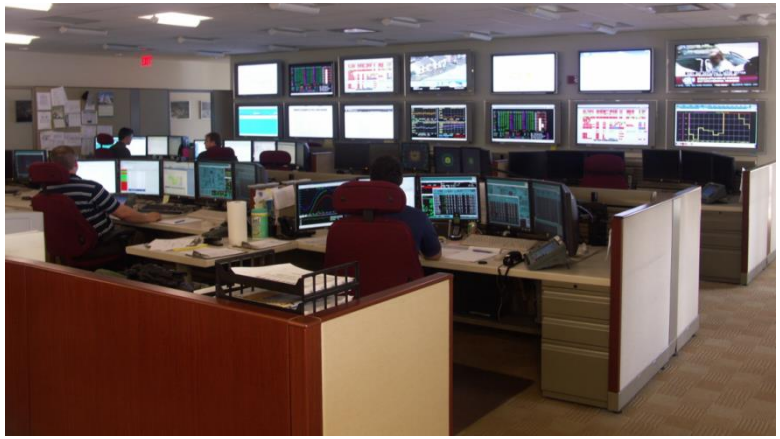
Performance Center – Vision

Fossil Generation's Fleet-wide "**Mission Control Center**" for continuous **monitoring** and **optimization** of plant equipment performance

Operating View of Fleet

- Drives consistent practices (UCF)
- Market interface w/MOC
- Proficient users of technology
- SME rotation mutually beneficial
- Reliability tools (SmartSignal & Plant View)
- Input in the budget process

Virtual Control Room - 23 Units



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Control & Technology Framework

Fossil Generation
Business Unit Strategy

Actionable
Information – KPI's

Discrete data
Limited value

ABB

Distributed Control Systems (DCS)
Distributed OSIsoft PI Historians
Large Population of Data

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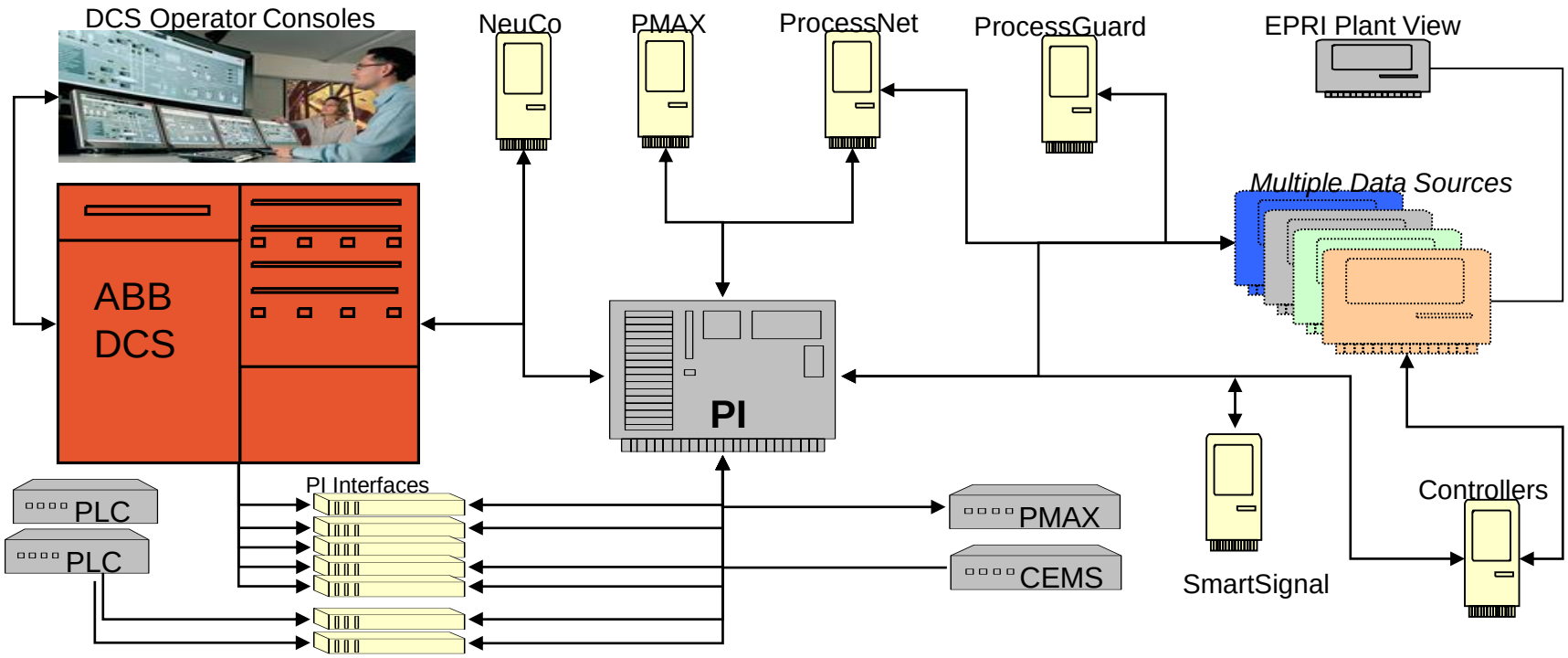
Control & Technology Infrastructure – Plants



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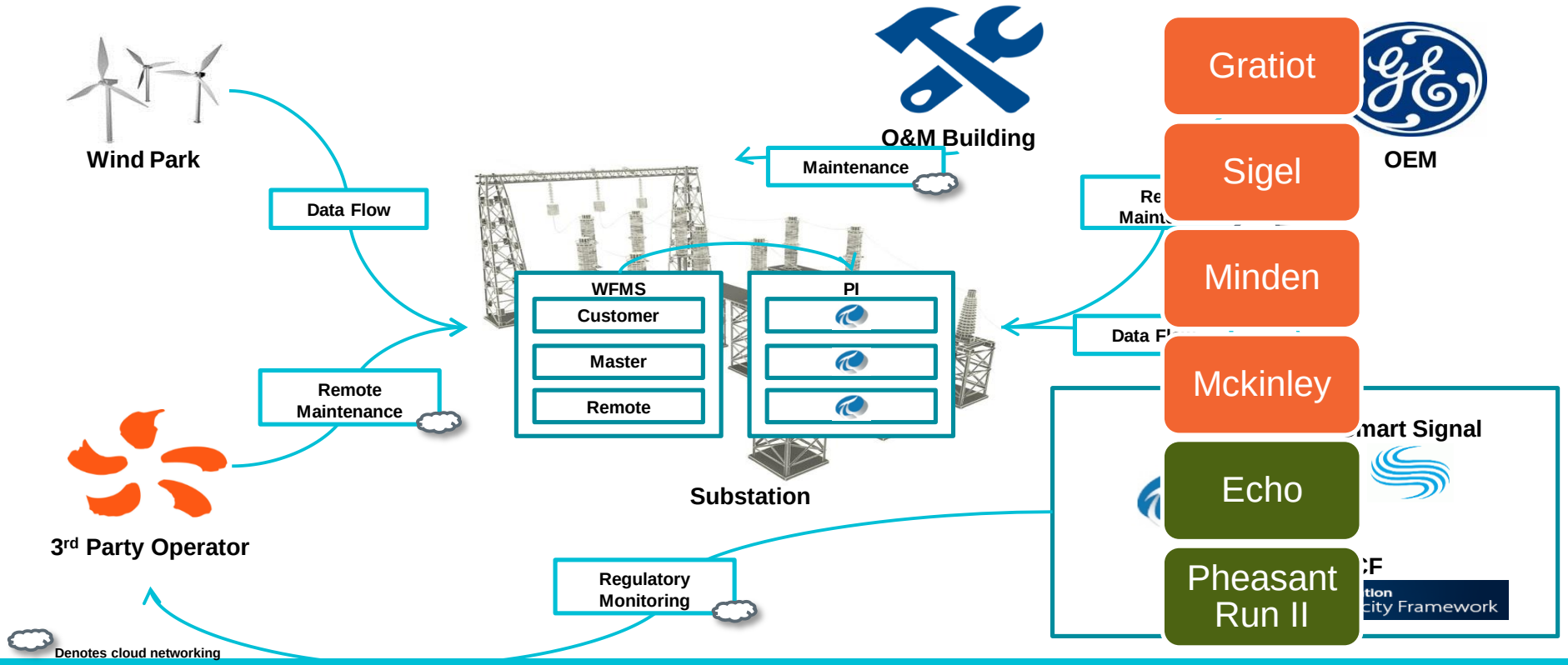
Control & Technology Infrastructure – Wind Parks



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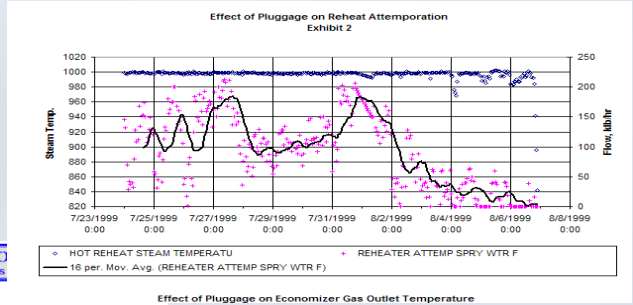
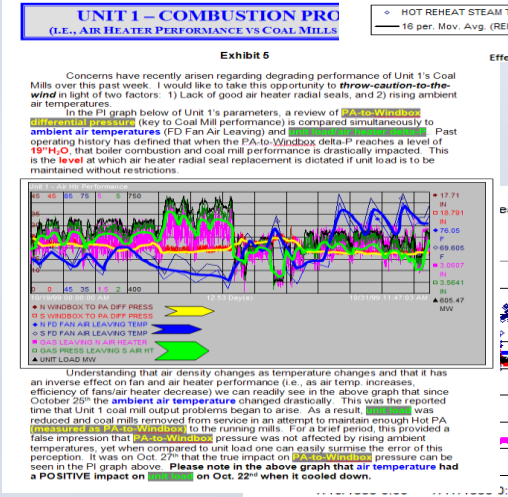
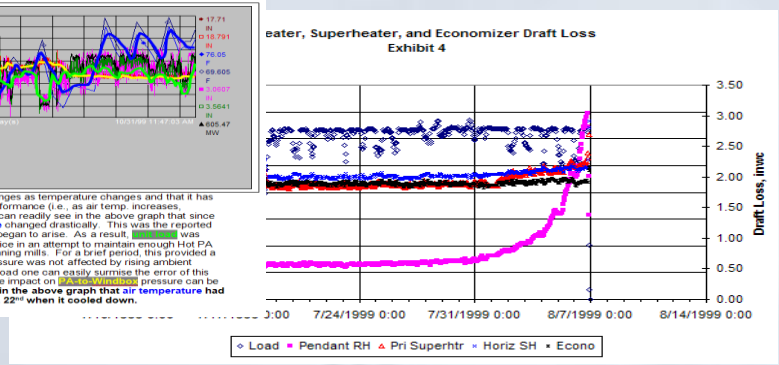
Raw PI Data Analysis

PI Yields Benefits

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

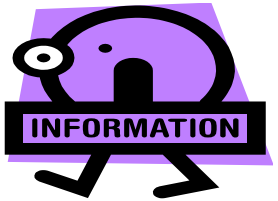






Challenge - Process Data Everywhere!

- **DCS** installations on nearly every unit
- Over **1,000,00** process data tags
  - PI Systems at each plant (~20 PI collectives)
  - PI Interfaces to DCS & many PLC's
- What is that **data screaming** at us?
- How do you effectively **utilize** the data?
- How do you turn data into **information**?



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Control & Technology Framework

Fossil Generation
Business Unit Strategy

Actionable
Information – KPI's

Discrete data
Limited value

Engineering Applications
PMAX, Digital Fuel Tracking, Fuel Cost Framework
Process Discrete to Data
90%

ABB

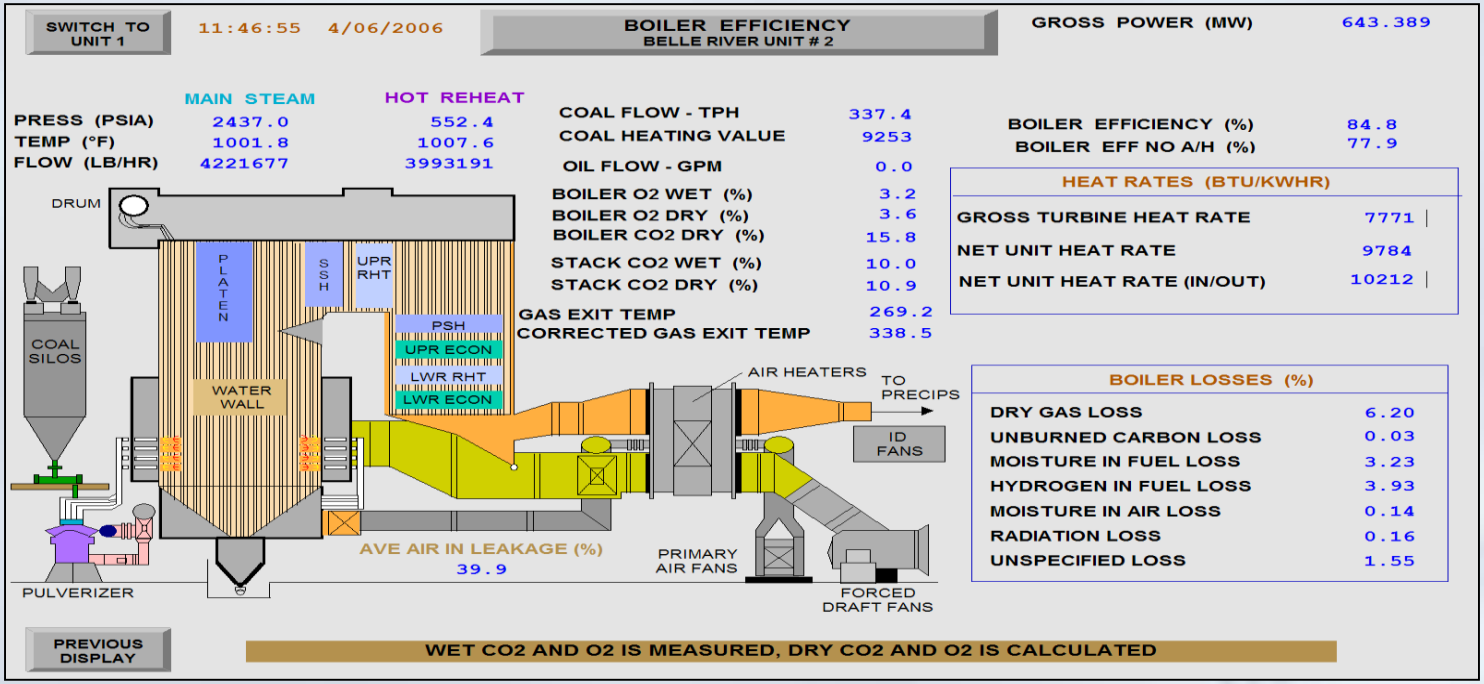
Distributed Control Systems (DCS)
Distributed OSIsoft PI Historians
Large Population of Data

OSIsoft.

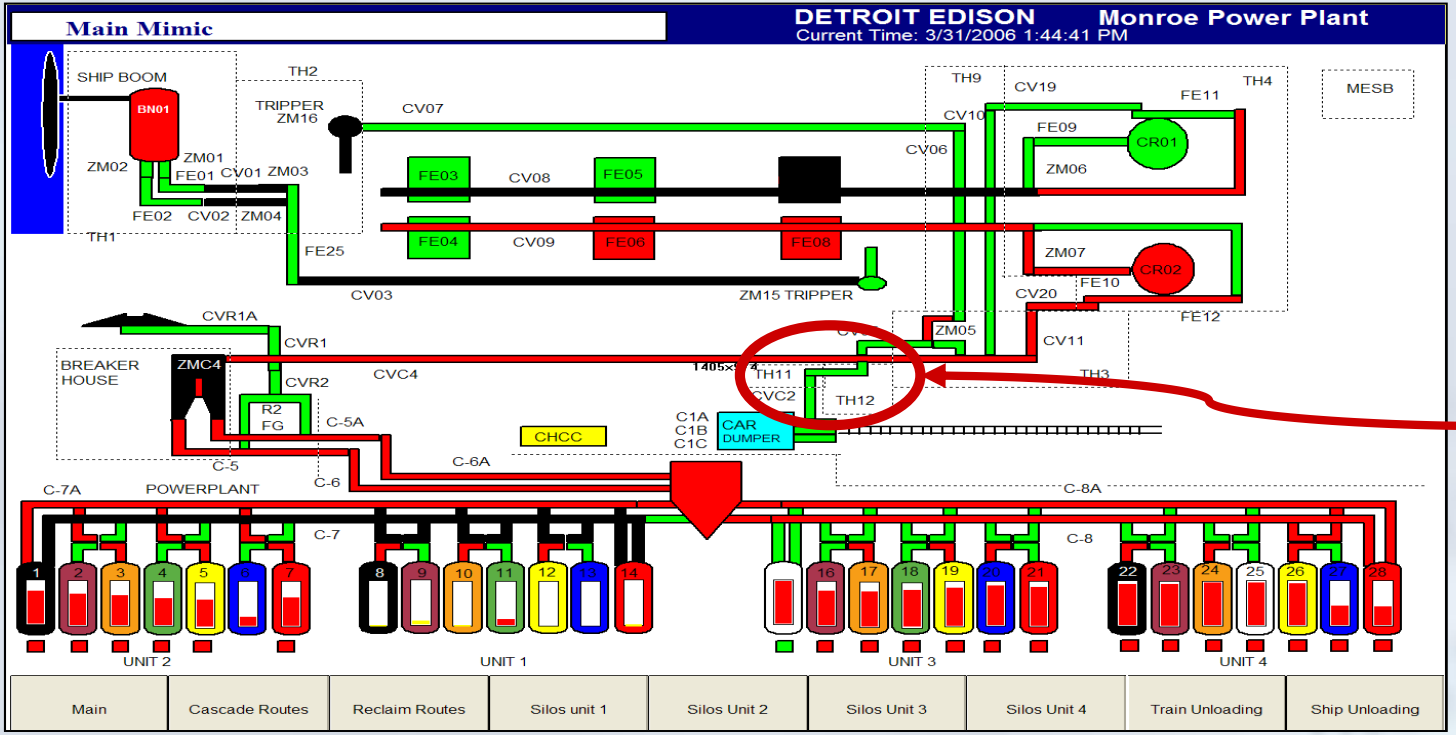
90%

Fleet Performance Analysis (PMAX)

Thermal Performance Calculation Engine

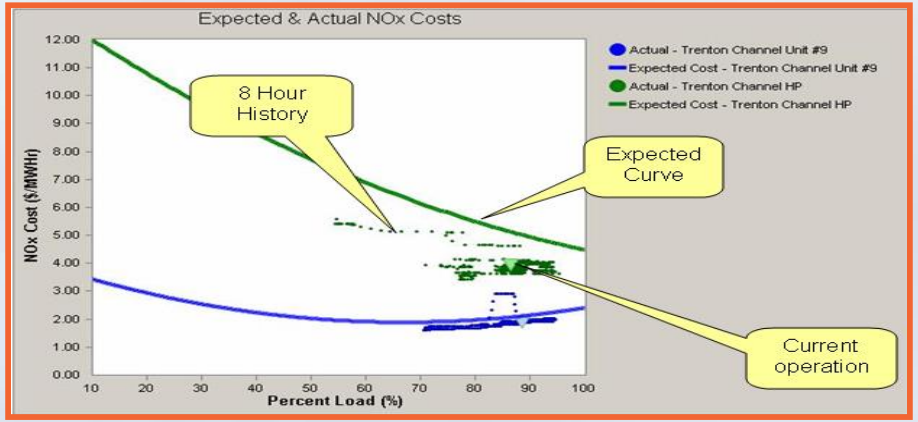


Digital Fuel Tracking System



On-line Fuel Analyzer

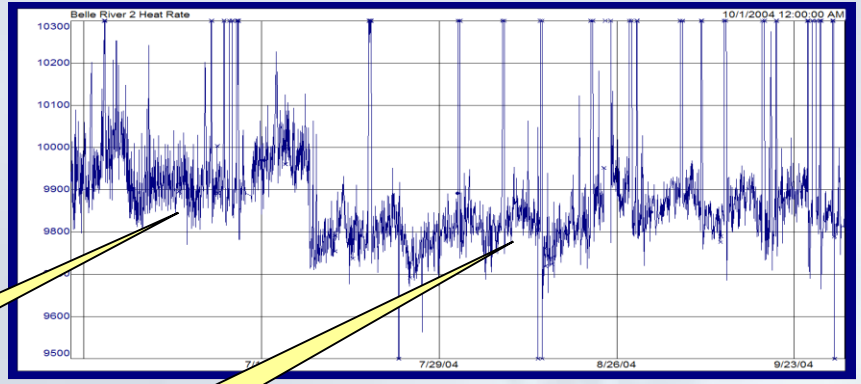
NOx Emissions Strategy



NOx Reduction with Improved Heatrate

Before Implementation

After Implementation



Primary focus is NOx reduction only

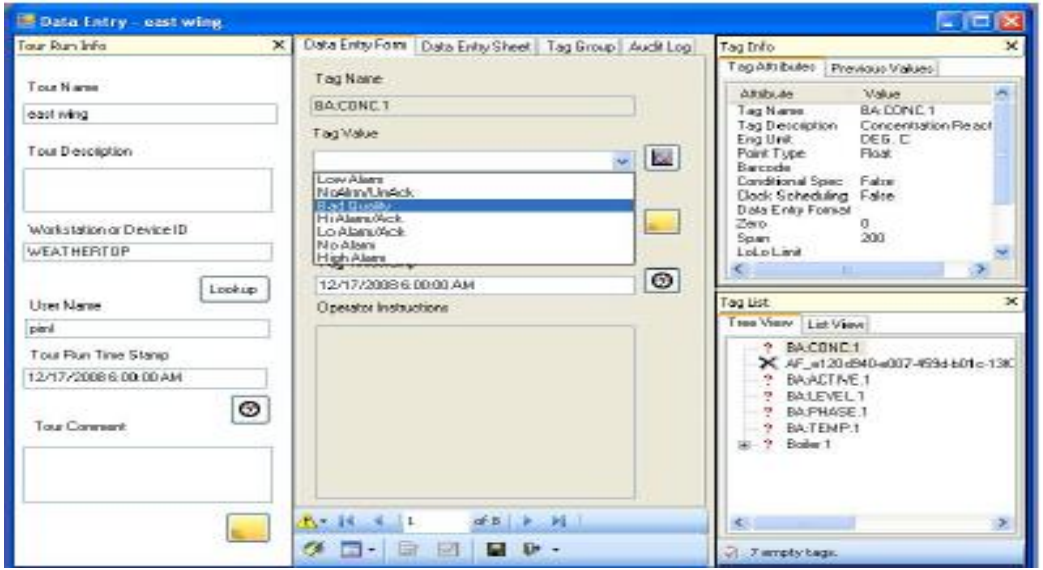
Focus on operating near NOx budget curve

Electronic Operator Rounds
RFID Technology / PI Manual Logger

RFID Tags

Industrial PDA (Symbol MC9060S)

Tablets



PI Manual Logger

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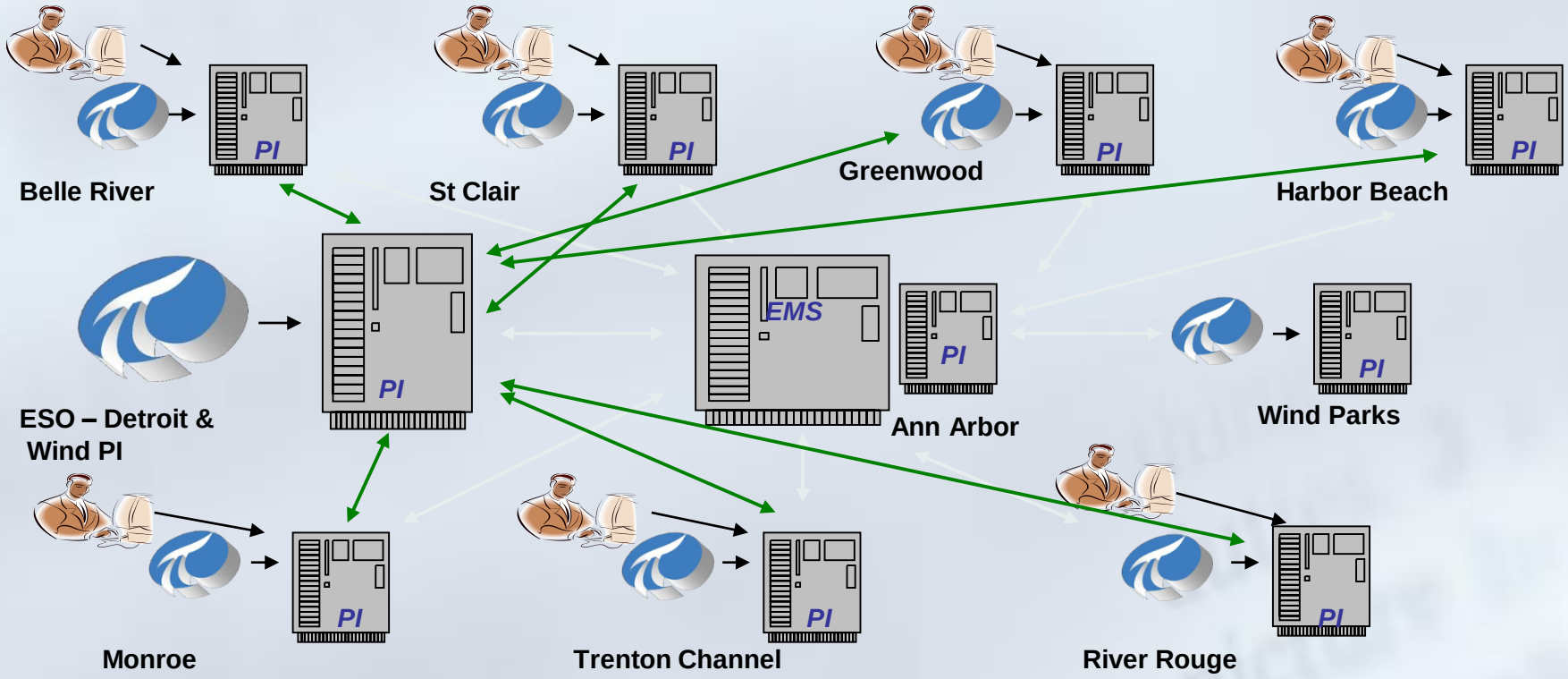
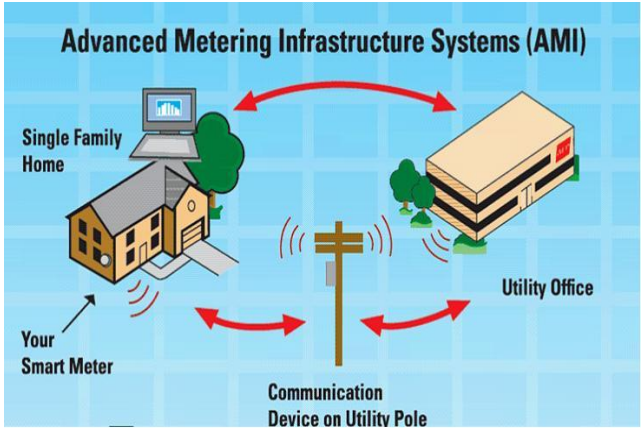
PI to PI Process Data Conduit



PI Advanced Metering Infrastructure (AMI)

- Implemented an extensive PI Infrastructure for AMI data
- MSP Interface to capture
- 8 Server PI Farm
- 1.5 Million Plus meters data
- 27 Million PI tags and growing



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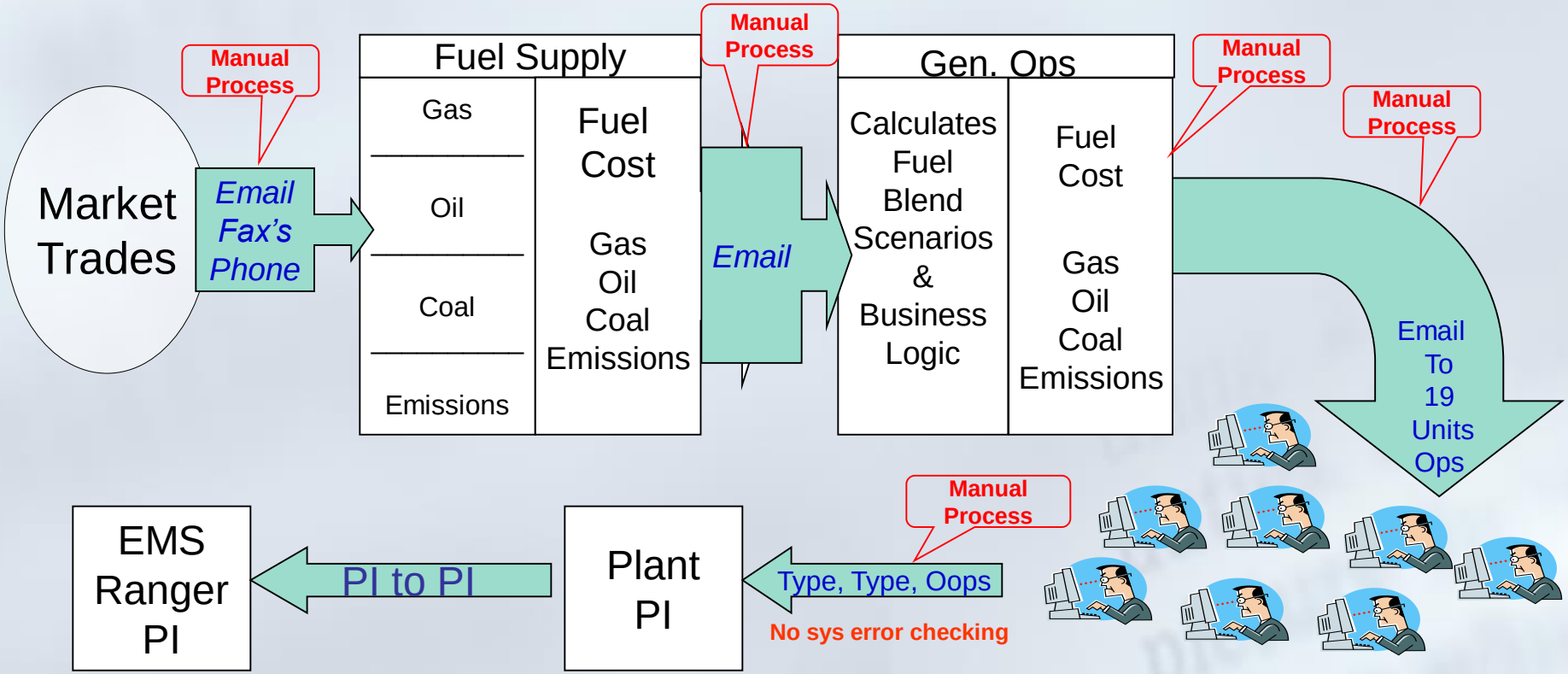
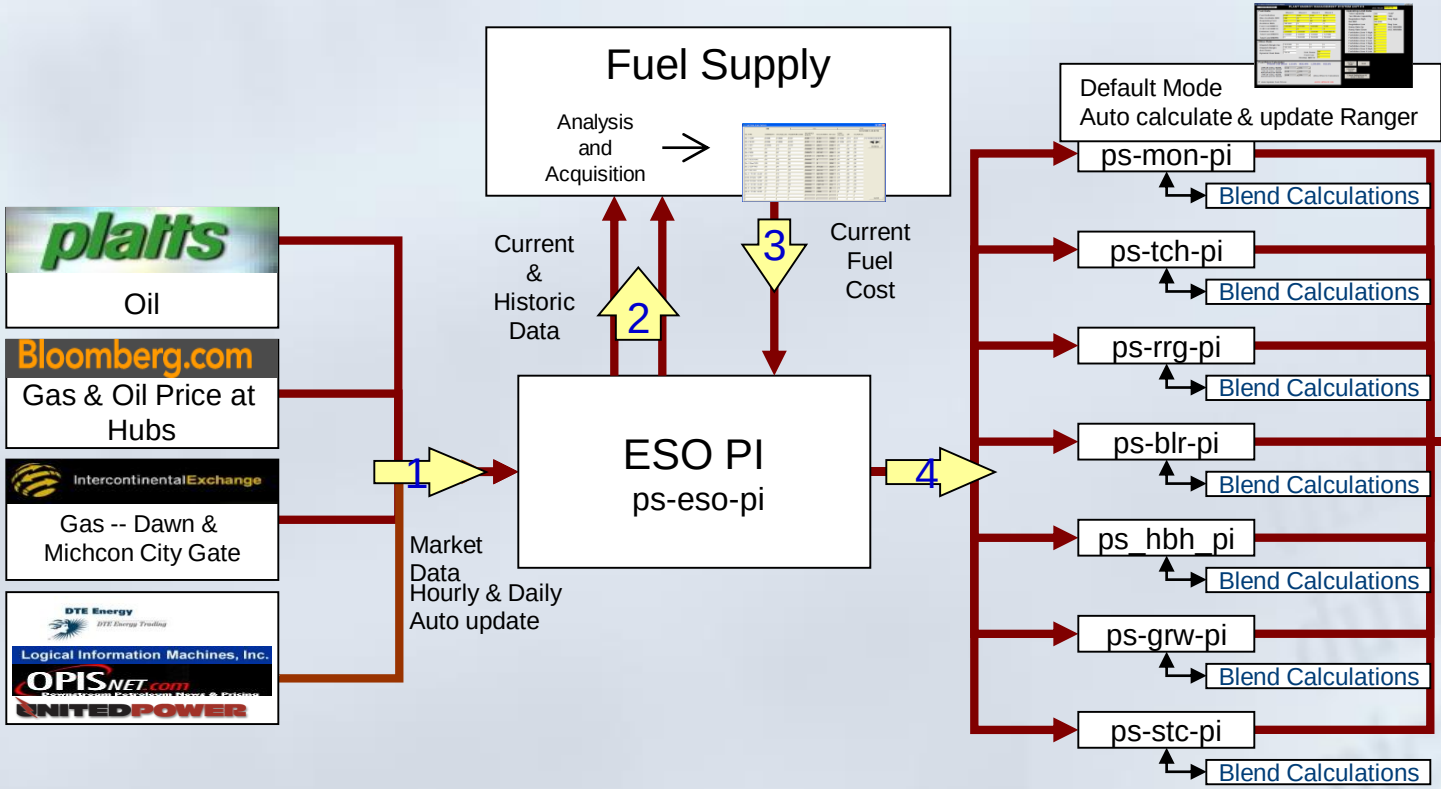
Before Fuel Cost Framework



Fuel Cost Framework



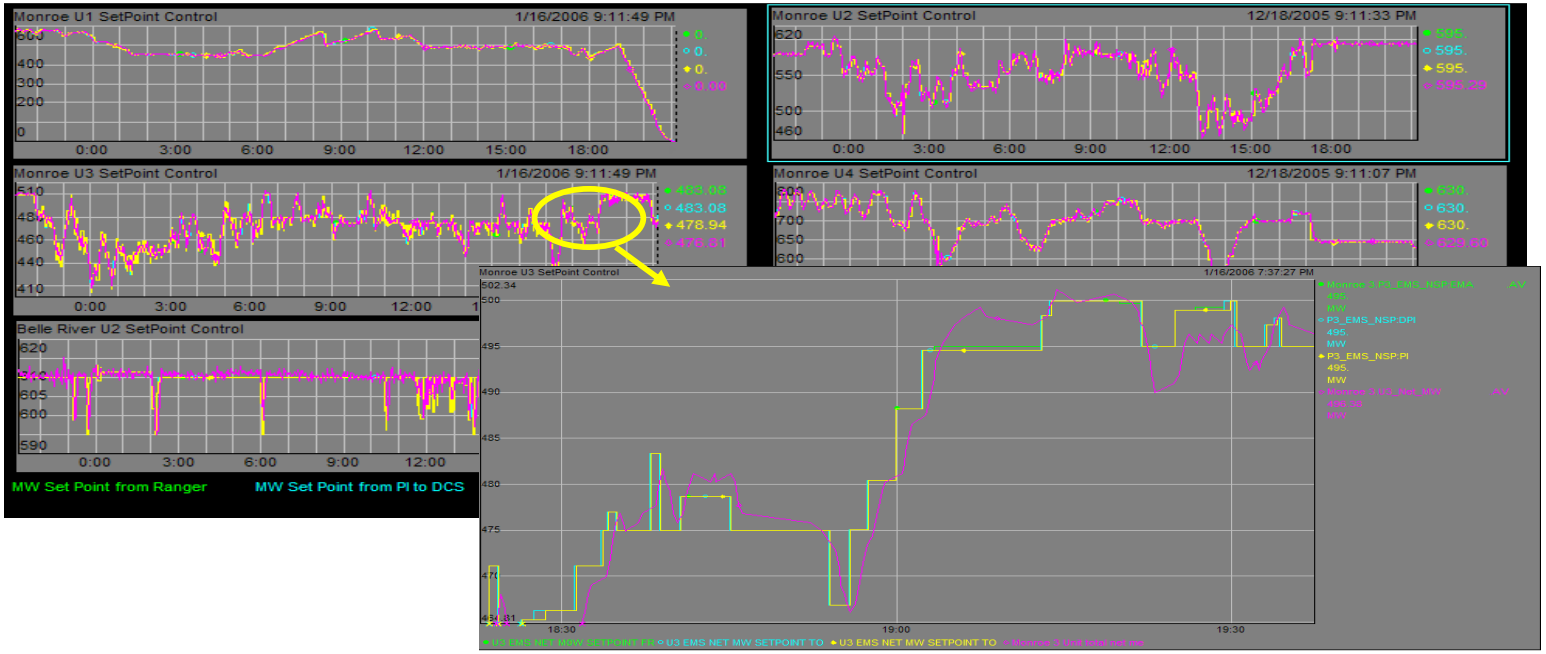
Improvements…

- 30 to 3 people
- Timely data entry
- Zero errors

PI to PI (AGC)

AGC – Automatic Generation Control

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



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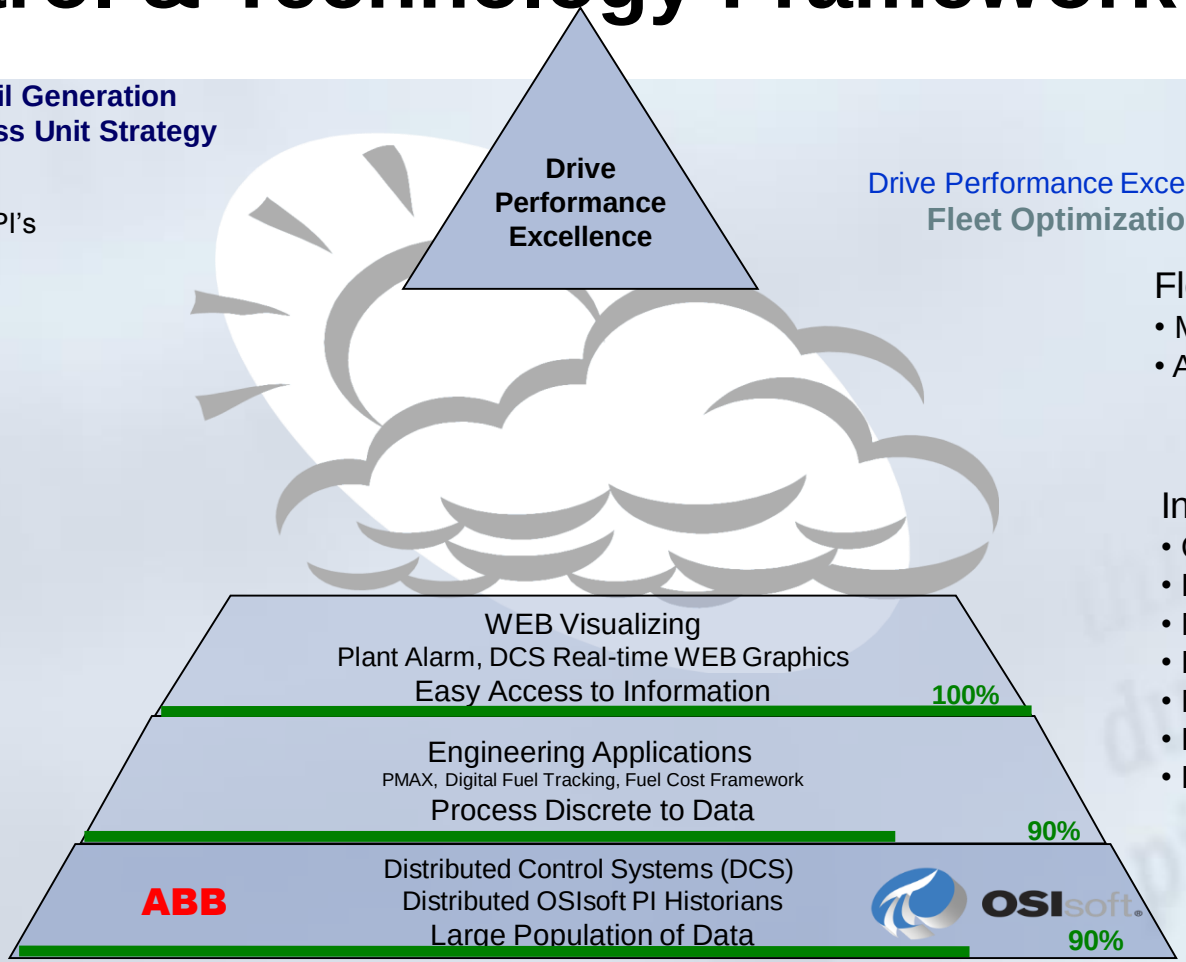
Control & Technology Framework

Fossil Generation
Business Unit Strategy

Actionable
Information – KPI's

Discrete data
Limited value

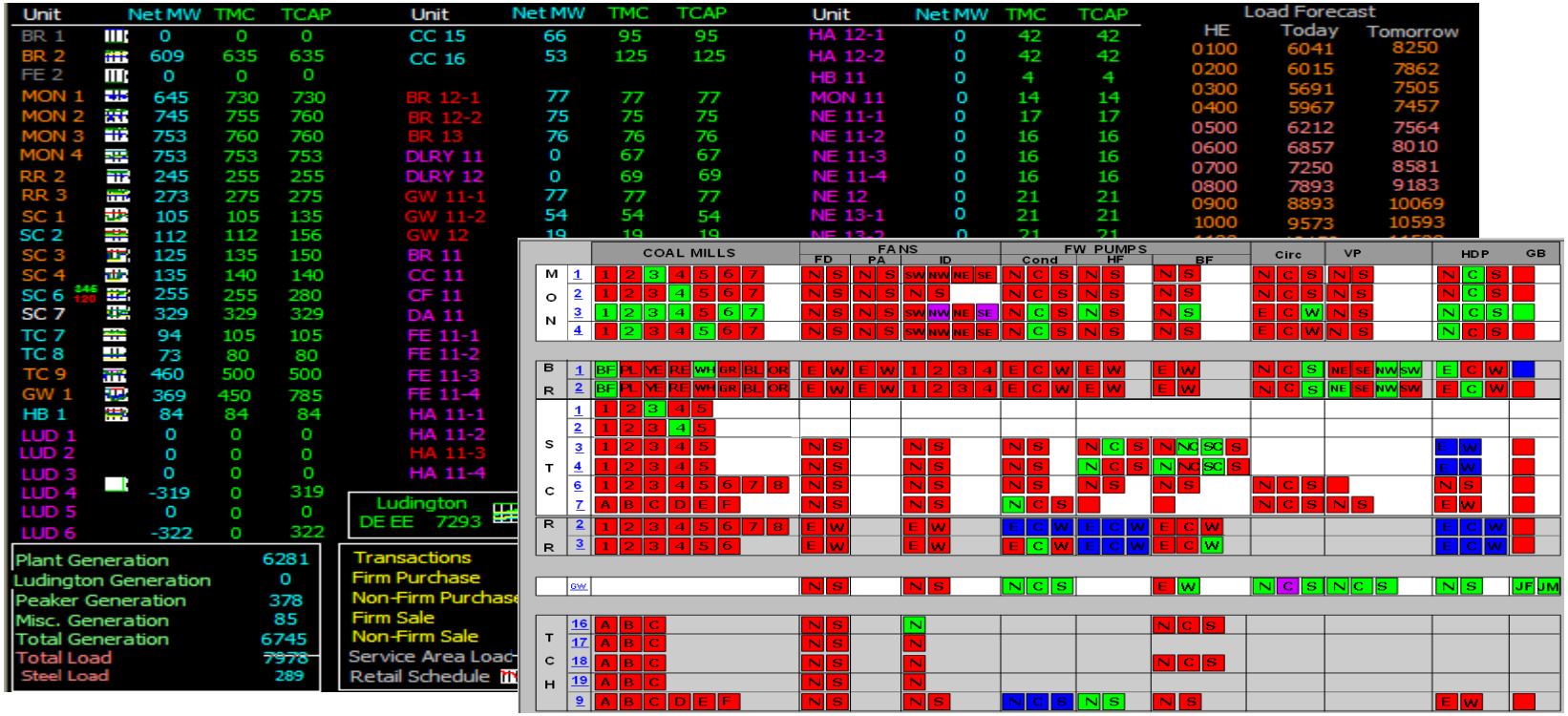


Drive Performance Excellence
Fleet Optimization

Fleet Perspective
- Methods
- Applications

Involves
- Operation
- Performance
- MISO Market
- Reliability
- Maintenance
- Reporting
- Budget

Fleet Status – PI WEB enabled



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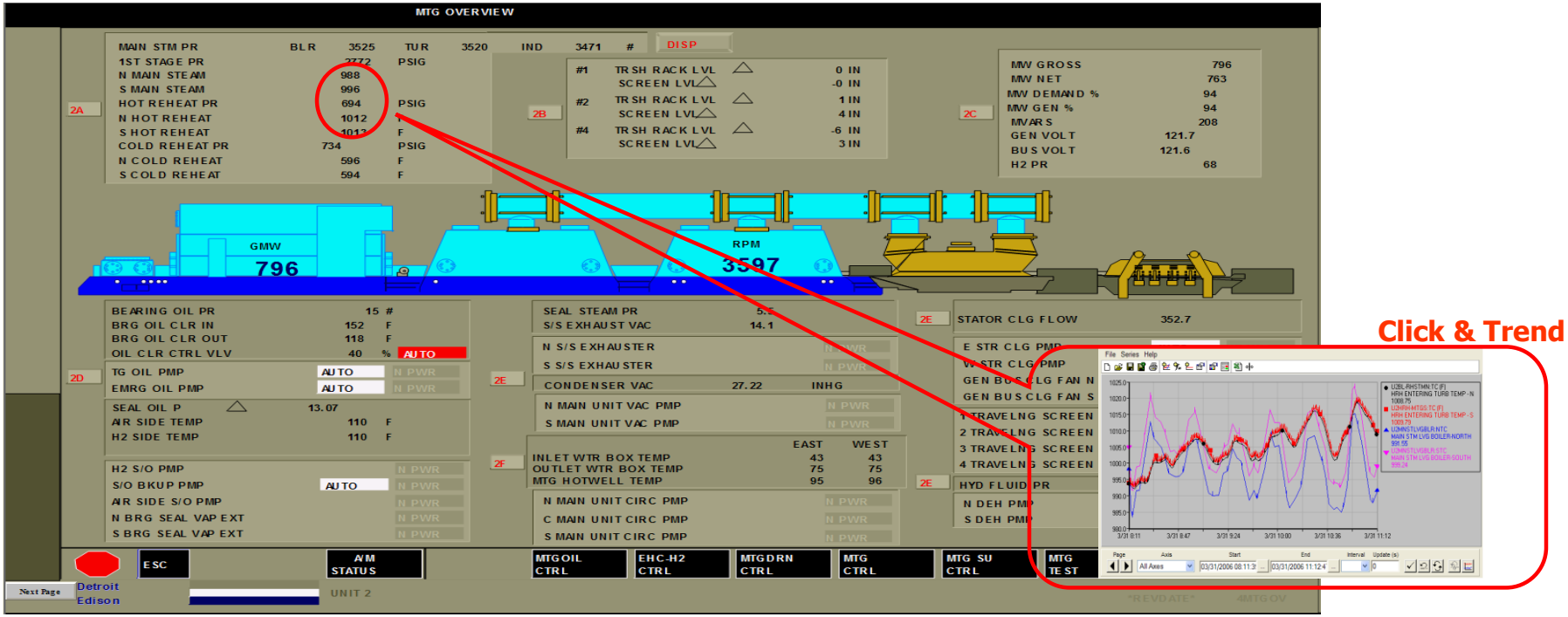
Real-Time DCS Operator Displays

6000 real time dynamic actively linked WEB DCS graphics



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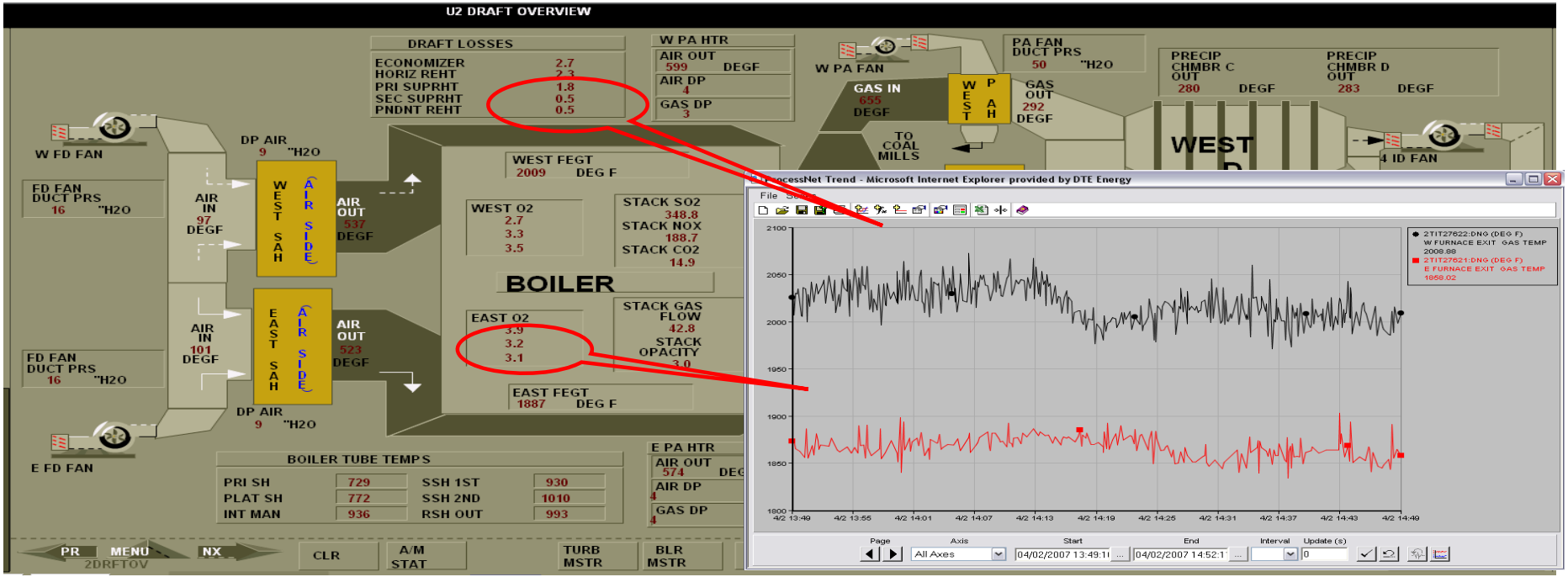
PI enabled - Event Re-play



Re-play events using historical PI data

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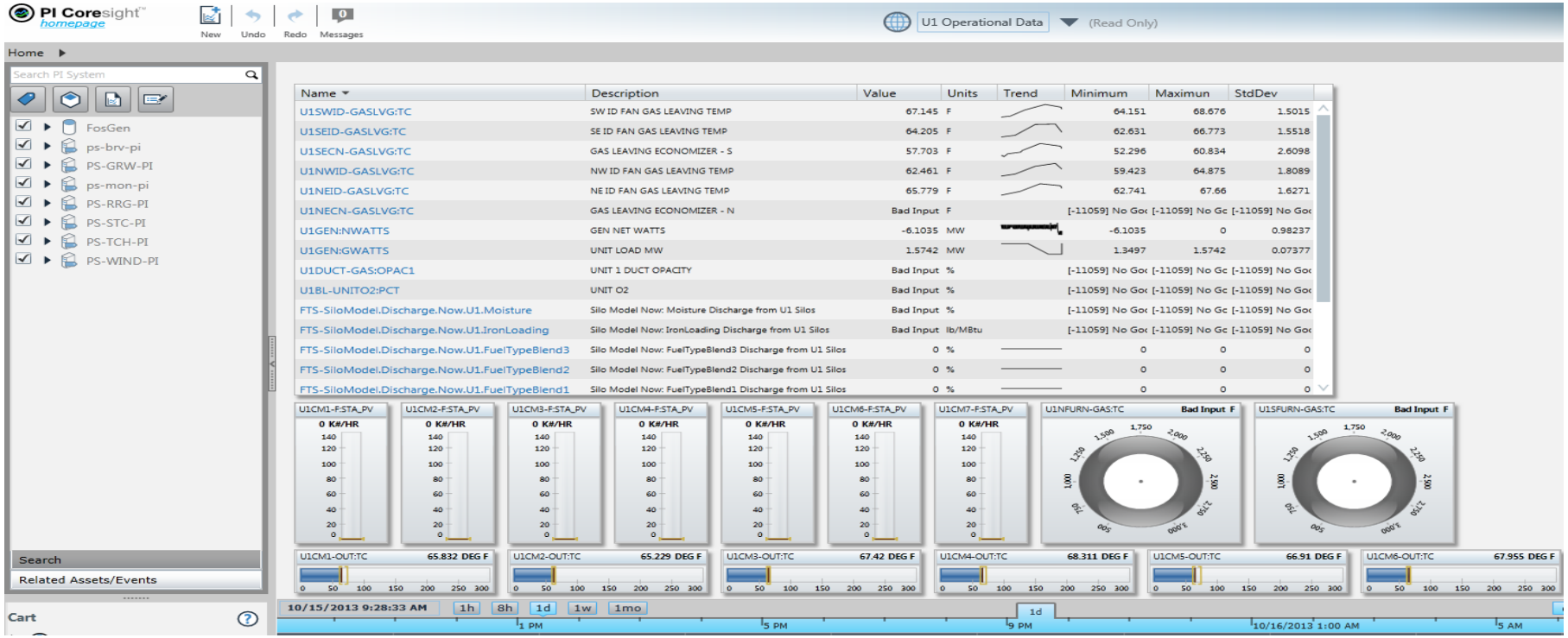
PI Coresight Displays



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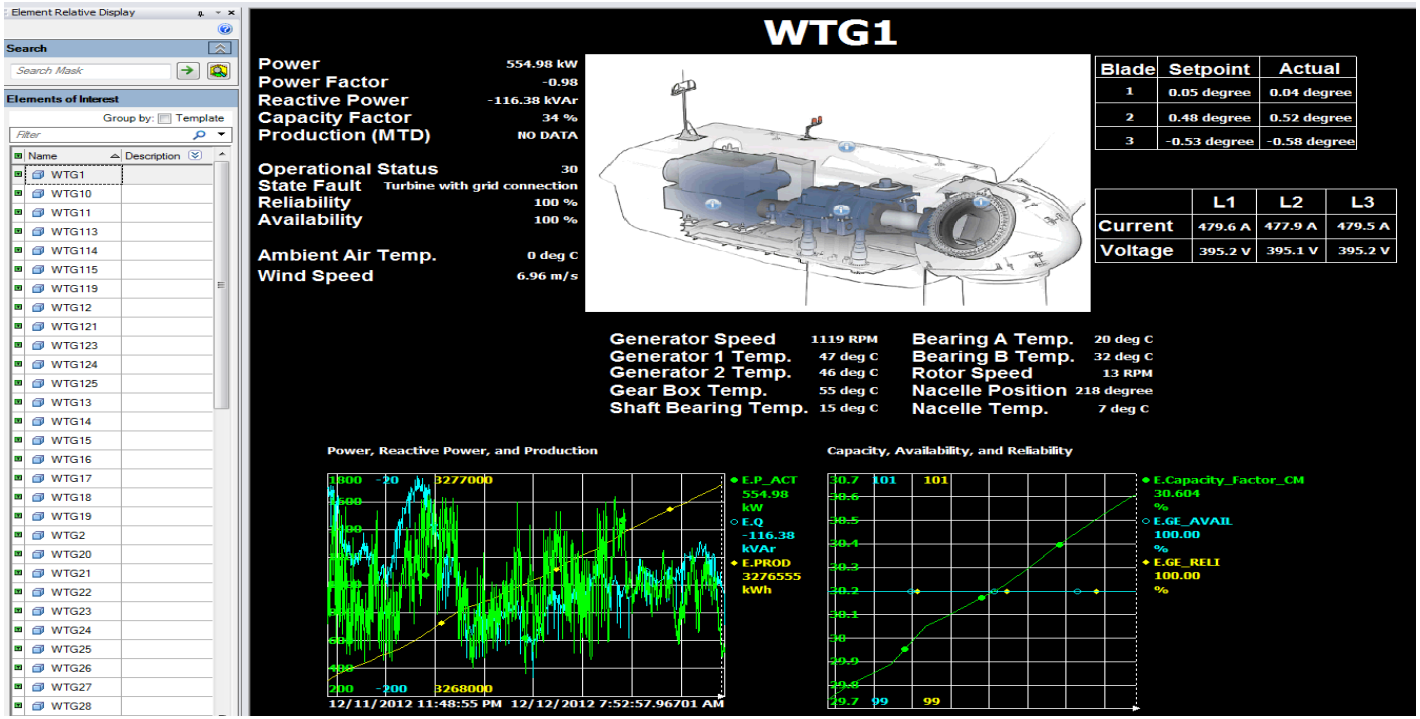
Real-Time Wind Turbine Display



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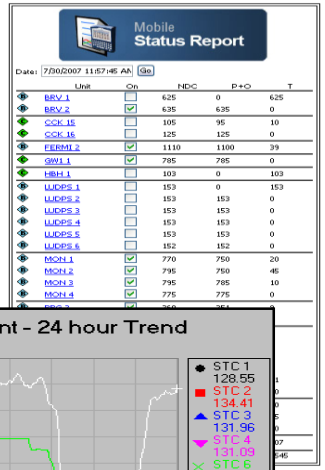
Mobile Work Force

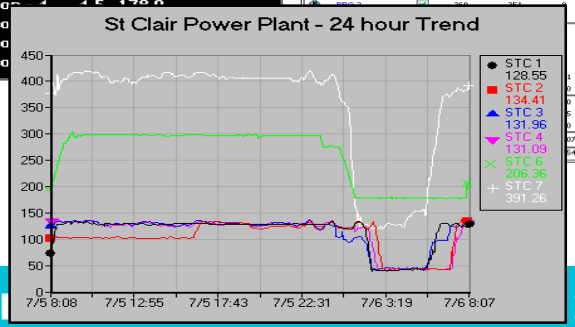
Mobile Work Force

PI WEB reports available on your Mobile Device

Unit	GrossMW	Rev/Min
Monroe Unit 1	547	3,599
Monroe Unit 2	44	3,600
Monroe Unit 3	438	3,599
Monroe Unit 4	545	3,599

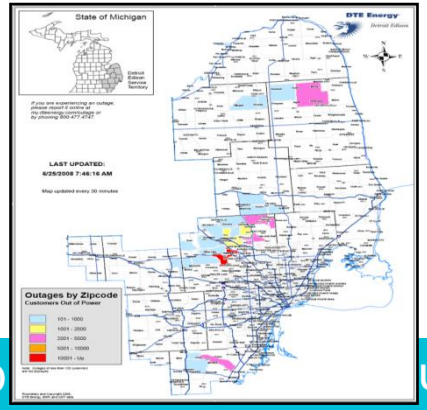
Bearing	Vibr	Temp
1 Mon - 12	0.8	168.0
1 Mon - 11	2.4	144.1
1 Mon - 10	2.7	156.4
1 Mon - 9	1.9	172.7
1 Mon - 8	3.2	166.2
1 Mon - 7	4.4	160.0
1 Mon - 6	1.3	177.4
1 Mon - 5	0.4	173.1

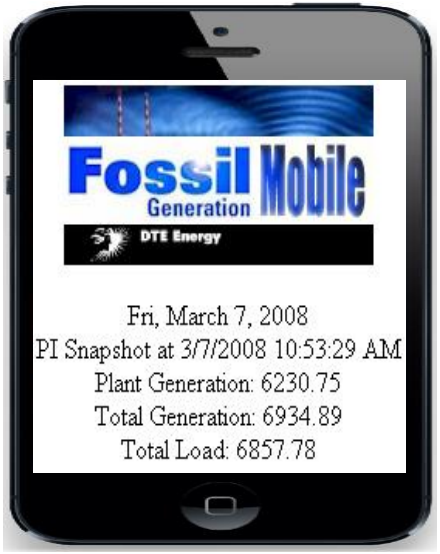


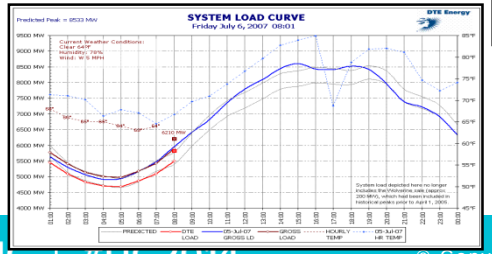


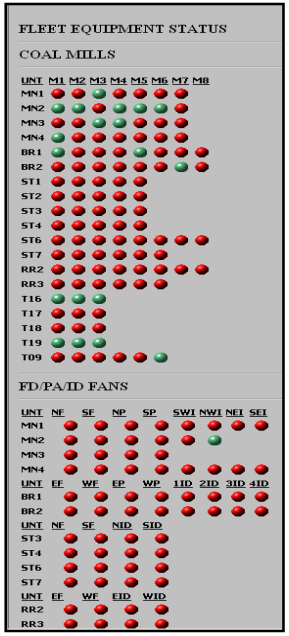
Unit	Net MW	TMC	TCAP
BR 1	601	625	625
BR 2	609	635	635
FE 2	1103	1103	1103
MON 1	523	770	770
MON 2	13	13	13
MON 3	404	785	785
MON 4	513	565	775
RR 2	193	251	251
RR 3	243	243	276
SC 1	121	125	125
SC 2	125	125	125
SC 3	125	125	125
SC 4	124	125	125
SC 6	183	270	270

21,204
Total Customers Out
Total Jobs: 59 | Cust Dispatched: 84









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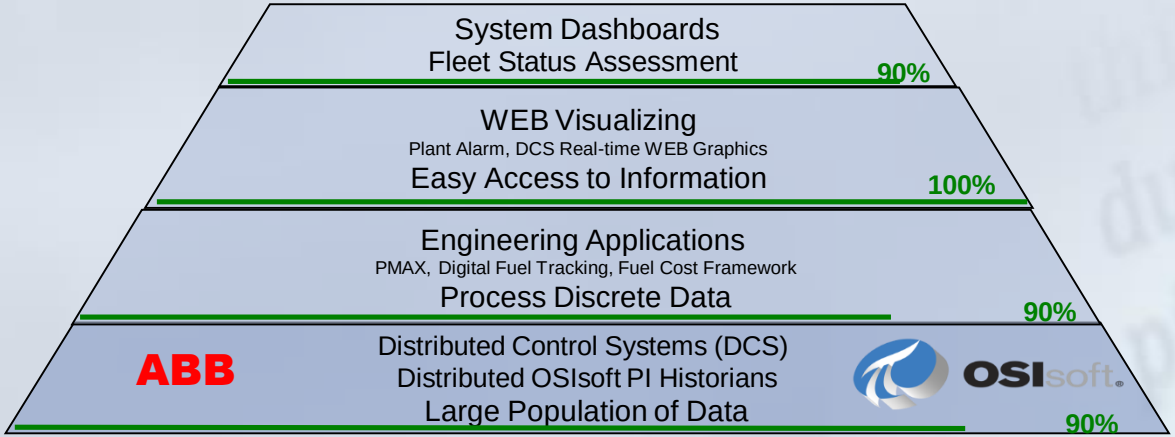
Control & Technology Framework

Fossil Generation
Business Unit Strategy

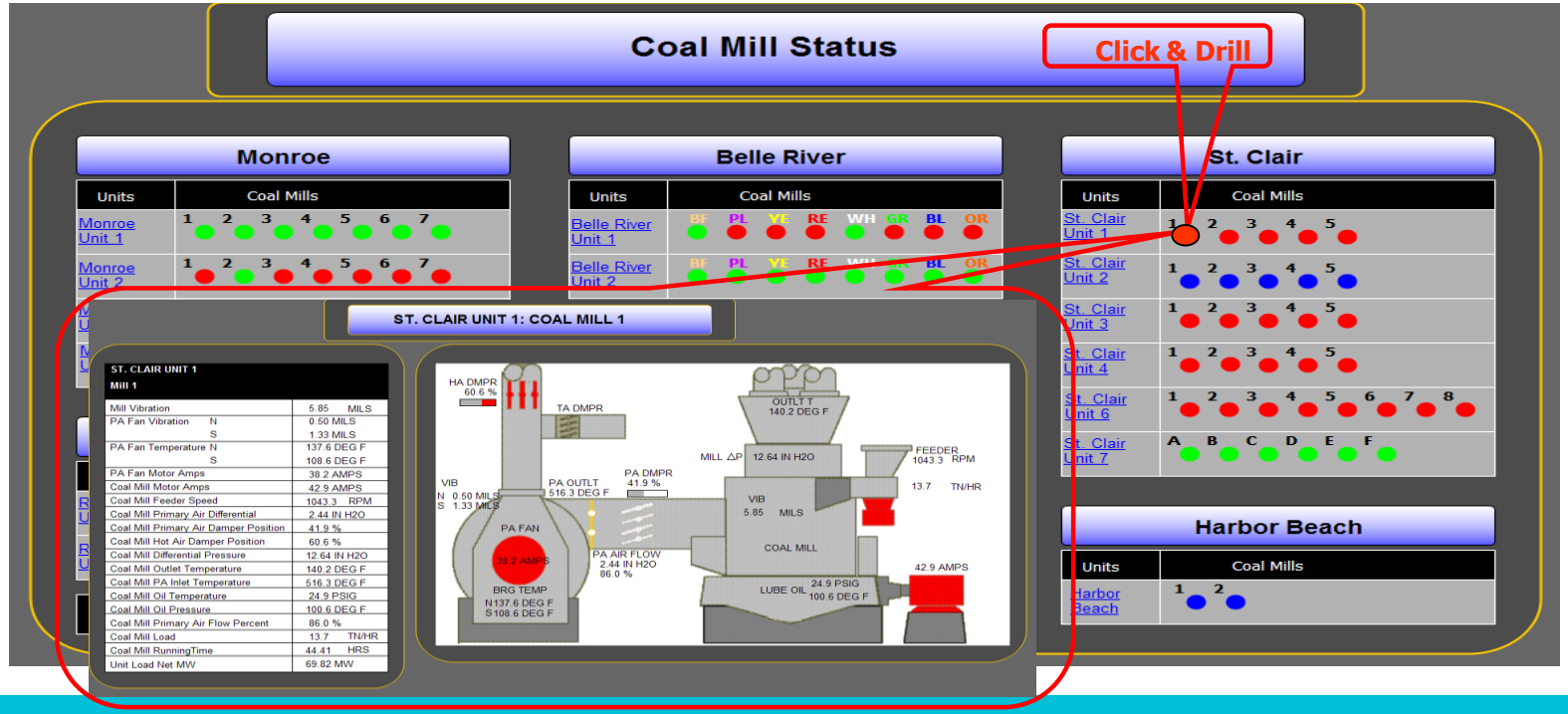
Actionable
Information – KPI's

Discrete data
Limited value



System Dashboards – PI Enabled

2000 real time dynamic actively linked WEB System graphics



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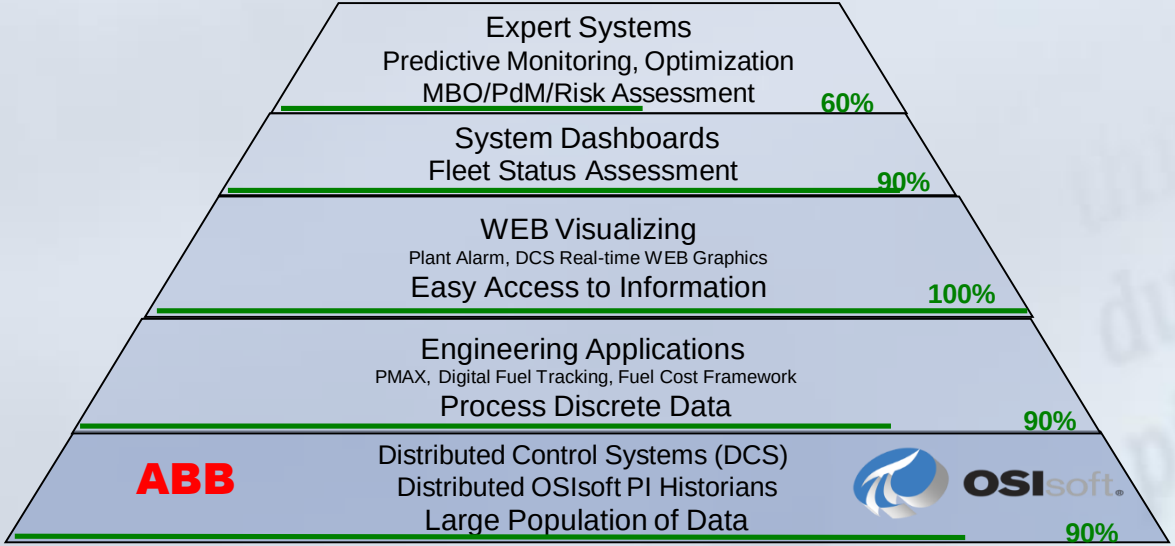
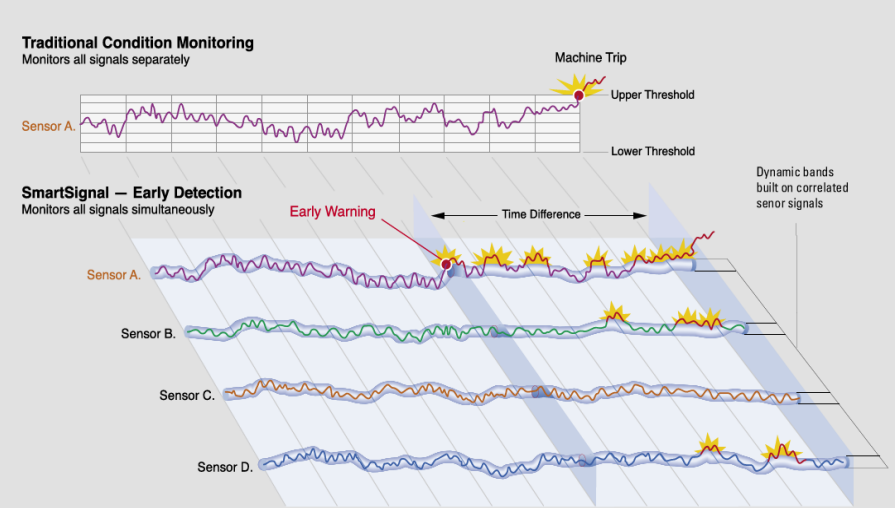


Advanced Pattern Recognition

Equipment Condition Monitoring SmartSignal



Similarity Based Modeling

PI Dependent Expert Systems Combustion Optimization – NeuCo

Objective – Coal pile to stack Optimization

- Closed loop Neural Net Optimization
- In Service St Clair Unit 7 (Neural Mode November 2007)
- Installation in progress on Belle River 2 (2008)
- Planned for Monroe Units 1-4 (High PRB Utilization Project)

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Control & Technology Framework

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Business Unit Strategy

Actionable
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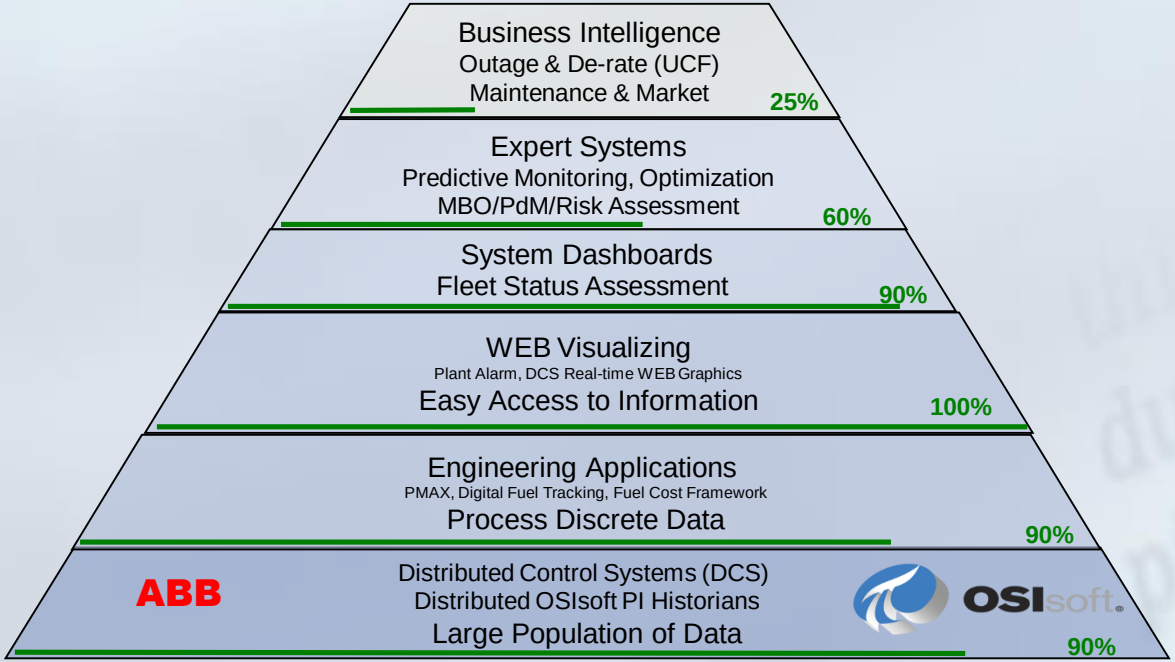
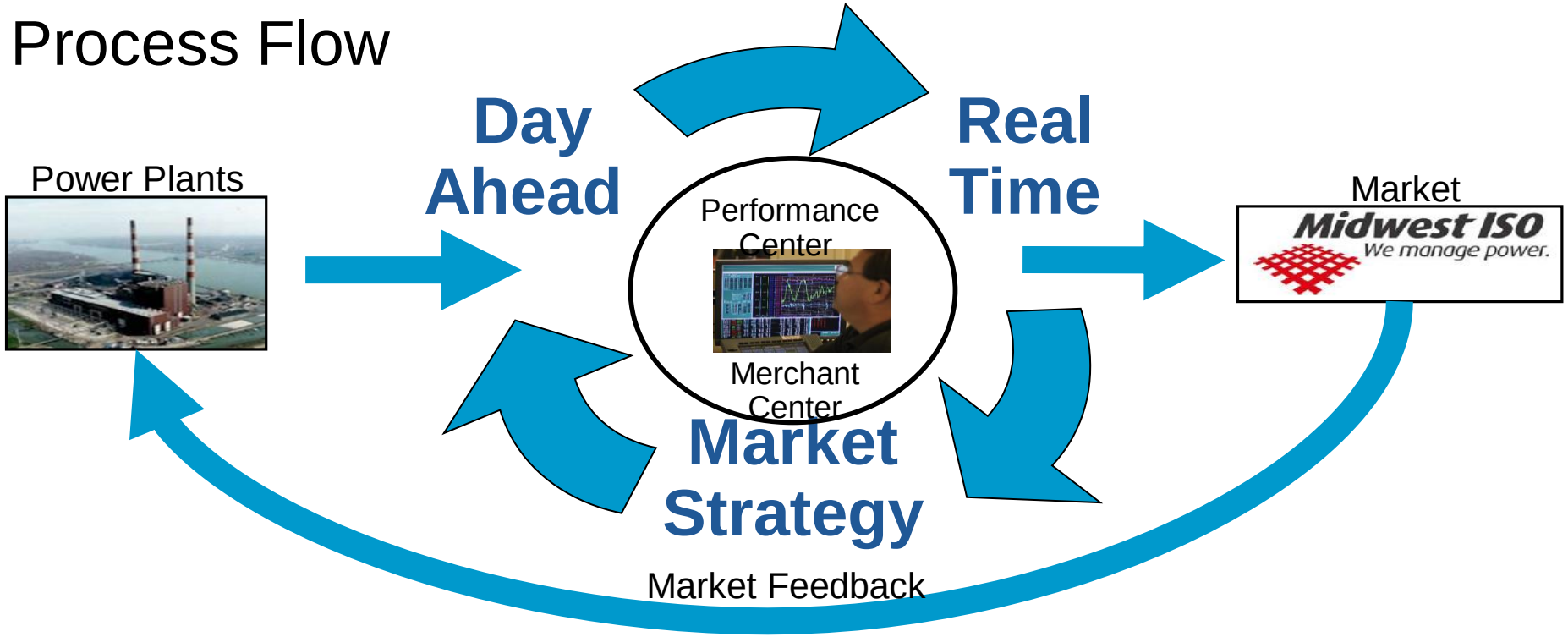


Unit Capacity Framework (UCF)

Process Flow



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Unit Capacity Framework (UCF)

- Manages all Unit Capacity and De-rates - Interfaces to MISO, P3M & EMS
- Automatically Generated Status Report
- Dynamically linked with Outage and de-rate process

Fossil Generation
Unit Capacity Framework

Reports | Data Entry | Options | Quick Links: | User: N/A | DTE Energy

Date/Time: 4/6/2006 12:46:00 PM Go

☐ Show Optional Fields ☑ Group Peaker Units ☐ Group Cycler Units ☐ Group Base Units

Sort: Alphabetically Historical Time: Current ☑

Export to Excel
Export to Word
Field Definitions

Fossil Generation Status Report

Thursday, April 06, 2006 12:46:56 PM

Last Modified By: David W Skiver (E49449) on Apr 6 2006 6:24AM

Unit	On	NDC	Pr Avail	Pr+Of Avail	Current Blend	Unit Constraints/Special Conditions	Primary Econ. Blend	Unit Econ. Blend	Primary Sched.	Primary Rand.	Unit Sched.	Unit Rand.	Total Sched.	Total Rand.
BRVPP 1	☐	625	600	625	{100%LSW}+{100%2OIL}		0	0	0	0	0	0	0	0
BRVPP 2	☑	635	610	635	{100%LSW}+{100%2OIL}		0	0	0	0	0	0	0	0
CCKPP 15	☐	135	135	135	{100%NGAS}		0	0	0	0	0	0	0	0
CCKPP 16	☐	100	100	100	{100%NGAS}		0	0	0	0	0	0	0	0
FERMI 2	☐	1110	0	0	{100%NUC}	*Outage:* refuel outage; May 10@0900; Dugan	0	0	0	0	0	0	0	0
GW1PP 1	☑	785	785	785	{60%NGAS/40%HSOIL}		0	0	0	0	0	0	0	0
HBHPP 1	☑	103	90	103	{100%LSS}+{100%2OIL}		0	0	0	0	0	0	0	0
MONPP 1	☐	770	0	0	{65%LSW/35%MSE}+{100%2OIL}	*Outage:* Periodic Outage; May 6@2000; F. Wszelaki	0	0	0	0	0	0	0	0
MONPP 2	☐	795	0	0	{65%LSW/35%MSE}+{100%2OIL}	*Outage [F]:* Tube leak; Apr 10@0655; Essex || *Derate [F]:* (0) Mill Performance; Apr 22@2100; P. Fessler || *Derate [F]:* (0) 6&7 SFWH; Jun 22@2100; P. Fessler || *Derate:* (0) 2-2 CM in SK; Apr 7@1400; F. Wszelaki	0	0	0	0	0	0	0	0
MONPP 3	☑	795	795	795	{65%LSW/35%MSE}+{100%2OIL}	*Derate [F]:* (0) No. 3 FWH Tube Leak; Jun 1@0600; P. Fessler	0	0	0	0	0	0	0	0
MONPP 4	☑	775	775	775	{65%LSW/35%MSE}+{100%2OIL}		0	0	0	0	0	0	0	0
RRGPP 2	☐	247	0	0	{70%LSW/30%LSS}+{100%NGAS}	*Outage:* Spring 2006 Per. Outage; May 24@0700; C.P. Mumaw	0	5	0	0	5	0	0	0
RRGPP 3	☑	280	280	280	{70%LSW/30%LSS}+{100%NGAS}		0	0	0	0	0	0	0	0
STCPP 1	☑	150	125	125	{100%LSW}		0	25	0	0	25	0	0	0
STCPP 2	☐	162	0	0	{100%LSW}	*Outage:* 2006 Periodic Outage; May 22@0600; John Quaine	25	25	25	0	25	0	25	0
STCPP 3	☑	168	125	125	{100%LSW}		0	43	0	0	43	0	0	0
STCPP 4	☑	158	125	125	{100%LSW}		0	33	0	0	33	0	0	0
STCPP 6	☑	321	281	321	{85%LSW/15%HSE}+{100%NGAS}		0	0	0	0	0	0	0	0
STCPP 7	☑	450	360	386	{80%LSW/20%HSE}+{100%2OIL}	*Derate [F]:* (58) E CM ; Apr 17@0800; Dan Lorenzetti || *Derate [F]:* (24) Opacity and SO3 Cond'ing; Nov 1@0000; Lorenzetti || *Derate [F]:* (6) #7 FWHtr; Nov 1@0600; Lorenzetti	0	0	0	0	0	64	0	64
TCHPP 7A	☑	210	110	110	{60%LSW/40%MSE}+{100%2OIL}		0	100	0	0	100	0	100	0
TCHPP 8	☑	122	100	100	{80%LSS/20%MSE}+{100%2OIL}		0	22	0	0	22	0	22	0
TCHPP 9	☑	520	350	370	{80%LSS/20%MSE}+{100%2OIL}		150	150	150	0	150	0	150	0
Peakers	?	792	186	186	N/A	N/A	0	606	0	0	606	0	0	0
Totals:		10208	9031	9564			175	1009	175	0	1009	64	297	64

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Enterprise Business Systems (EBS) Maximo & SAP

- SAP
  - Financial Information
  - Human Resources
  - Supply Chain
- Maximo
  - Work Management System

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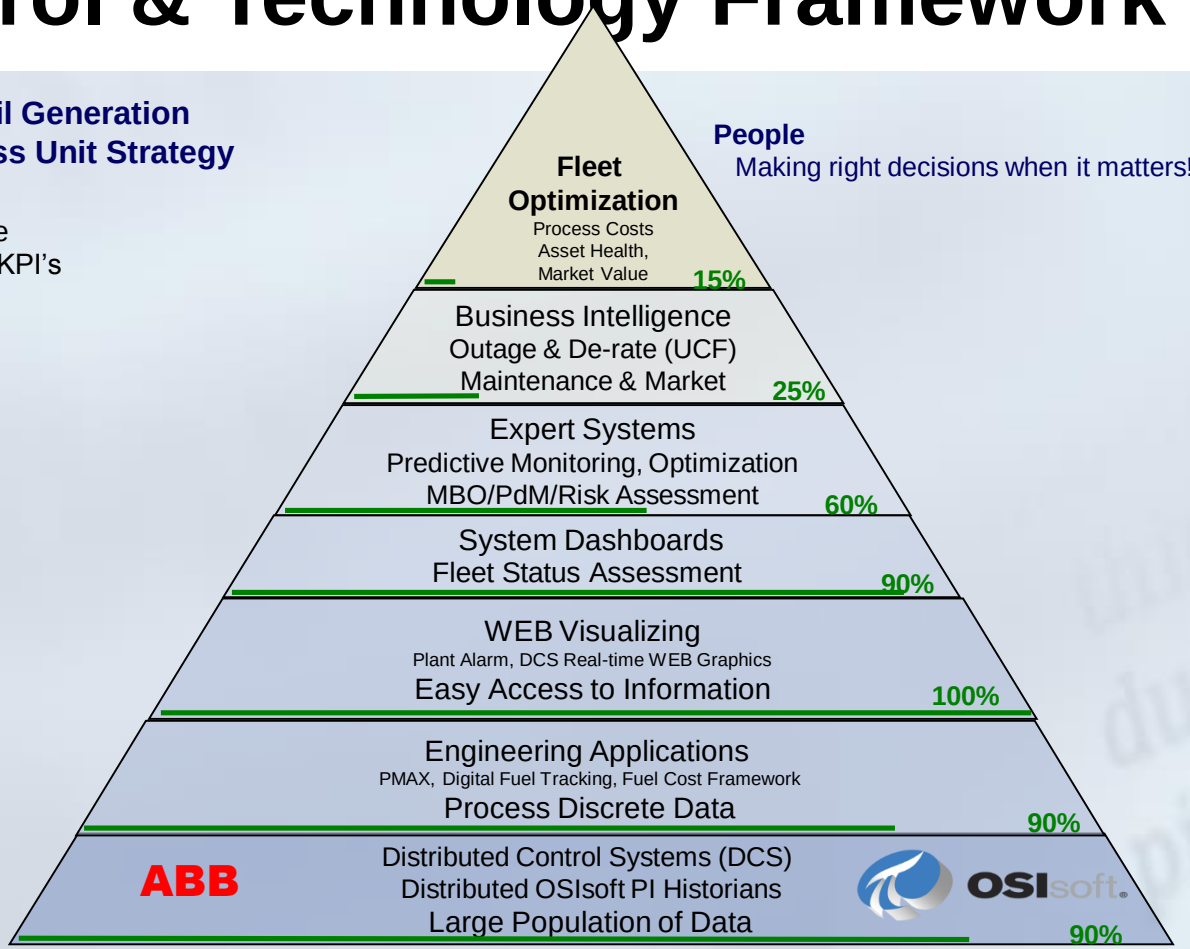
Control & Technology Framework

Fossil Generation
Business Unit Strategy

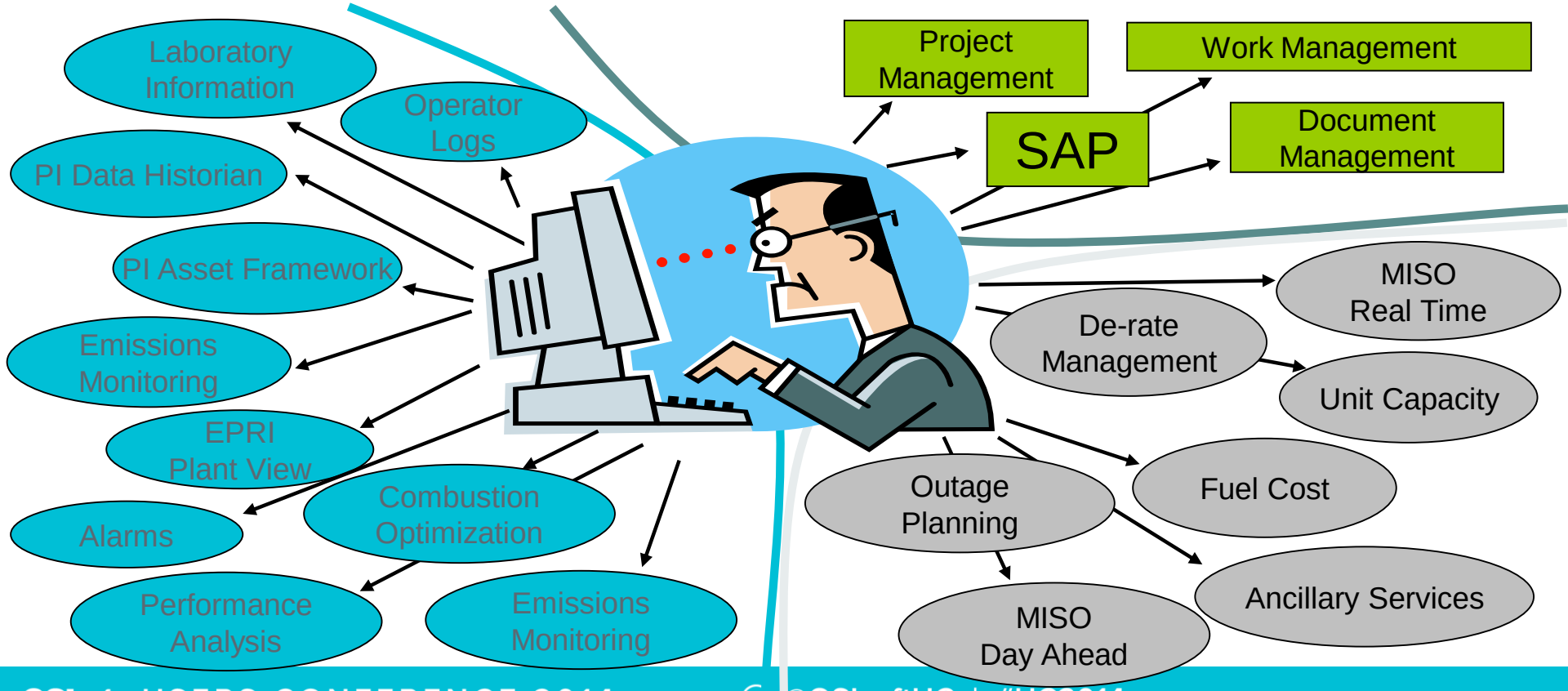
Actionable
Information – KPI's

Discrete data
Limited value



People
Making right decisions when it matters!

No Shortage of Information!



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Common Methodology

Standard GUI
Single Method

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

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

Process Information

Work Management
Project Management
Document Management
SAP

Business Systems

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

Market Data

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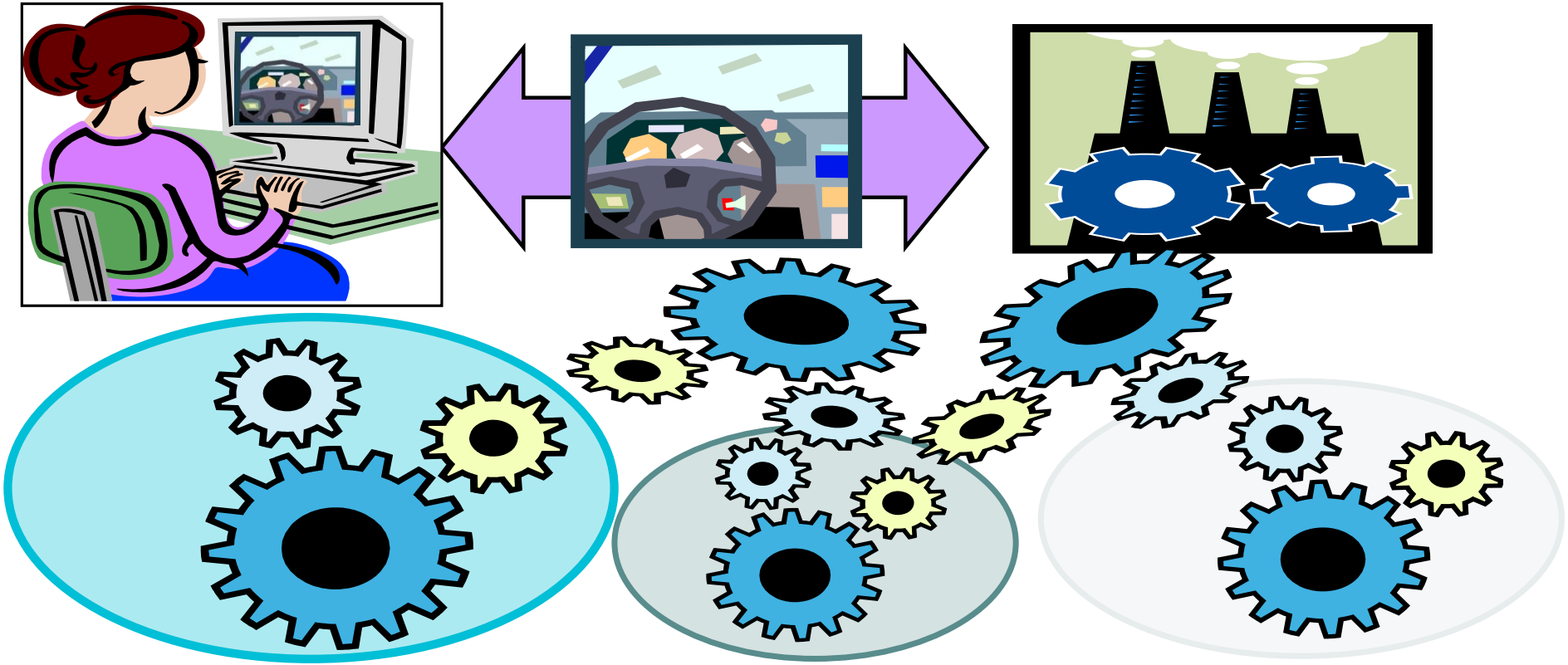
Common Structure



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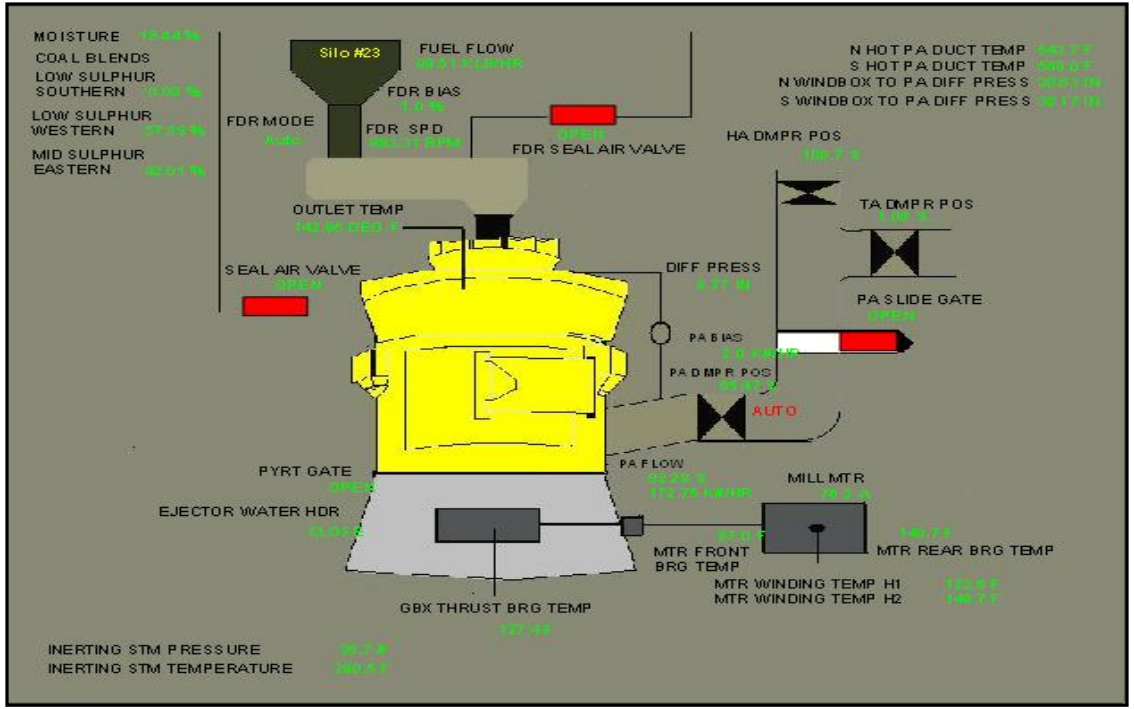
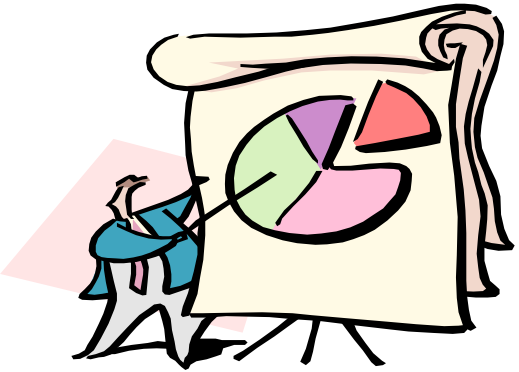
Fleet Performance Analysis and Optimization

Pulverizer Dashboard



Process Information



More information is need for Analysis

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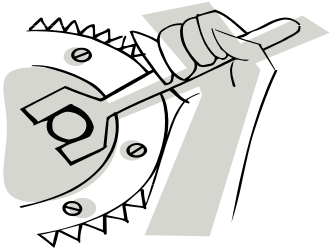
Pulverizer Assessment
What information is needed?

Pulverizer

- Milling Costs
- Process Costs
- Production Costs
- EAF
- SmartSignal Watch List
- Work Performed & Work Pending
- Alarms



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Pulverizer - Multiple Data Sources

Consistent Reporting

- Common Methodology
- Common Structure

Unit Capacity

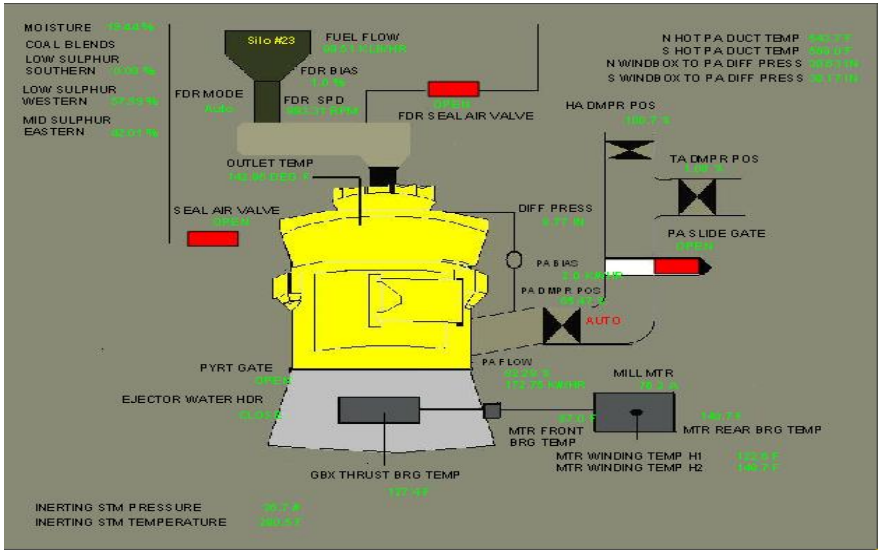
Alarms

EPRI PlantView

Maximo

SAP

Documentum



PI

P3M

SmartSignal

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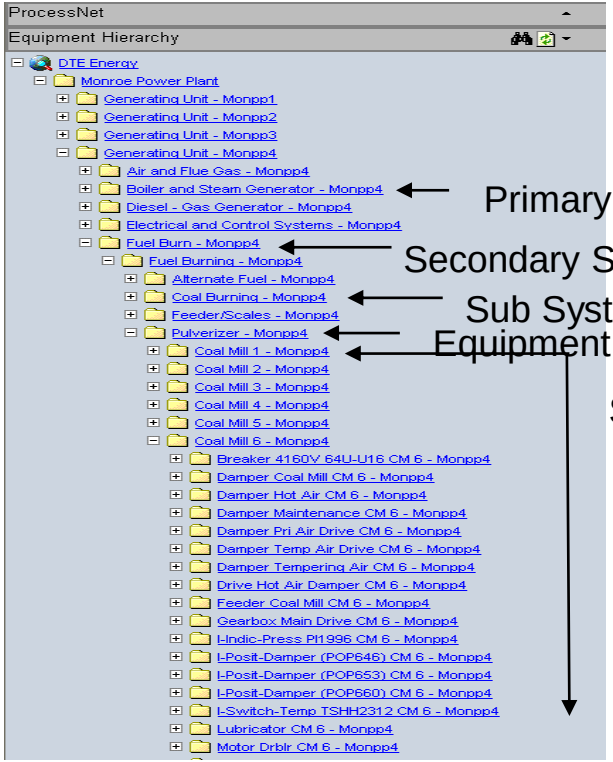
Common Thread
Equipment Hierarchy



Primary System

Secondary System

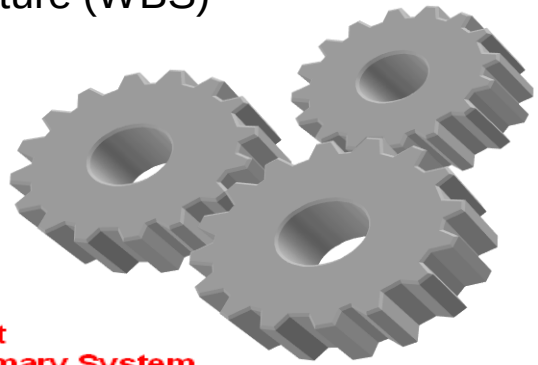
Sub System

Equipment

Sub Equipment

Equipment Hierarchy

- Hierarchical System Index (HSI)
- Work Breakdown Structure (WBS)



DTE Energy – Business Unit
Monroe Power Plant – Plant
Generating Unit - Monpp4 – Unit
Fuel Burn - Monpp4 – Primary System
Fuel Burn - Monpp4 – Secondary System
Pulverizer - Monpp4 – Sub System
Coal Mill 1 - Monpp4 – Equipment / Sub Equip
Breaker 4160V 64U-U16 CM 1 - Monpp4
Damper Coal Mill CM 1 - Monpp4
Damper Hot Air CM 1 - Monpp4
Damper Maintenance CM 1 - Monpp4
Damper Pri Air Drive CM 1 - Monpp4

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Pulverizer - Multiple Data Sources

Consistent Reporting

- Common Methodology
- Common Structure

Unit Capacity

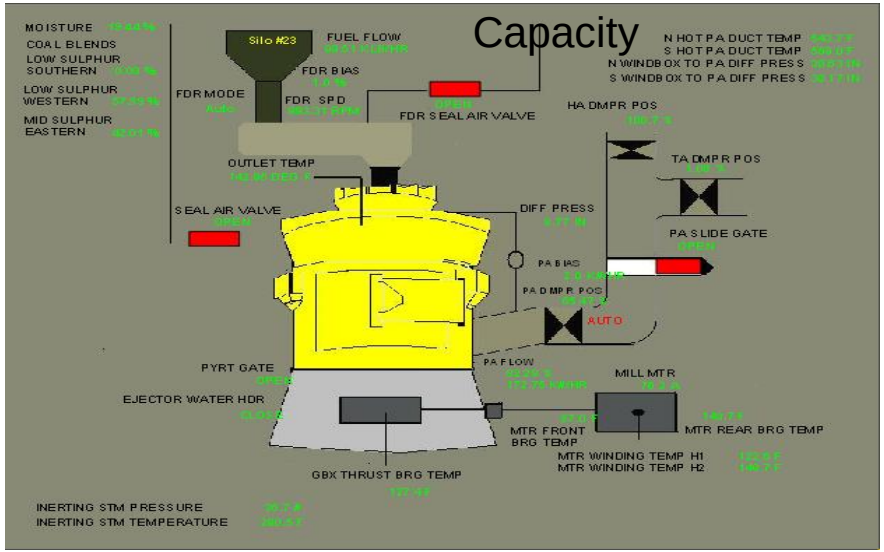
Alarms

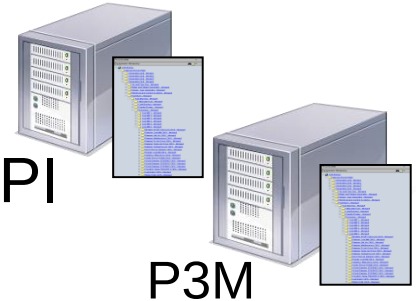
EPRI PlantView

Maximo

SAP

Documentum





PI

P3M

SmartSignal

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Asset Framework
Expanded System Dashboard

Health Assessment

PI

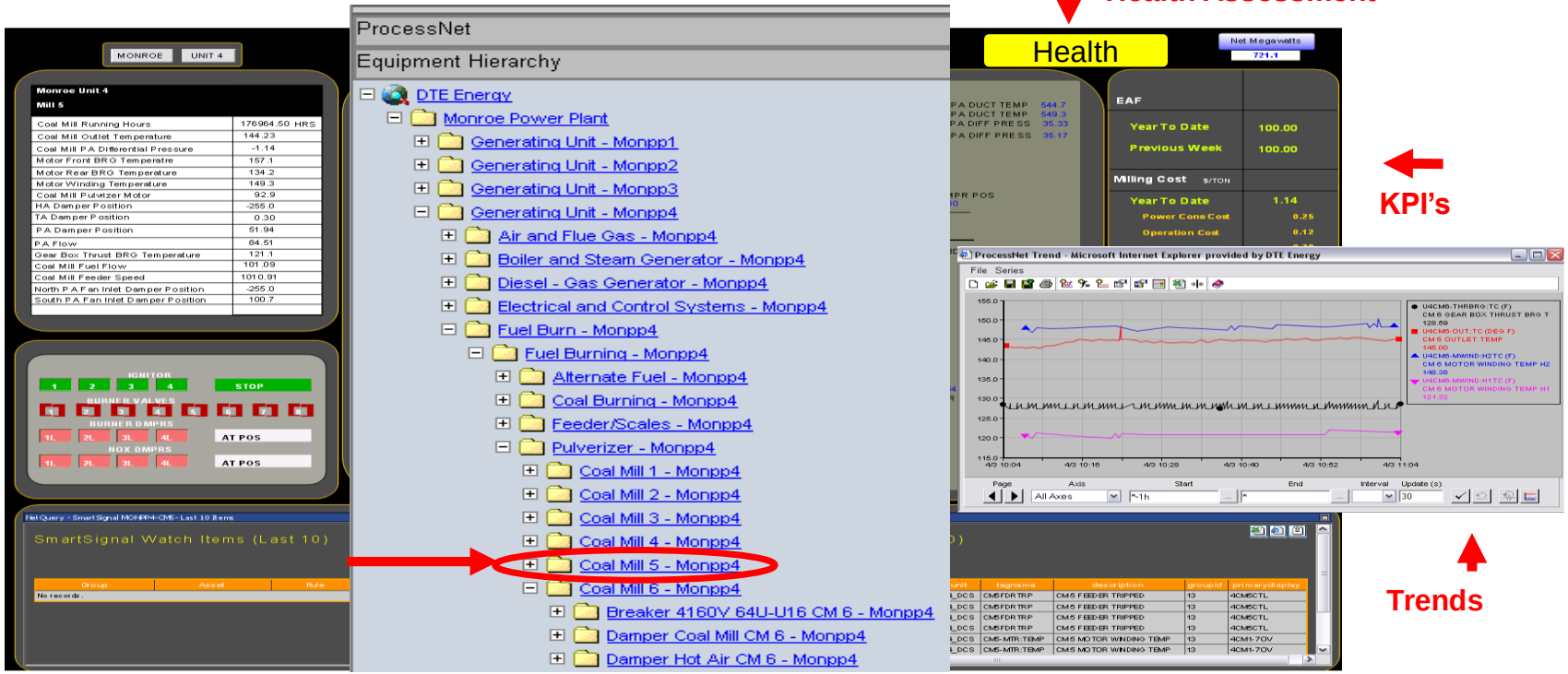
DCS

KPI's

Trends

SmartSignal Watch List

Alarms



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PI Asset Framework (AF)

Elements

- Elements
  - Alternate FD Fan - maximo name in attribute
  - Alternate FD Fan hierarchy - AF optimized
  - DTE Energy
    - Belle River Power Plant
      - BLRPP Commons Units 1&2
      - BLRPP Fuel Supply
      - BLRPP Unit 1
        - BLRPP Unit 1 Air/Flue Gas
        - BLRPP Unit 1 Boiler / Steam Generator
        - BLRPP Unit 1 Electrical/Control Systems
        - BLRPP Unit 1 Fuel Burning
          - Fuel Burning
            - Alternate Fuel
            - Coal Burning
            - Pulverizer
              - 01FSSYS01: SYSTEM RECORD, Coal Mill Systems that Controls Multipl
              - 1CMSYS05 PU INERTING MILL STEAM INERTING GENERAL: SYST
              - 1CMSYS06 AIR DAMPER/ EXHA DAMPER OR EXHAUSTER GENER
              - Coal Mill Blue 01A04-09
                - 01BUSYS14-BLUE: System Burner & Burner Lines Unit 1-BLUE
                - Blue H Mill #1 North Side
                - Coal Mill Blue 1 Swing VLV Inlet
                - Blue H Mill #2 North Side
                - Blue H Mill #4 North Side
                - Blue H Mill #6 North Side
                - Blue H Mill #7 North Side
                - 01FESYS14-BLUE: System Feeder & Bin & Feeder Pipes & Valves
                - 01ICSYS14-BLUE: Instruments And Controls Unit 1-BLUE
                - 01LUSYS14-BLUE: System Mill Lube & Cooling Unit 1-BLUE
                - 01PASYS14-BLUE: System Primary Air Dampers Unit 1-BLUE
                - Blue Coal Mill Motor
              - Coal Mill Buff 01A03-02
              - Coal Mill Gray 01A03-04
              - Coal Mill Orange 01A03-05
              - Coal Mill Purple 01A04-06
              - Coal Mill Red 01A04-07
              - Coal Mill White 01A04-08
              - Coal Mill Yellow 01A03-03
        - BLRPP Unit 1 Grounds & Physical Plant
        - BLRPP Unit 1 Plant Waste
        - BLRPP Unit 1 Reclaiming / Plant Feed
        - BLRPP Unit 1 Service Air & Gas
        - BLRPP Unit 1 Switching & Mat
        - BLRPP Unit 1 Turbine / Generator
        - BLRPP Unit 1 Water Systems
      - BLRPP Unit 2

Blue H Mill #2 North Side

General | Child Elements | Attributes | Ports | Version

Filter

Name	Value
A A FREQ	14
A A QUAL	0
A B FREQ	15
A B QUAL	95
A COMB INDEX	0
A INTENSITY	84
B A FREQ	27
B A QUAL	99
B B FREQ	26
B B QUAL	100
B COMB INDEX	57
B INTENSITY	82
Control Output	26.74414
COOLING POSITION	0
CTRLGRA DR	??????????
FLAME SCANNER A A DETECT	0
FLAME SCANNER A B DETECT	1
FLAME SCANNER A CHANNEL FAULT	0
FLAME SCANNER A FAULT STATUS	0
FLAME SCANNER A MODULE FAULT	0
FLAME SCANNER B A DETECT	1
FLAME SCANNER B B DETECT	1
FLAME SCANNER B CHANNEL FAULT	0
FLAME SCANNER B FAULT STATUS	0
FLAME SCANNER B MODULE FAULT	0
FLAME STATUS	5
LIGHTOFF POSITION	0
MODE LOCK	0

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Process Cost Drill Down

MONROE | MONROE UNIT 4 | ALL PLANTS | MONROE POWER PLANT

Unit Summary

MONROE	UNIT 4
EAF	
Year To Date	80.14
Previous Week	100.00
PROD COST (Inst) $/MWh	
Current Date	21.21
Fuel Cost	18.16
Emission Cost	3.05
Previous Week	22.22
Fuel Cost	18.92
Emission Cost	3.30
PROD COST $/MWh	
Year To Date	19.85
Fuel Cost	17.73
Operation Cost	1.45
Maintenance Cost	0.66
Previous Week	19.83
Fuel Cost	18.92
Operation Cost	0.91
Maintenance Cost	0.00
MILLING COST $/TON	
Year To Date	4.87
Power Cons Cost	0.11
Operation Cost	3.28
Maintenance Cost	1.48
Previous Week	2.20
Power Cons Cost	0.11
Operation Cost	2.09
Maintenance Cost	0.00
HEAT RATE BTU/100kWh	
Current Date	10732
Previous Week	10732

Coal Mill	Mill 1	Mill 2	Mill 3	Mill 4	Mill 5	Mill 6	Mill 7
Status							
EAF							
Year To Date	100.00	100.00	99.93	99.79	100.00	100.00	100.00
Previous Week	100.00	100.00	100.00	100.00			
Milling Cost $/TON							
Year To Date	1.87	1.82	1.75	13.43			
Power Cons Cost	0.21	0.22	0.22	0.20			
Operation Cost	0.10	0.12	0.13	0.14			
Maintenance Cost	1.55	1.48	1.40	13.09			
Previous Week	0.28	0.30	0.29	0.26			
Power Cons Cost	0.21	0.22	0.22	0.20			
Operation Cost	0.07	0.07	0.07	0.07			
Maintenance Cost	0.00	0.00	0.00	0.00			
SS Count							
Year To Date	0	3	0	0			
Previous Week	0	0	0	0			
PG Count							
Year To Date	6	2	0	6			
Previous Week	0	0	0	0			

● = RUNNING ● = NOT RUNNING ● = NOT INSTRUMENTED

MONROE	UNIT 1	UNIT 2	UNIT 3	UNIT 4
EAF				
Year To Date	96.57	76.76	0.00	80.14
Previous Week	98.96	40.46	0.00	100.00
PROD COST (Inst) $/MWh				
HEAT RATE BTU/100kWh				
Current Date	10687	10614	10669	10732
Previous Week	10687	10614	10669	10732

NetQuery - ProcessGuard MONPP4 - Last 10 Alarms

ProcessGuard Alarms (Last 10)

vt_start	vt_end	plant	unit	tagname	description	groupid	primarydisplay
1/29/2007 10:38:01 AM	Open	MONPP	ALL_DCS	CM6-MTRFBRG:TC	CM6 MOTOR FRONT BEARING TEMP	14	4M6CTL
1/29/2007 10:37:58 AM	01/29/2007 10:38:01	MONPP	ALL_DCS	CM6-MTRFBRG:TC	CM6 MOTOR FRONT BEARING TEMP	14	4M6CTL
1/29/2007 10:37:53 AM	01/29/2007 10:37:58	MONPP	ALL_DCS	CM6-MTRFBRG:TC	CM6 MOTOR FRONT BEARING TEMP	14	4M6CTL
1/29/2007 10:37:46 AM	01/29/2007 10:37:53	MONPP	ALL_DCS	CM6-MTRFBRG:TC	CM6 MOTOR FRONT BEARING TEMP	14	4M6CTL
1/29/2007 10:37:36 AM	01/29/2007 10:37:46	MONPP	ALL_DCS	CM6-MTRFBRG:TC	CM6 MOTOR FRONT BEARING TEMP	14	4M6CTL
1/29/2007 10:37:34 AM	01/29/2007 10:37:46	MONPP	ALL_DCS	CM6-MTRFBRG:TC	CM6 MOTOR FRONT BEARING TEMP	14	4M6CTL
1/29/2007 10:37:19 AM	01/29/2007 10:37:34	MONPP	ALL_DCS	CM6-MTRFBRG:TC	CM6 MOTOR FRONT BEARING TEMP	14	4M6CTL
1/29/2007 10:37:17 AM	01/29/2007 10:37:34	MONPP	ALL_DCS	CM6-MTRFBRG:TC	CM6 MOTOR FRONT BEARING TEMP	14	4M6CTL
1/29/2007 10:29:41 AM	Open	MONPP	ALL_DCS	CM6-MTRFBRG:TC	CM6 MOTOR REAR BEARING TEMP	14	4M6CTL
1/29/2007 10:29:36 AM	01/29/2007 10:29:41	MONPP	ALL_DCS	CM6-MTRFBRG:TC	CM6 MOTOR REAR BEARING TEMP	14	4M6CTL

NetQuery - SmartSignal MONPP4 - Last 10 Items

SmartSignal Watch Items (Last 10)

Group	Asset	Rule	Total	First	Last
MILL 2 - MOTOR, BRG TEMPS & CURRENT	MONPP4 PULVERIZERS	UNC M2-MTRFBRG:TC, CM 2 MOTOR REAR BEARING TE LOW	17.57	3/23/2007 7:12:31 PM	4/5/2007 1:23:18 PM
MILL 1 - MOTOR, BRG TEMPS & CURRENT	MONPP4 PULVERIZERS	UNC M1-MTR:AMP, CM 1 PULV MOTOR AMPS HIGH	6	4/5/2007 9:53:17 AM	4/5/2007 11:03:16 AM
MILL 7 - MOTOR, BRG TEMPS & CURRENT	MONPP4 PULVERIZERS	UNC M7-THRSBRG:TC, CM 7 GEAR BOX THRUST BRG TLOW	16	4/5/2007 1:03:16 AM	4/5/2007 4:53:11 AM
MILL 2 - MOTOR, BRG TEMPS & CURRENT	MONPP4 PULVERIZERS	UNC M2-MTR:TEMP, CM 2 MOTOR WINDING TEMP HIGH	4	4/3/2007 11:53:38 PM	4/4/2007 12:43:37 AM
MILL 2 - MOTOR, BRG TEMPS & CURRENT	MONPP4 PULVERIZERS	UNC M2-MWIND:H2TC, CM 2 MOTOR WINDING TEMP H2 HIGH	4	4/3/2007 11:53:38 PM	4/4/2007 12:43:37 AM

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Application Framework
Expanded System Dashboard

Health Assessment

PI

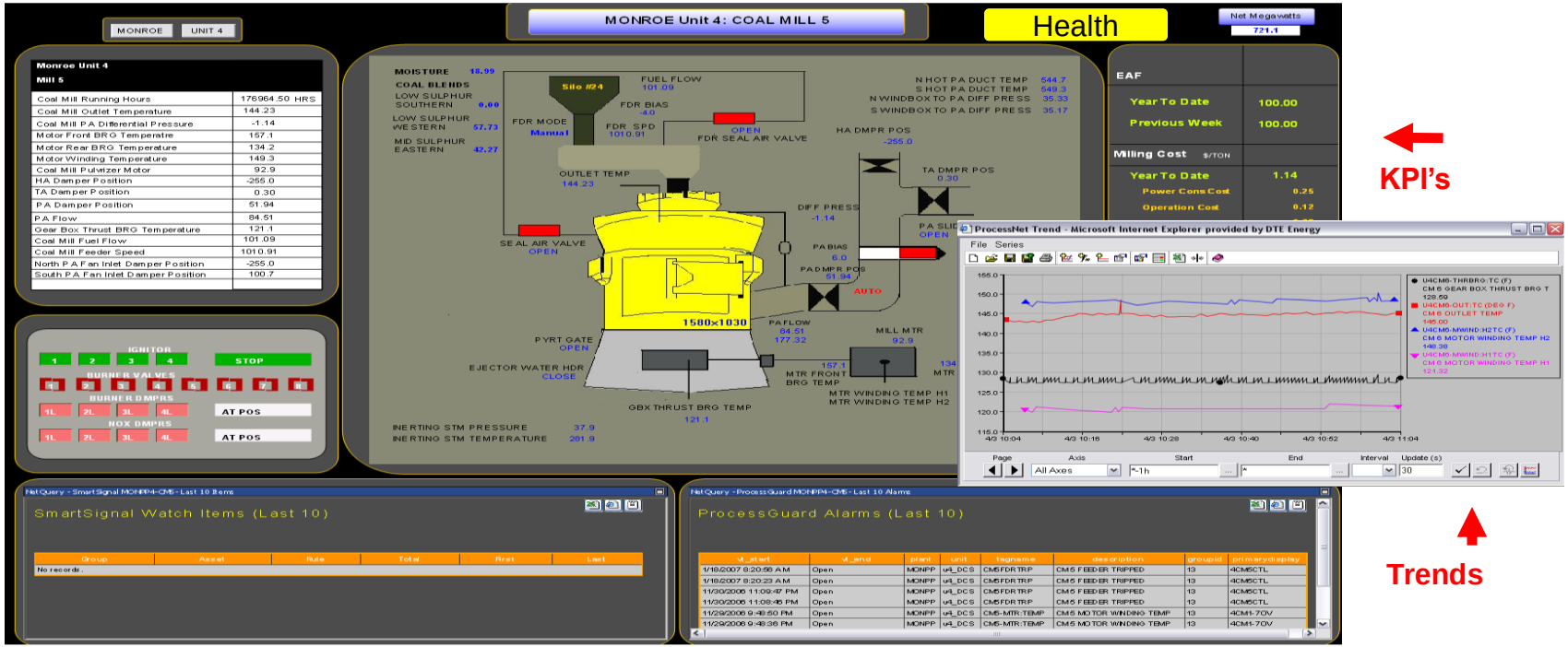
DCS

KPI's

Trends

SmartSignal Watch List

Alarms



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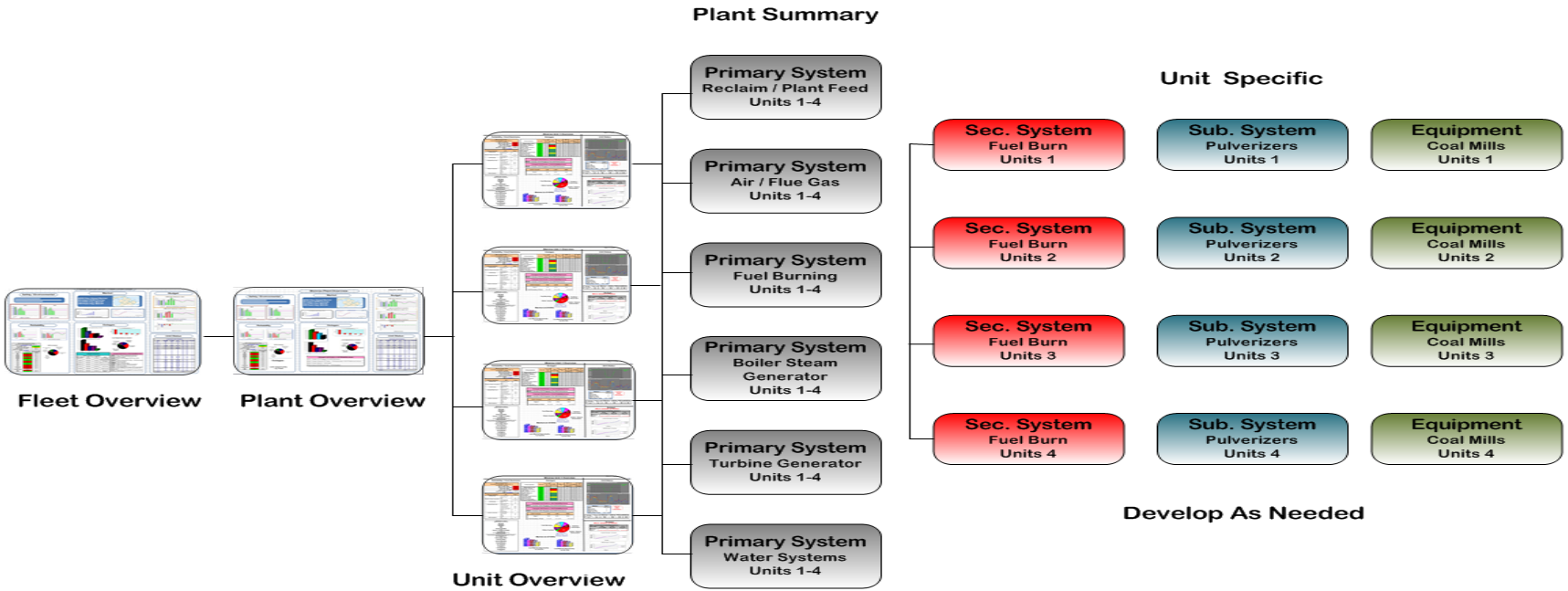
Logical Display Flow



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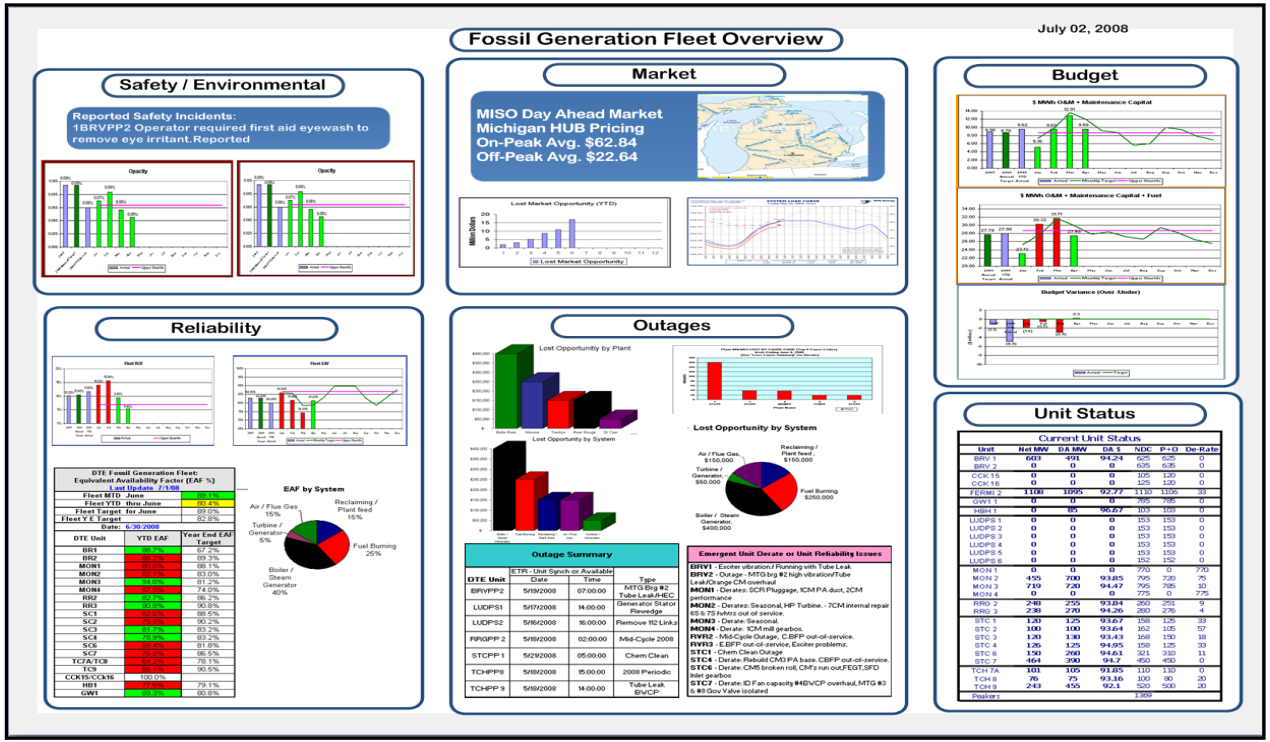
Fleet Overview



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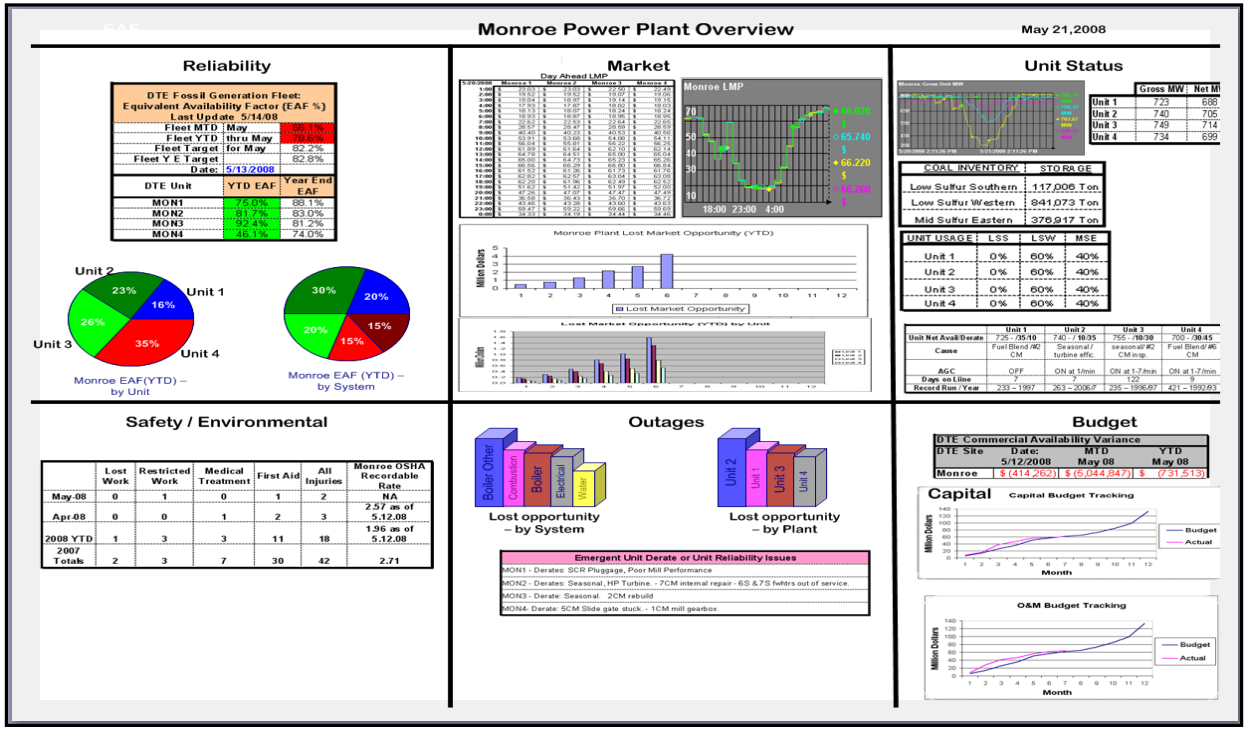
Plant Overview



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Unit Overview

Monroe Unit 1 Overview

Reliability / Cost Summary

Monroe Power Plant: Equivalent Availability Factor (EAF %) Last Update 5/14/08		
Monroe MTD	May	88.1%
Monroe YTD	thru May	78.8%
Unit 1 MTD	May	82.0%
Unit 1 YTD	thru May	81.9%
Unit 1 Target	for May	82.2%
Unit 1 Y E Target		82.8%
Date:	5/13/2008	

Primary Systems	KPI	Value
Air/Flue Gas	Aux Power Cost	$ -
	Process Cost	$ -
	EAF	%
Boiler & Steam Generation	EAF	%
	Unit Heat Rate	BTU/kWHr
	Boiler Efficiency	%
Fuel Burning	Milling Cost	$ -
	EAF	%
	Air to Coal Ratio	%
Reclaim/Plant Feed	O&M Costs	$ -
	AUX Power Cost	$ -
	Actual Inventory	tons
	Actual Delivery	tons
	Actual Consumption	tons
	Replacement Cost	$ -
	Blend	%
	Blend Cost	$ -
	Blend Quality	
Turbine/ Generator	Process Cost	$ -
	Mega Watts	mw
	EAF	%
	MTBF	
	MTTR	
Water Systems	EAF	%
	Process Cost	$ -

MONPP Unit 1 Detail
Date: 6/2/2008 10:41:34 AM

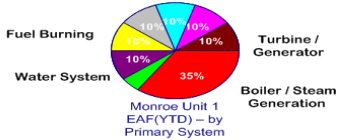
Unit Type: Base Load
MegaWatts: 707.3983
NDC: 770
Primary Available: 710
Primary + Overfire Available: 710
Current Blend: (60%LSW/40%MSE)+(100%2OIL)
Unit Constraints:
Derate [F]: (0) #2 CM internal inspection; Jun 6@1600; Harrison
Derate [F]: (60) SCR Pluggage; Jun 8@0805; E. Harrison
Special Conditions: None
Primary Econ. Blend: 46
Unit Econ. Blend: 0
Primary Scheduled: 46
Primary Random: 0
Unit Scheduled: 0
Unit Random: 60
Total Scheduled: 0
Total Random: 60

Outages

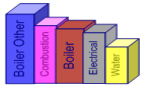
Primary Systems	YTD EAF	Year End EAF Target	Health Assesment	O&M Cost YTD	O&M Cost Previous Week	Capital Cost YTD	Capital Cost Previous Week
Monroe Unit 1 Total	75.0%	88.1%		$25,500.0	$1,593.8	$25,500.0	$1,500.0
Unloading / Storage	88.0%	90.0%		$1,500.0	$93.8	$1,500.0	$93.8
Reclaiming / Plant feed	92.0%	94.0%		$2,000.0	$125.0	$2,000.0	$125.0
Fuel Burning	71.0%	73.0%		$2,000.0	$125.0	$2,000.0	$125.0
Boiler / Steam Generator	74.0%	76.0%		$2,000.0	$125.0	$2,000.0	$125.0
Air / Flue Gas	88.0%	90.0%		$2,000.0	$125.0	$2,000.0	$125.0
Turbine / Generator	96.0%	98.0%		$2,000.0	$125.0	$2,000.0	$125.0
Water System	77.0%	79.0%		$3,500.0	$218.8	$3,500.0	$218.8
Plant Waste	88.0%	90.0%		$2,000.0	$125.0	$2,000.0	$125.0
Electical & Control System	96.0%	98.0%		$2,000.0	$125.0	$2,000.0	$125.0
Service Air & Gas	86.0%	88.0%		$2,000.0	$125.0	$2,000.0	$125.0
Switching & Mat	100.0%	102.0%		$2,000.0	$125.0	$2,000.0	$125.0
Diesel - Gas generator	82.0%	84.0%		$2,000.0	$125.0	$2,000.0	$125.0
Grounds & Physical Plant	92.0%	96.0%		$500.0	$31.3	$500.0	$31.3

Emergent Unit Derate or Unit Reliability Issues

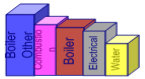
MON1 - Derates: SCR Pluggage, Poor Mill Performance



Market (in $1000)

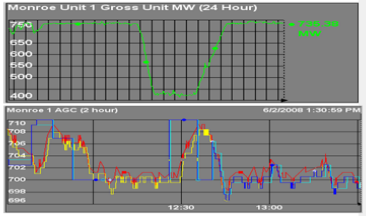


Lost Market Opportunity - by System



Lost Market Opportunity - by De-rate

Unit Status

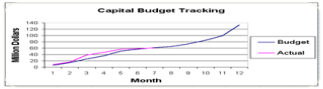


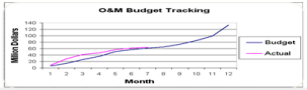
	Unit 1
Unit Net Avail/Derate	725 - /35/10
Cause	Fuel Blend /#2 CM
AGC	OFF
Days on Line	7
Record Run / Year	233 – 1997

Heat Rate (BTU/KWHR)	P3M for Last Month	PMAX Gross Turbine Heat Rate	PMAX Net Turbine Heat Rate	PMAX Gross Unit Heat Rate	PMAX Net Unit Heat Rate
Unit 1	9988	7966	8392	9473	9979

Budget

DTE Commercial Availability Variance			
DTE Site	Date: 5/12/2008	MTD May 08	YTD May 08
Monroe Unit 1	$ (414,262)	$ (5,044,847)	$ (731,513)





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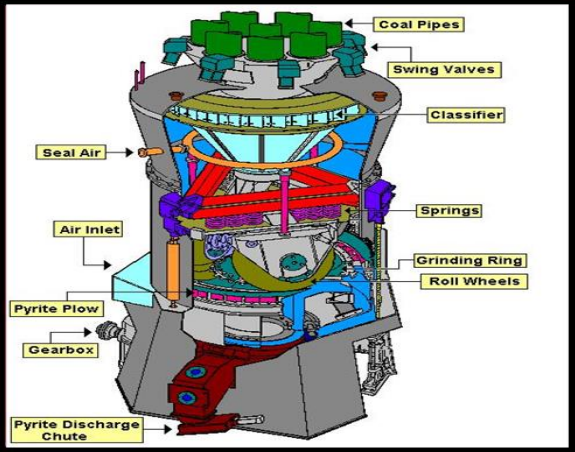
Coal Mill

Fleet >> Monroe >> Fuel Burn >> Unit 1 Fuel Burning >> Pulverizer >> **Coal Mill 1**

COAL MILL 1

Total Flow	645.9 kLB/Hr
Total Coal Blend (%)	LSS LSW MSE 0.0 70.0 30.0
Coal Throughput MTD	
Primary Air Flow	175.2 kLB/Hr
Tempering Air Flow	137.5 kLB/Hr
CM Outlet Temp	137.4 Deg F
CM Diff Pressure	8.6 in
Coal Mill Running Hours	54490.9 Hr
Feeder Speed	921.52 RPM
Feeder Flow	92.65 kLB/Hr
Motor Current	71.08 Amps
Motor Power	0.25 MW
Milling Cost (MTD)	$ 0.12 /Ton
Milling Cost (YTD)	$ 0.24 /Ton
O & M Cost (MTD)	$ 0
O & M Cost (YTD)	$ 32389
EAF (MTD)	100.0 %
EAF (YTD)	100.0 %
EAF MegaWatt Weeks Lost (MTD)	0.00 MWWks
EAF MegaWatt Weeks Lost (YTD)	5.83 MWWks
MTBF	6246.3 Hr
MTTR	17.6 Hr
ROF (MTD)	0.0 Hr
ROF (YTD)	0.0 Hr
ROF MegaWatt Weeks Lost (MTD)	0.00 MWWks
ROF MegaWatt Weeks Lost (YTD)	5.00 MWWks

Health Status



Vibrations (IPS)

	Vertical	Horizontal	Axial	Transverse	In
Motor IB	0.00	0.00	0.00	x	x
Motor OB	0.00	0.00	x	x	x
Gear Box IN	0.00	0.00	0.00	x	x
Gear Box 4	x	x	0.00	0.00	x
Gear Box 5	x	x	0.00	0.00	x
Gear Box 6	x	x	0.00	0.00	x
Gear Box 8	x	x	x	0.00	0.00
Gear Box 9	x	x	0.00	x	x

Monroe > Fuel Burn > Unit 1 Fuel Burning > Pulverizer > Coal Mill 1 - SmartSignal Rules Fired

Machine_Nm	Rule_Nm	Total	First	Last
No records				

Monroe > Fuel Burn > Unit 1 Fuel Burning > Pulverizer > Coal Mill 1 - ProcessGuard Alarm

TagName	Description	STARTTIME	ENDTIME
CM-INERT	CM INERTING	Oct 14 2008 8:12AM	Oct 15 2008 12:09AM

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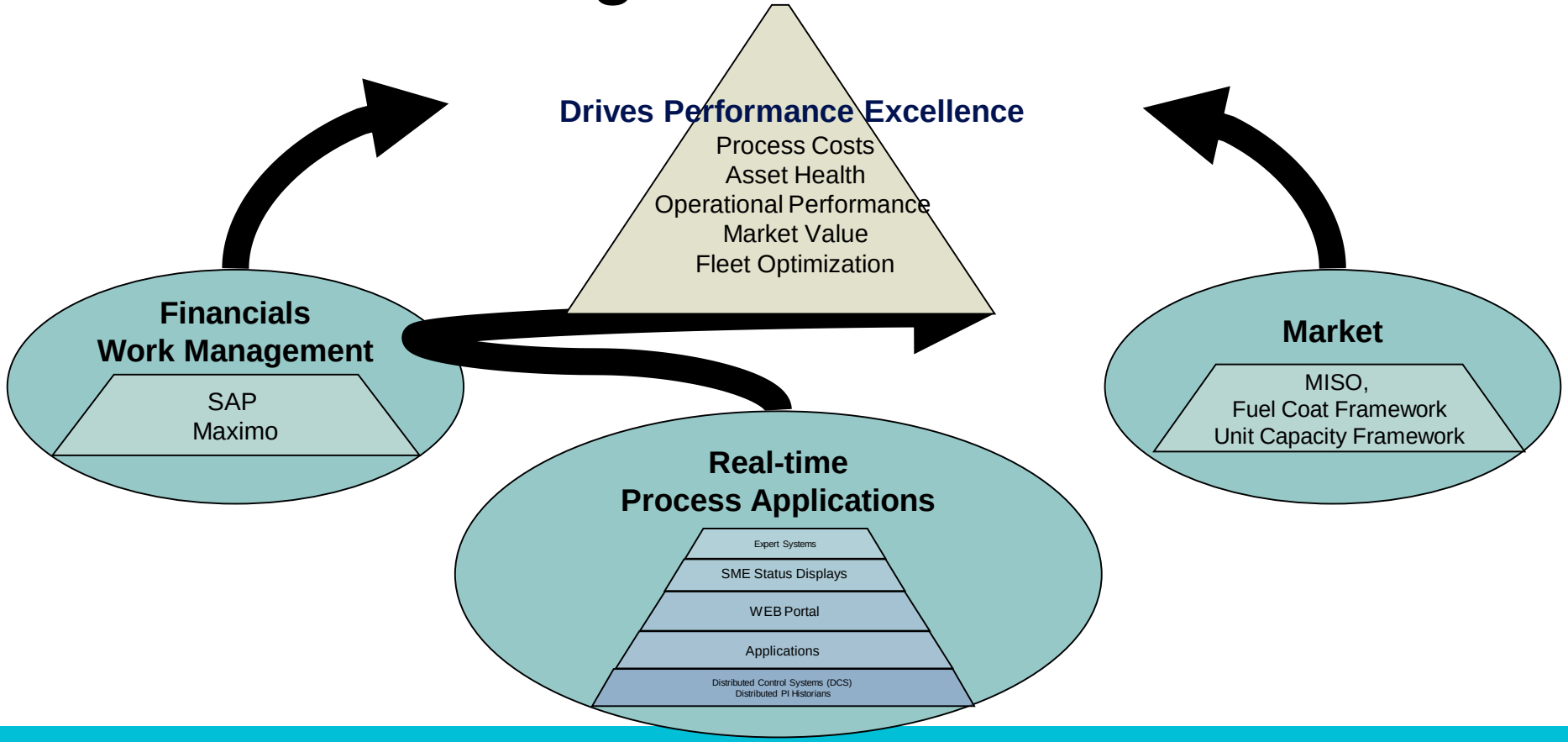
Total Fleet Management



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QUESTIONS?

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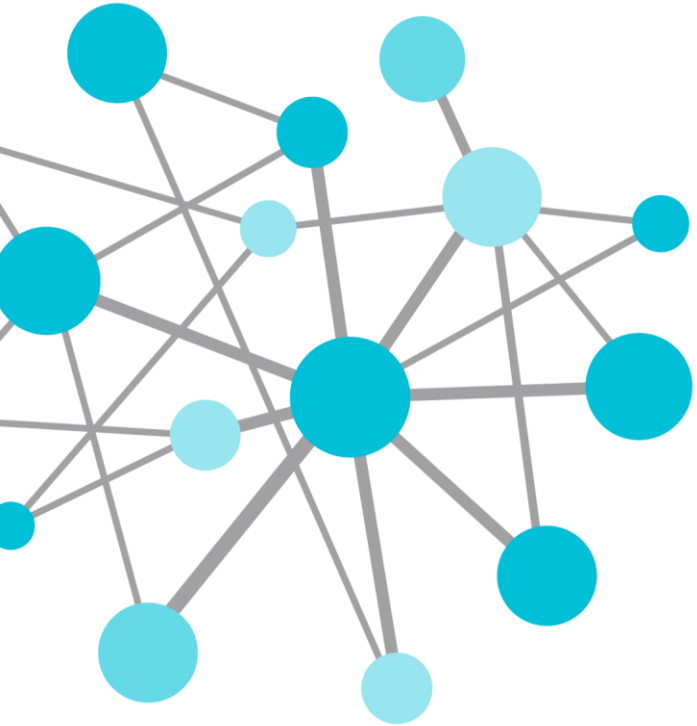

THANK YOU

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