VOYAGE2007

MONTEREY OSISOFT USER CONFERENCE 2007 CALIFORNIA

Fleet Optimization ……. through Process Information

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DTE Energy

DTE Energy

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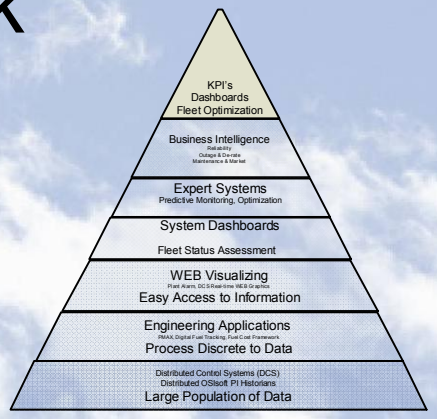
Agenda

- About **DTE Energy**
- **OSI**soft a Key Technology Enabler
- DTE – **OSI**soft Enterprise Agreement **(EA)**
- Technology Framework
  - Current
  - Future State



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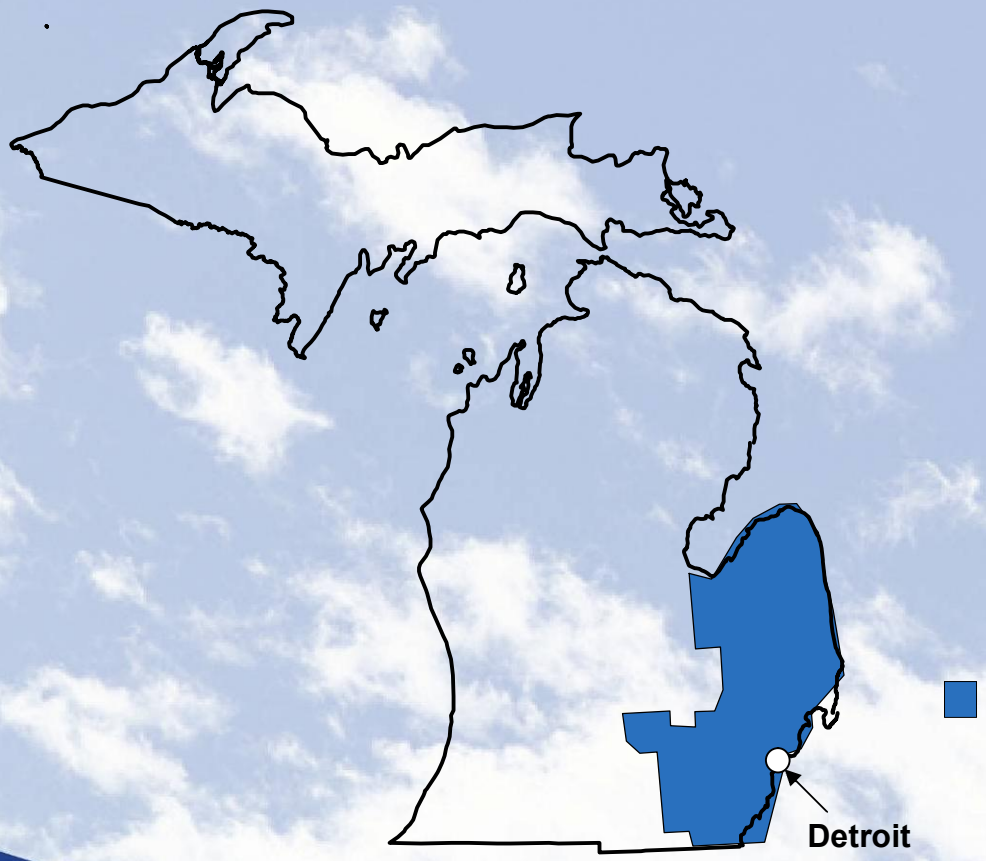
DTE Energy - Detroit Edison



Detroit Edison

- Michigan's largest electric utility with 2.2 million customers
- Over 11,080 MW of power generation, primarily coal fired
- 54,000 GWh in electric sales
- $4.7 billion in revenue

DTE Energy - Detroit Edison

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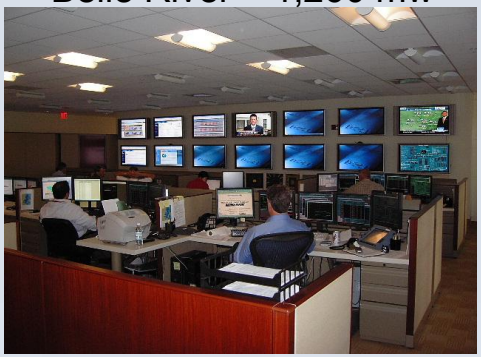
Plants & Performance Center

Monroe – 3,135 mw

Belle River – 1,260 mw

Trenton Channel - 730 mw



Performance Center – 11,588 mw

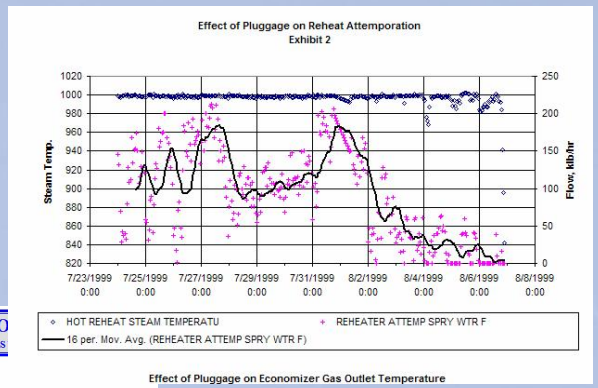
River Rouge - 527 mw

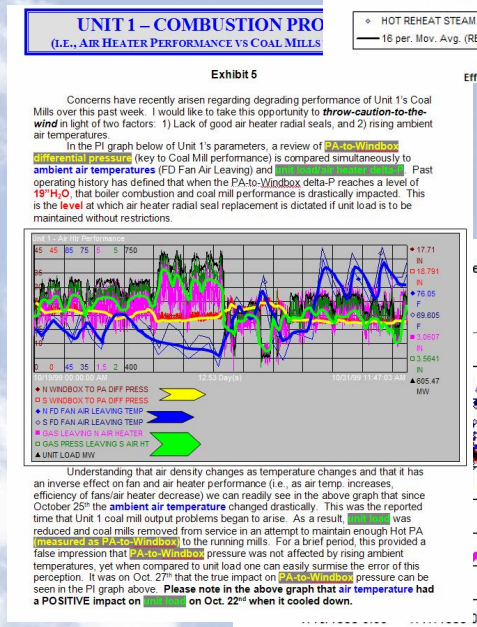
Greenwood – 785 mw

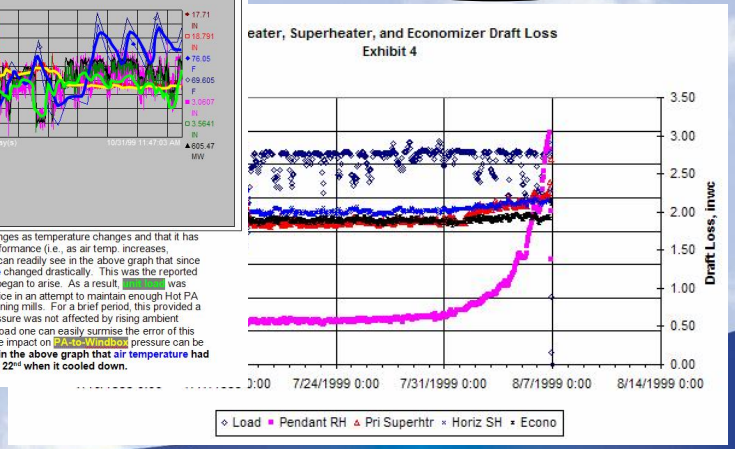
Generating Unit	Capacity Unit	Capacity Plant
Belle River 1	625	
Belle River 2	635	
Belle River		**1260**
Conners Creek 15	135	
Conners Creek 16	100	
Conners Creek		**235**
Fermi 2	**1110**	**1110**
Greenwood 1	**785**	**785**
Harbor Beach 1	**103**	**103**
Monroe 1	770	
Monroe 2	795	
Monroe 3	795	
Monroe 4	775	
Monroe		**3135**
River Rouge 2	247	
River Rouge 3	280	
River Rouge		**527**
St Clair 1	150	
St Clair 2	162	
St Clair 3	168	
St Clair 4	158	
St Clair 6	321	
St Clair 7	450	
St Clair		**1409**
Trenton Channel 7A	124	
Trenton Channel 8	122	
Trenton Channel 9	520	
Trenton Channel		**766**
Peakers	**1224**	**1224**
Totals:	**10554**	**10554**

History of OSI PI in DTE Energy

- Pilot at Monroe PP in 1998
- Fossil Generation Fleet 1999
- GenOps – EMS Ranger 2001
- SOC SCADA– 2002
- Fermi Nuclear– 2003
- DTE Subsidiaries – 2007
- **Enterprise Agreement** – 2007
- Continuous PI Expansion
  - Magnitude
  - Functionality







Success!

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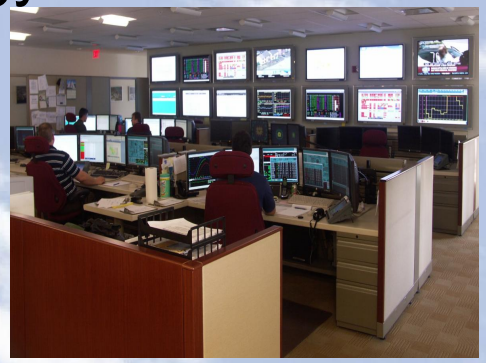
OSIsoft a Key Technology Enabler

- **Information** and **Application** Integration
  - **Primary data source** of process data (current & historic)
  - **Integral** part of many **Applications** (process and business)
  - **Communication Conduit** (plant status, fuel cost, control, EMS)
  - **Strategic** to DTE Energy's day to day Operation

- **Performance Center** – Enabling Technology
  - Equipment Condition Monitoring – SmartSignal
  - Enables DCS Displays
  - Process & Market Analysis



- DTE – OSIsoft Enterprise Agreement **(EA)**
  - Key to the Supply Cabinet

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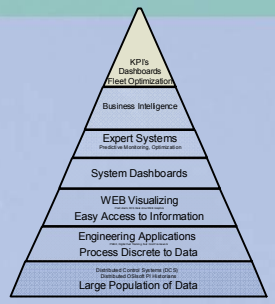
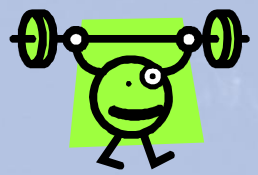
Why – OSIsoft Enterprise Agreement?

5 Key Benefits



1. OSI is a DTE Core Technology
2. OSI's Strong Track Record & Future Direction
3. Expand DTE's Use of OSIsoft Applications
4. Normalize Budget Allocation
5. **Premium** Software Reliance Program



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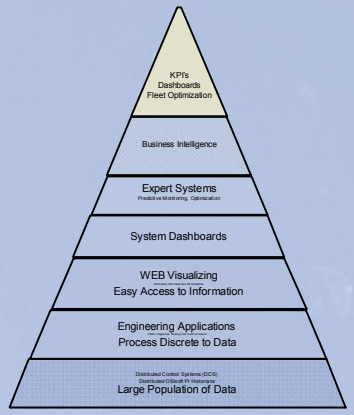
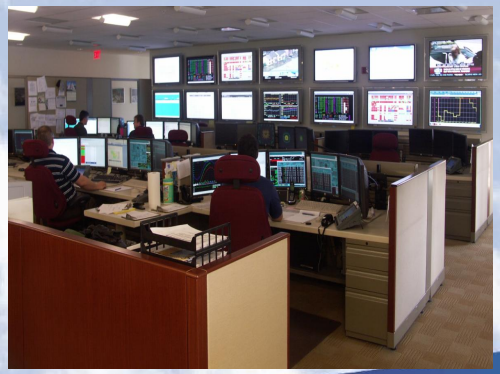
1. Core Technology

- Integral Part **Technology Framework**



- Component of Many **Applications**
  - Control Processes
  - Business Processes

- **Performance Center**
  - Enabling Technology



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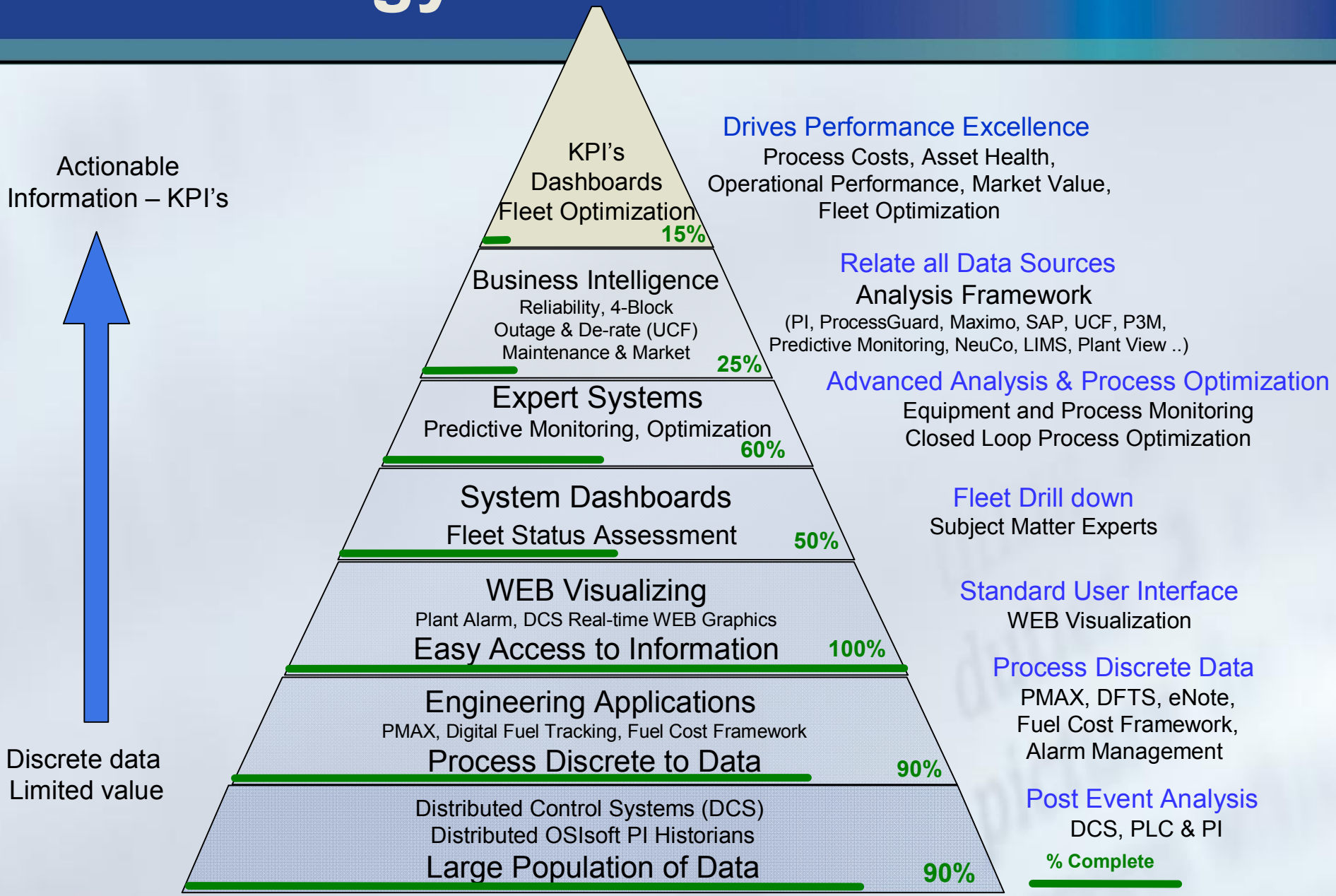
Technology Framework



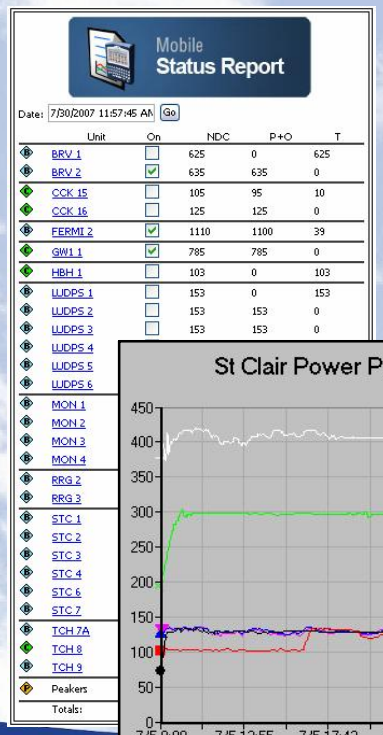
How Does Technology Enable You?

Mobile Work Force

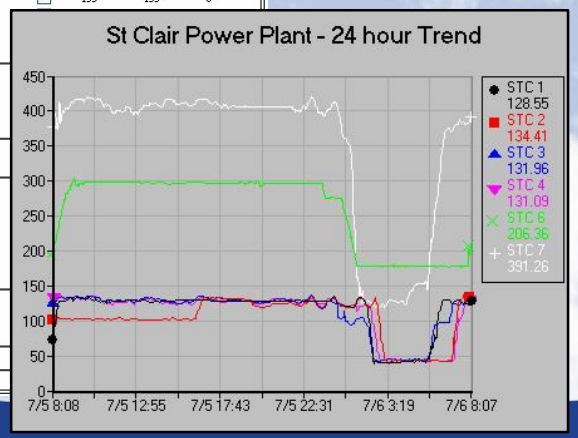
PI WEB reports available on your BlackBerry

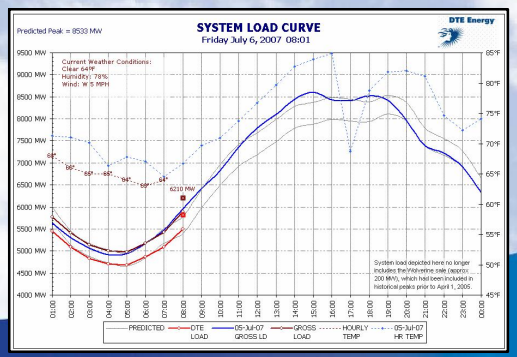
Unit	GrossMW	Rev/Min
Monroe Unit 1	547	3,599
Monroe Unit 2	44	3,600
Monroe Unit 3	438	3,599
Monroe Unit 4	545	3,599

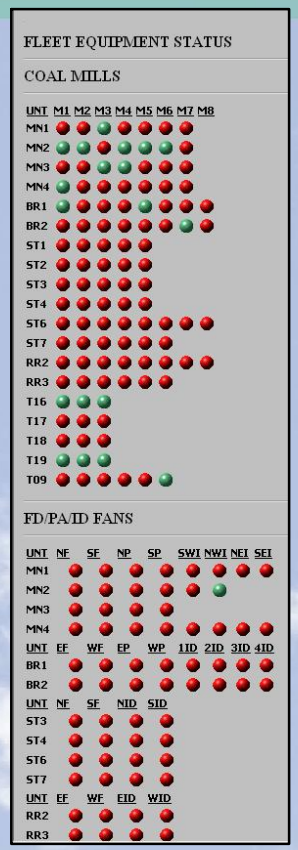
Bearing	Vibr	Temp
1 Mon - 12	0.8	168.0
1 Mon - 11	2.4	144.1
1 Mon - 10	2.7	156.4
1 Mon - 9	1.9	172.7
1 Mon - 8	3.2	166.2
1 Mon - 7	4.4	160.0
1 Mon - 6	1.3	177.4
1 Mon - 5	0.4	173.1
1 Mon - 4	4.5	178.0
1 Mon - 3	0.5	169.7
1 Mon - 2	2.1	159.4
1 Mon - 1	2.8	170.1



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







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Fleet Performance Center

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

- Located in Ann Arbor Michigan
- 7x24 hour operation (February 2006).
- Plant interface with Merchant Operation Center.
- Oversight of Outage and de-rate coordination.

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2. Track Record & Future Direction

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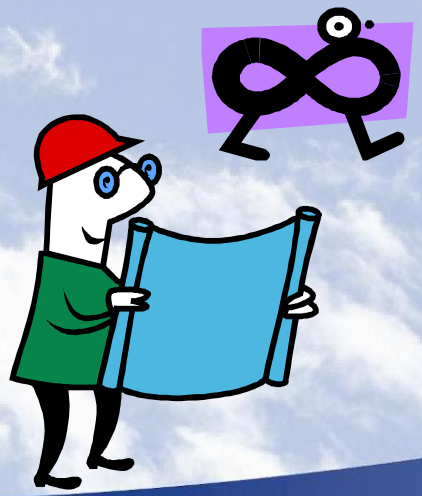
- Exceptional Track Record
  - **Worldwide** and Multi Industry
  - Exceptional System **Availability**
  - **Open** and **Fast** Data Access for Analysis
  - Unlimited **Interfaces** (PLC, DCS, Corporate Systems)
- Future Direction
  - Multi Industry Leverage
  - Managed PI
  - High Availability (HA) PI System
  - Analysis Framework



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3. Expand Use of PI Applications

- **Currently** Application in Use
  - PI Data Historian – Fleet Wide 300,000 tags
  - ProcessBook, DataLink, Active View, PI ManualLogger, PI Alarm, PI SMT
  - Multiple PI interfaces, Data Access Pack, API and SDK

- **Planned** Expansion
  - Expand PI tag count (Process Data, Operator Rounds, Application data ...)
  - IT Monitor
  - Analysis Framework
  - Advanced Computing Engine (PI ACE)
  - PI Module Database
  - RtPortal (WEB Visualization)

- **Required** Expansion
  - NERC Critical Infrastructure Protection
  - Market Interface
  - Environmental Reporting Regulations

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4. Normalize / Reduce Budget

- Capital Budget – Application Expansion
  - Strategic Technology Approval
  - Facilitates stable budget forecast
- O&M Budget – Support
  - Fixed Budget
  - Known Future Budget Impact
- Product Cost
  - Significant **Discounts**
  - **Unlimited** Usage

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5. Premium SRP (Software Reliance Program)

- Enterprise **Project Manager** and Enterprise **Account Manager**
- **Remote Monitoring**
- **Proactive Problem Resolution**
- Specialized Performance Reports
- Access to Center of Excellence
- Unlimited Tags & Standard Interfaces
- **Software Update System**
- Quarterly Reviews
- Access to all CBT's and Webinars, Training and Event vouchers

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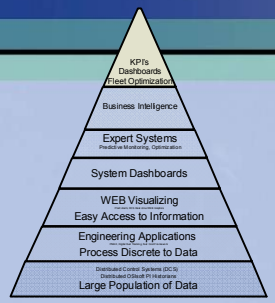
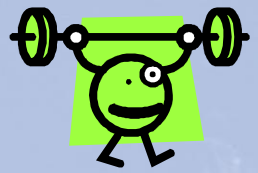
Why – OSIsoft Enterprise Agreement?



1. ☑ A DTE Core Technology
2. ☑ OSI's Strong Track Record & Future Direction
3. ☑ Expand DTE Use of OSIsoft Applications
4. ☑ Normalize Budget Allocation
5. ☑ **Premium** Software Reliance Program



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How Did We Get Here?

Lets take a closer look under the hood.

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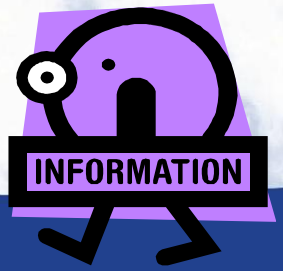
Challenge - Process Data Everywhere!

- **DCS** installations on nearly every unit
- Nearly **300,000** process data tags
  - PI Systems at each plant
  - 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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Technology Framework - Benefits

Annual Savings

Actionable
Information – KPI's

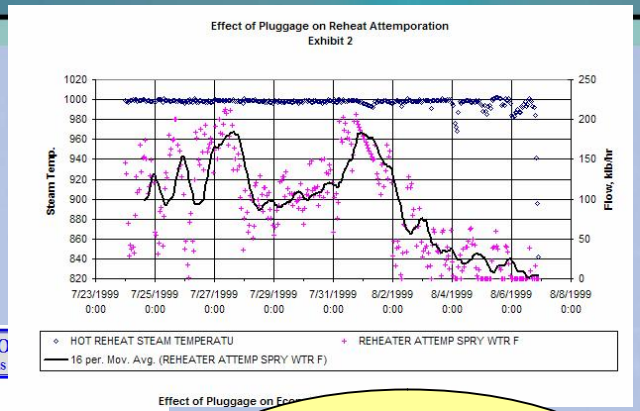
Discrete data
Limited value

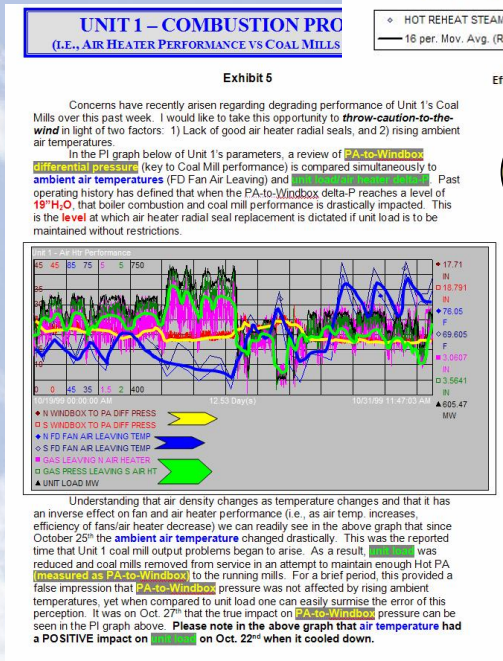
Distributed OSIsoft PI Historians
Large Population of Data

Data Analysis
$3,000,000

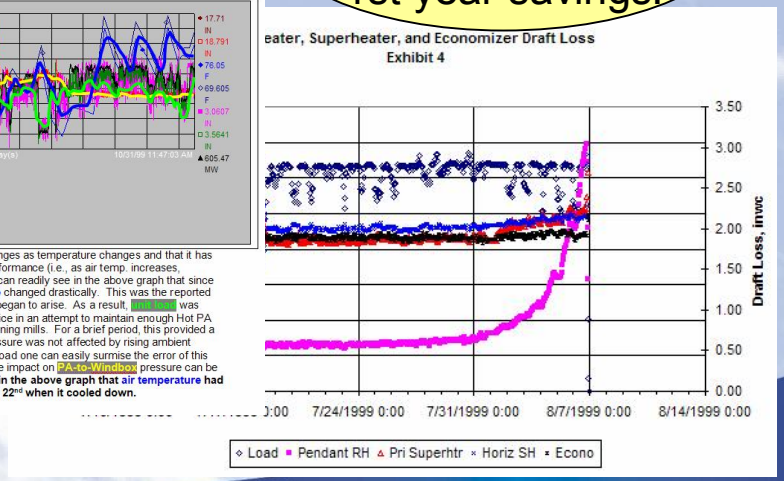
Raw Data Analysis

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





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



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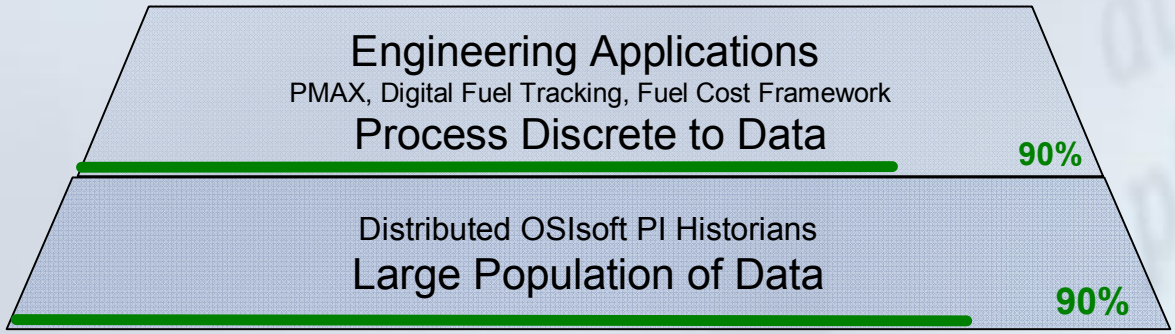
Technology Framework - Benefits

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!

SWITCH TO UNIT 1

11:46:55 4/06/2006

BOILER EFFICIENCY
BELLE RIVER UNIT # 2

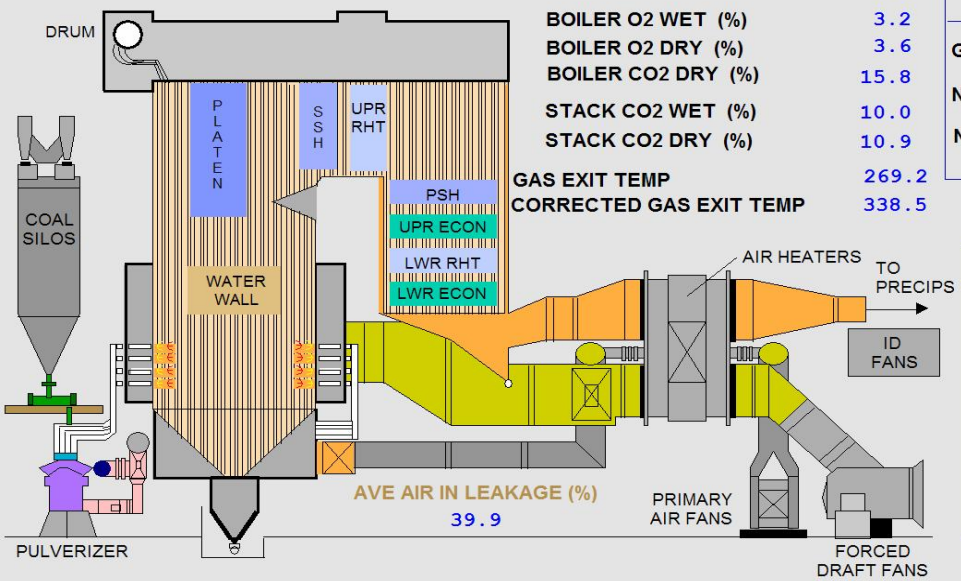
GROSS POWER

	MAIN STEAM	HOT REHEAT
PRESS (PSIA)	2437.0	552.4
TEMP (°F)	1001.8	1007.6
FLOW (LB/HR)	4221677	3993191

COAL FLOW - TPH	337.4
COAL HEATING VALUE	9253
OIL FLOW - GPM	0.0
BOILER O2 WET (%)	3.2
BOILER O2 DRY (%)	3.6
BOILER CO2 DRY (%)	15.8
STACK CO2 WET (%)	10.0
STACK CO2 DRY (%)	10.9
GAS EXIT TEMP	269.2
CORRECTED GAS EXIT TEMP	338.5

BOILER EFFICIENCY (%)	84.8
BOILER EFF NO A/H (%)	77.9

HEAT RATES (BTU/KWHR)	
GROSS TURBINE HEAT RATE	7771
NET UNIT HEAT RATE	9784
NET UNIT HEAT RATE (IN/OUT)	10212



AVE AIR IN LEAKAGE (%)
39.9

BOILER LOSSES (%)	
DRY GAS LOSS	6.20
UNBURNED CARBON LOSS	0.03
MOISTURE IN FUEL LOSS	3.23
HYDROGEN IN FUEL LOSS	3.93
MOISTURE IN AIR LOSS	0.14
RADIATION LOSS	0.16
UNSPECIFIED LOSS	1.55

PREVIOUS DISPLAY

WET CO2 AND O2 IS MEASURED, DRY CO2 AND O2 IS CALCULATED

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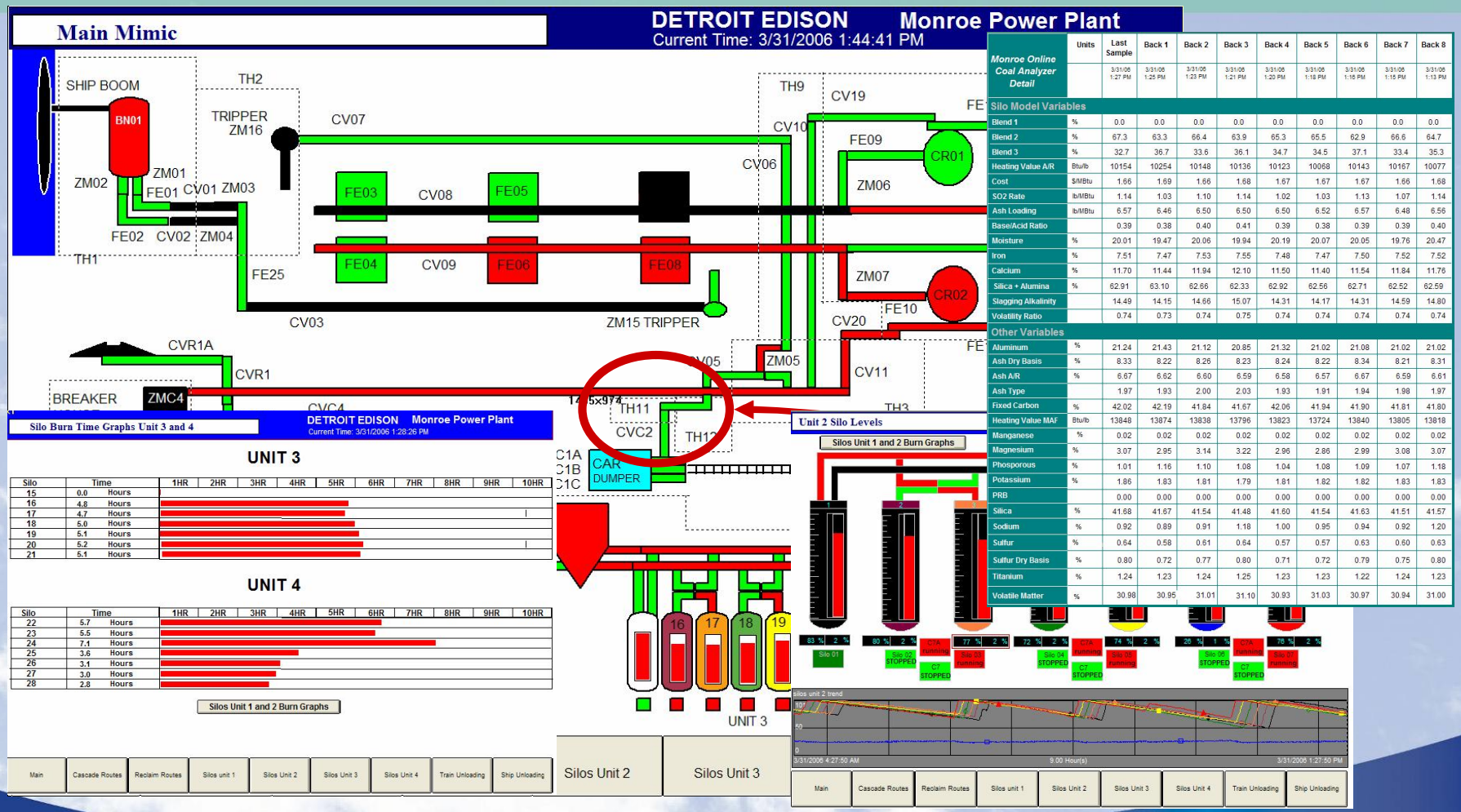
Digital Fuel Tracking System

$1,200,000
Annual Savings!



Monroe Online Coal Analyzer Detail	Units	Last Sample	Back 1	Back 2	Back 3	Back 4	Back 5	Back 6	Back 7	Back 8
		3/31/06 1:27 PM	3/31/06 1:25 PM	3/31/06 1:23 PM	3/31/06 1:21 PM	3/31/06 1:20 PM	3/31/06 1:18 PM	3/31/06 1:16 PM	3/31/06 1:15 PM	3/31/06 1:13 PM
Silo Model Variables										
Blend 1	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Blend 2	%	67.3	63.3	66.4	63.9	65.3	65.5	62.9	66.6	64.7
Blend 3	%	32.7	36.7	33.6	36.1	34.7	34.5	37.1	33.4	35.3
Heating Value A/R	Btu/lb	10154	10254	10148	10136	10123	10068	10143	10167	10077
Cost	$/MBtu	1.66	1.69	1.66	1.68	1.67	1.67	1.67	1.66	1.68
SO2 Rate	lb/MBtu	1.14	1.03	1.10	1.14	1.02	1.03	1.13	1.07	1.14
Ash Loading	lb/MBtu	6.57	6.46	6.50	6.50	6.50	6.52	6.57	6.48	6.56
Base/Acid Ratio		0.39	0.38	0.40	0.41	0.39	0.38	0.39	0.39	0.40
Moisture	%	20.01	19.47	20.06	19.94	20.19	20.07	20.05	19.76	20.47
Iron	%	7.51	7.47	7.53	7.55	7.48	7.47	7.50	7.52	7.52
Calcium	%	11.70	11.44	11.94	12.10	11.50	11.40	11.54	11.84	11.76
Silica + Alumina	%	62.91	63.10	62.66	62.33	62.92	62.56	62.71	62.52	62.59
Slagging Alkalinity		14.49	14.15	14.66	15.07	14.31	14.17	14.31	14.59	14.80
Volatility Ratio		0.74	0.73	0.74	0.75	0.74	0.74	0.74	0.74	0.74
Other Variables										
Aluminum	%	21.24	21.43	21.12	20.85	21.32	21.02	21.08	21.02	21.02
Ash Dry Basis	%	8.33	8.22	8.26	8.23	8.24	8.22	8.34	8.21	8.31
Ash A/R	%	6.67	6.62	6.60	6.59	6.58	6.57	6.67	6.59	6.61
Ash Type		1.97	1.93	2.00	2.03	1.93	1.91	1.94	1.98	1.97
Fixed Carbon	%	42.02	42.19	41.84	41.67	42.06	41.94	41.90	41.81	41.80
Heating Value MAF	Btu/lb	13848	13874	13838	13796	13823	13724	13840	13805	13818
Manganese	%	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Magnesium	%	3.07	2.95	3.14	3.22	2.96	2.86	2.99	3.08	3.07
Phosporous	%	1.01	1.16	1.10	1.08	1.04	1.08	1.09	1.07	1.18
Potassium	%	1.86	1.83	1.81	1.79	1.81	1.82	1.82	1.83	1.83
PRB		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Silica	%	41.68	41.67	41.54	41.48	41.60	41.54	41.63	41.51	41.57
Sodium	%	0.92	0.89	0.91	1.18	1.00	0.95	0.94	0.92	1.20
Sulfur	%	0.64	0.58	0.61	0.64	0.57	0.57	0.63	0.60	0.63
Sulfur Dry Basis	%	0.80	0.72	0.77	0.80	0.71	0.72	0.79	0.75	0.80
Titanium	%	1.24	1.23	1.24	1.25	1.23	1.23	1.22	1.24	1.23
Volatile Matter	%	30.98	30.95	31.01	31.10	30.93	31.03	30.97	30.94	31.00

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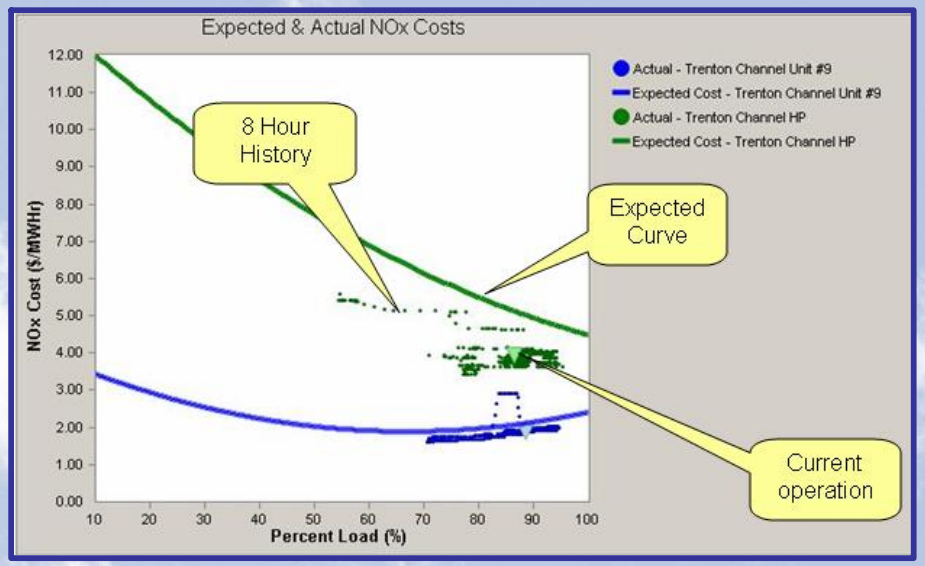
VALUE NOW, VALUE OVER TIME

NOx Emissions Strategy

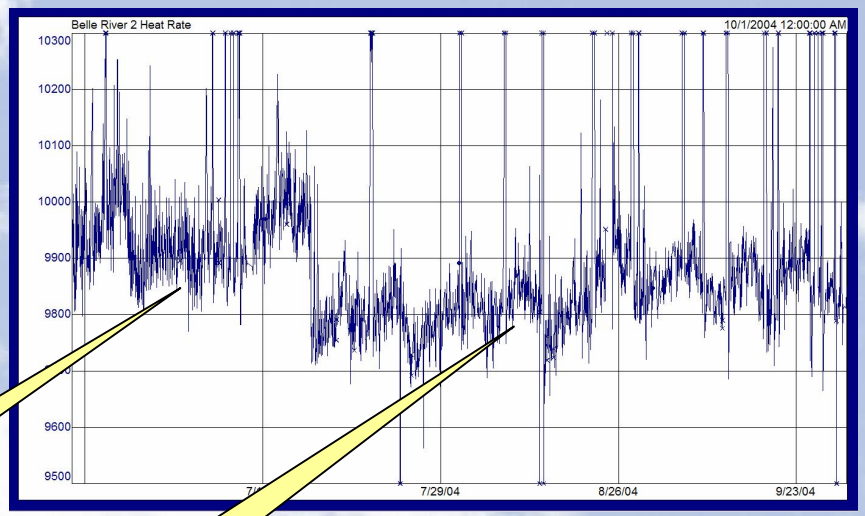
$2,200,000
Annual Savings!



NOx Reduction with Improved Heatrate

Before Implementation

After Implementation



Primary focus is NOx reduction only

Focus on operating near NOx budget curve

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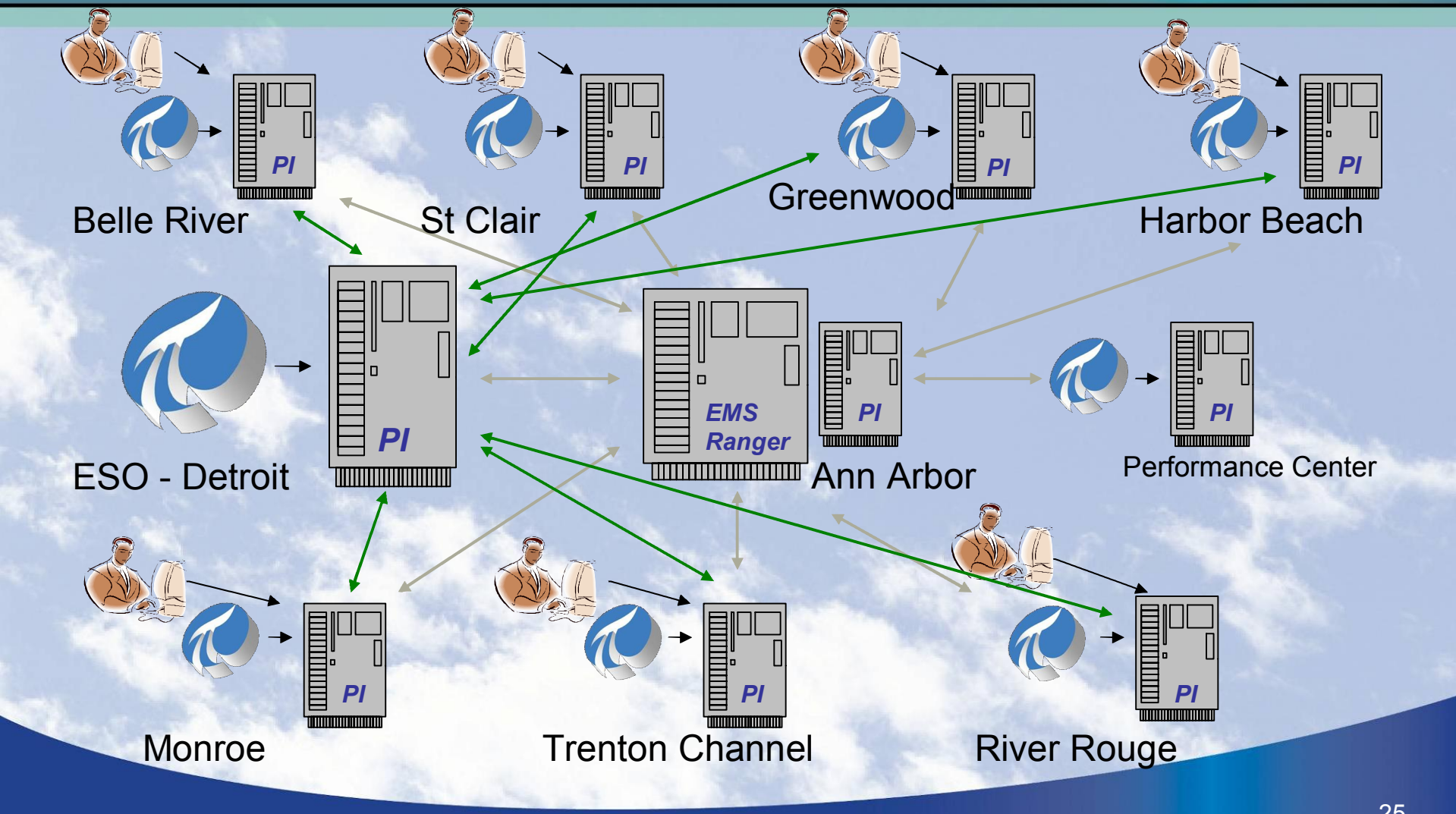
VALUE NOW, VALUE OVER TIME

PI to PI Process Data Conduit



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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

$120,000 Savings!

Fossil Generation
Unit Capacity Framework

Reports | Data Entry | Administration | EMS | Print | About | Quick Links:

Plant Energy Management System - Monroe Unit 1

Last Refresh: 3/3/2006 2:27:23 PM | Auto-Refresh Interval: 5 Minutes | AGC Mode: LOCAL

Select Unit | Change Data | Send Now | Limits & Error Checks

Fuel Data

	Block 1	Block 2	Block 3	Block 4
Fuel Definition	Coal	Coal	Coal	#2 Oil
Max Available MW	680	0	0	0
Regulating Fuel	Yes	No	No	No
Realtime MWs	670.1719	0	0	0
Fuel Cost $/MBTU	2.306458	2.306458	2.306458	14.04883
O + M Cost $/MBTU	0.1099987	0.1099987	0.1099987	0.1099987
Emission Cost	0.6212921	0.6212921	0.6212921	0.1028996
Total Cost $/MBTU	3.03772	3.03772	3.03772	14.26172
Total Cost $/MW Hr	27.33936	27.33936	27.33936	128.3555

Other Data

	Block 1	Block 2	Block 3	Block 4
Dispatch Margin Up	9.828125	0	0	0
Dispatch Margin	Calc Failed	0	0	0
Aux Power	32.3125			
Dynamic Heat Rate	106.87			

Unit Status	DNE
Fuel Cost	0
Startup MBTU	0

Fuel Price Calculator

* Current Blend: LSS:100%

Type of Coal / Blend % By Weight	LSS	100%
Type of Coal / Blend % By Weight	LSW	0%
Type of Coal / Blend % By Weight	LSW	0%

☐ Auto Update Fuel Prices | Calculate | Send

Operating Limit Data

Total Capability	680	TCAP
Ten Minute Capability	680	TMC
Regulation High	680	Reg High
Net MW	670.1719	
Regulation Low	400	Reg Low
Ramp Rate Up	2	AGC MW/MIN
Ramp Rate Down	2	AGC MW/MIN
Forbidden Zone 1 High	0	
Forbidden Zone 1 Low	0	
Forbidden Zone 2 High	0	
Forbidden Zone 2 Low	0	
Forbidden Zone 3 High	0	
Forbidden Zone 3 Low	0	
Forbidden Zone 4 High	0	
Forbidden Zone 4 Low	0	

Quick Reference

1. To edit data, click "Change Data".
2. Make necessary changes, then click "Send Now".

Select Unit | Change Data | Send Now | Limits & Error Checks

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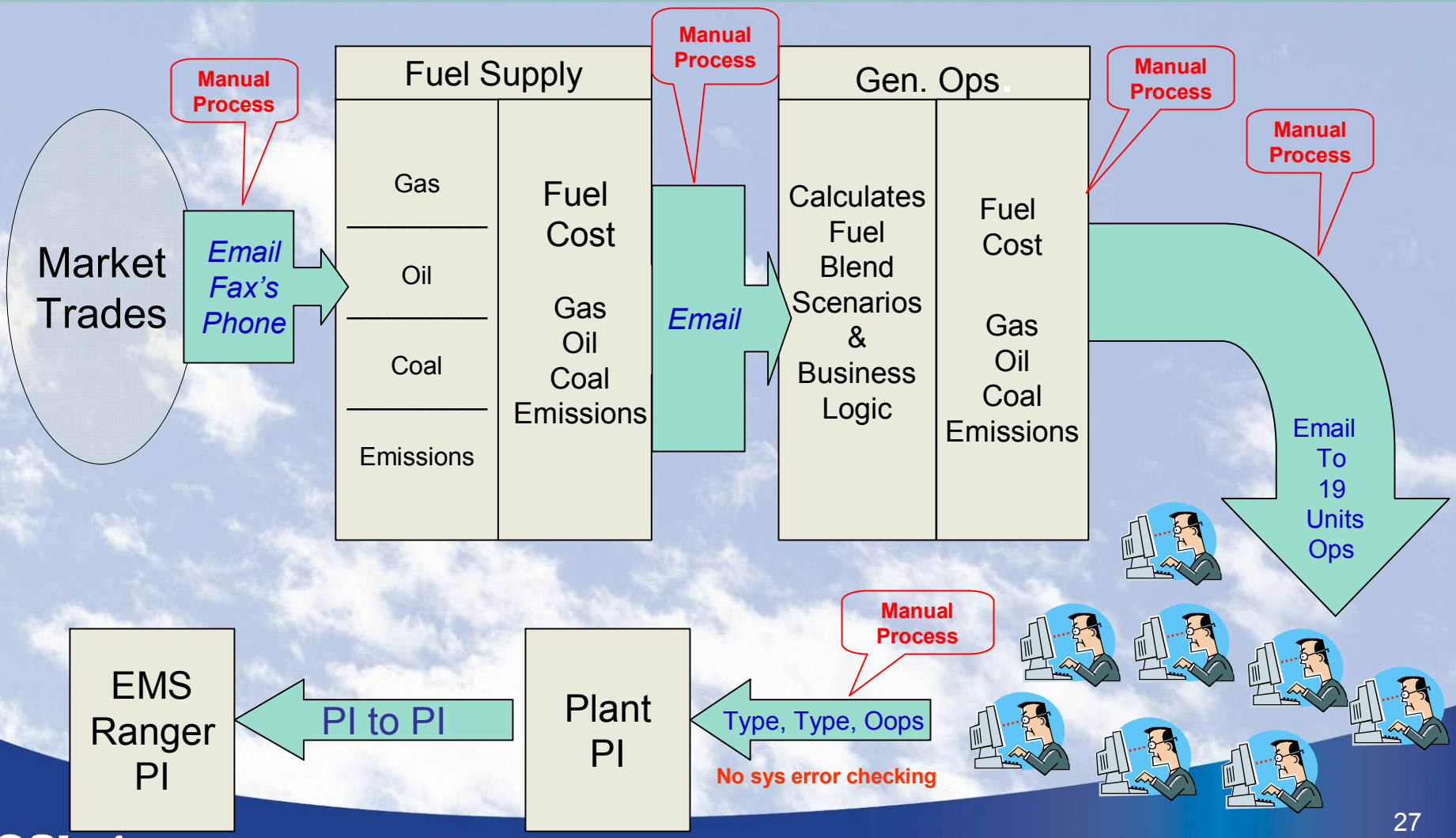
VALUE NOW, VALUE OVER TIME

Before Fuel Cost Framework



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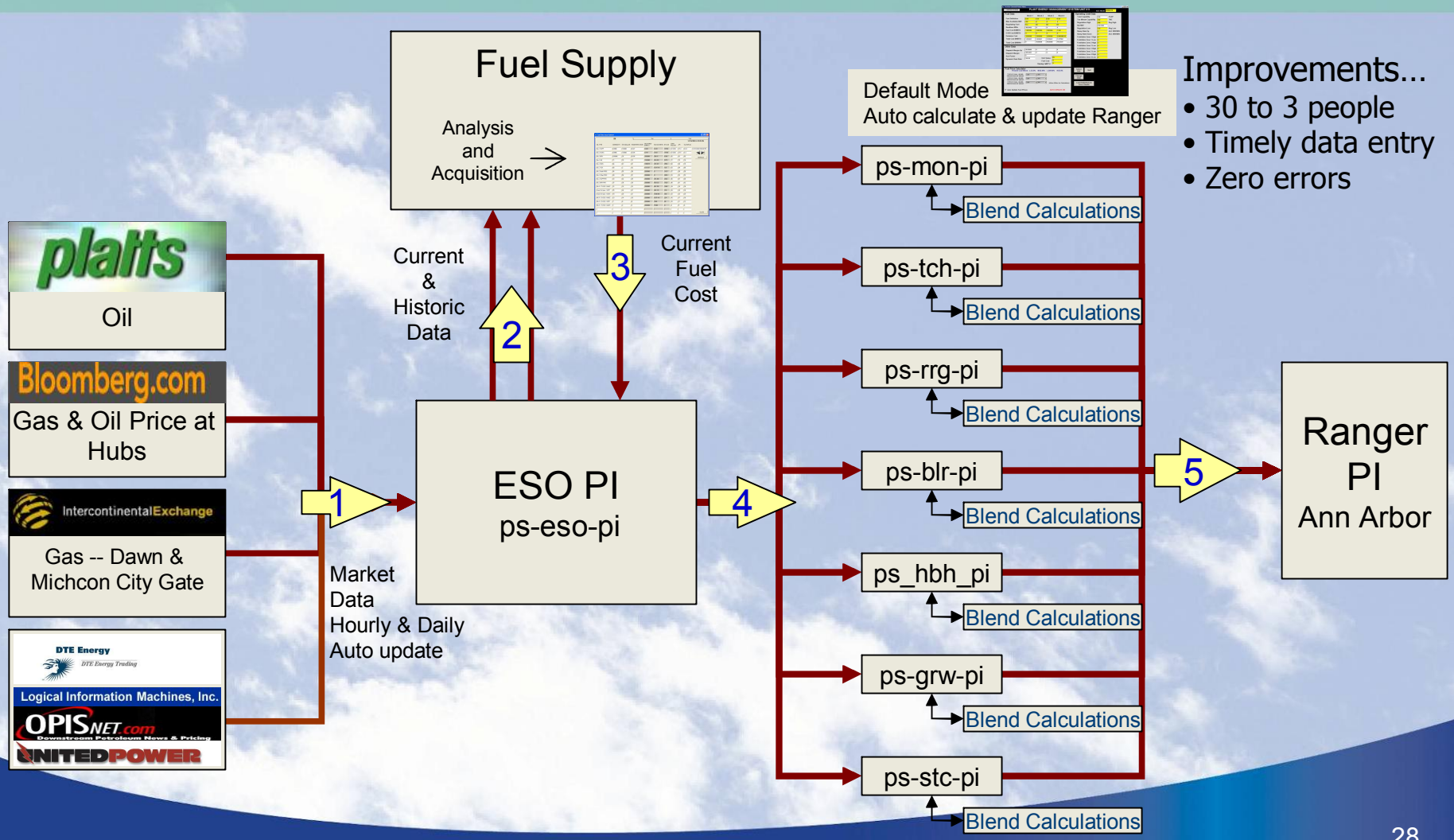
VALUE NOW, VALUE OVER TIME

Fuel Cost Framework

$530,000
Annual Savings!



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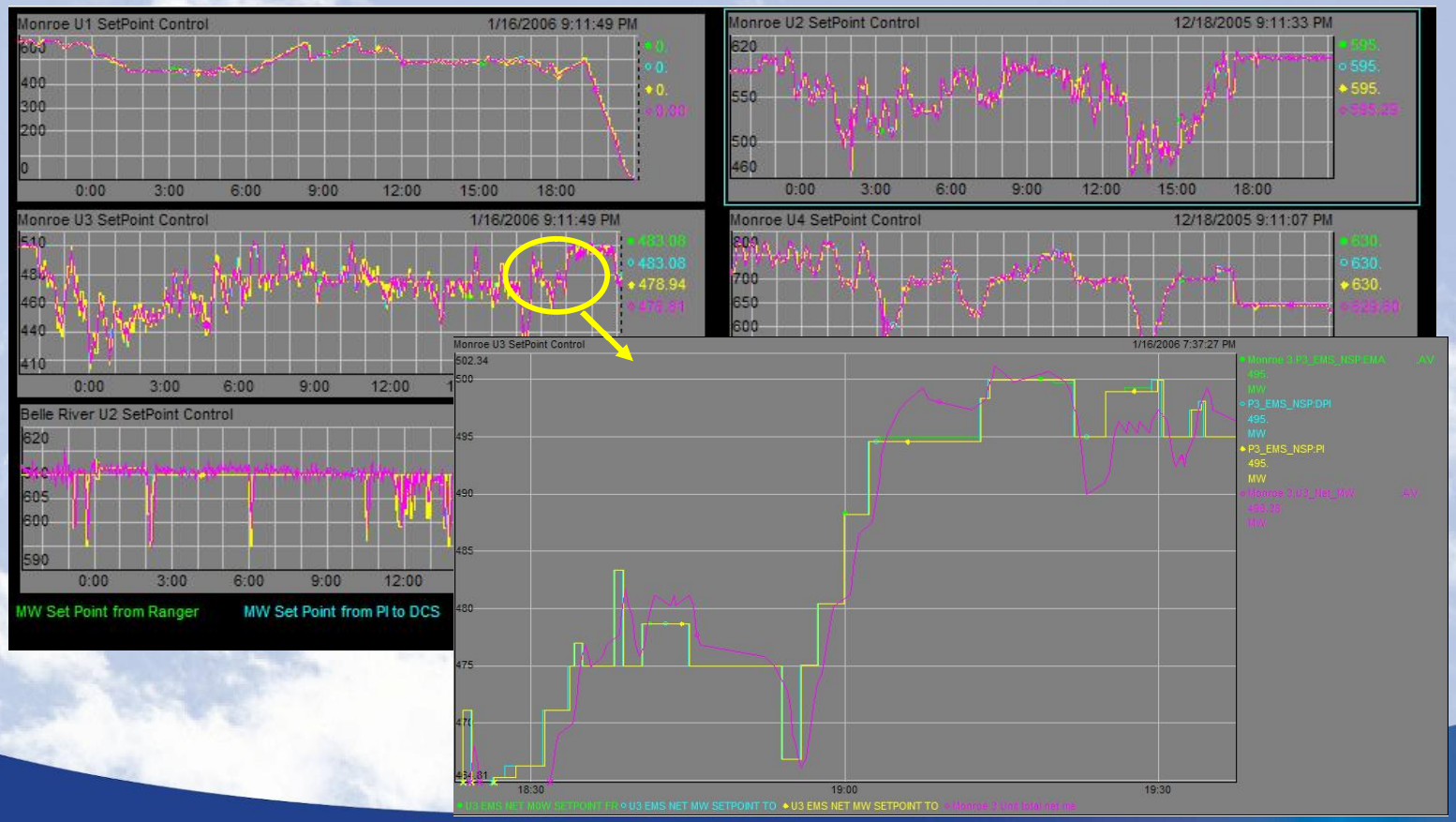
VALUE NOW, VALUE OVER TIME

PI to PI (AGC)

$200,000 Savings!

AGC – Automatic Generation Control

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



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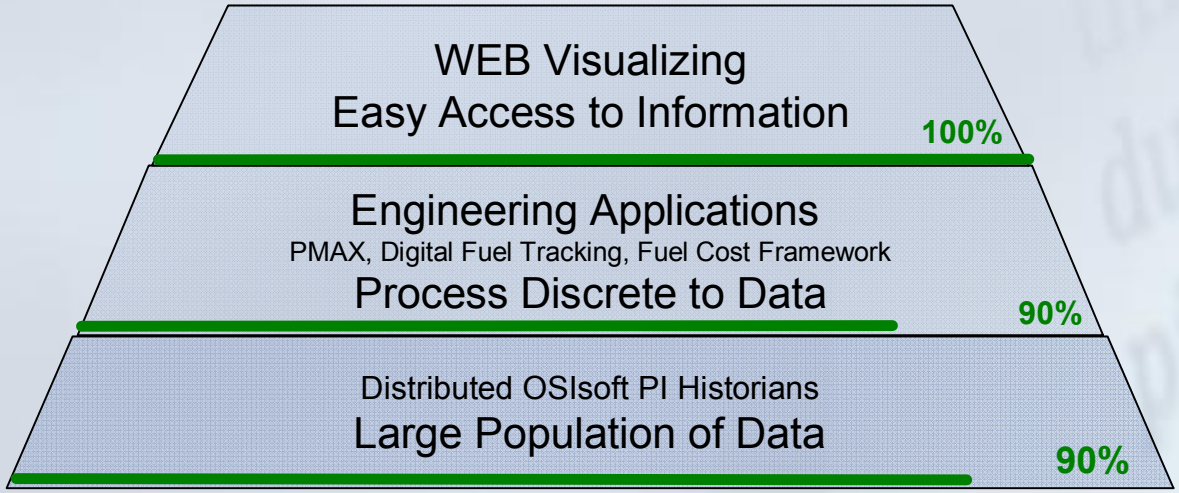
VALUE NOW, VALUE OVER TIME

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

Unit	Net MW	TMC	TCAP
BR 1	0	0	0
BR 2	609	635	635
FE 2	0	0	0
MON 1	645	730	730
MON 2	745	755	760
MON 3	753	760	760
MON 4	753	753	753
RR 2	245	255	255
RR 3	273	275	275
SC 1	105	105	135
SC 2	112	112	156
SC 3	125	135	150
SC 4	135	140	140
SC 6	255	255	280
SC 7	329	329	329
TC 7	94	105	105
TC 8	73	80	80
TC 9	460	500	500
GW 1	369	450	785
HB 1	84	84	84
LUD 1	0	0	0
LUD 2	0	0	0
LUD 3	0	0	0
LUD 4	-319	0	319
LUD 5	0	0	0
LUD 6	-322	0	322

Unit	Net MW	TMC	TCAP
CC 15	66	95	95
CC 16	53	125	125
BR 12-1	77	77	77
BR 12-2	75	75	75
BR 13	76	76	76
DLRY 11	0	67	67
DLRY 12	0	69	69
GW 11-1	77	77	77
GW 11-2	54	54	54
GW 12	19	19	19
BR 11			
CC 11			
CF 11			
DA 11			
FE 11-1			
FE 11-2			
FE 11-3			
FE 11-4			
HA 11-1			
HA 11-2			
HA 11-3			
HA 11-4			

Unit	Net MW	TMC	TCAP
HA 12-1	0	42	42
HA 12-2	0	42	42
HB 11	0	4	4
MON 11	0	14	14
NE 11-1	0	17	17
NE 11-2	0	16	16
NE 11-3	0	16	16
NE 11-4	0	16	16
NE 12	0	21	21
NE 13-1	0	21	21
NE 13-2	0	21	21

Load Forecast

HE	Today	Tomorrow
0100	6041	8250
0200	6015	7862
0300	5691	7505
0400	5967	7457
0500	6212	7564
0600	6857	8010
0700	7250	8581
0800	7893	9183
0900	8893	10069
1000	9573	10593

Plant Generation	6281
Ludington Generation	0
Peaker Generation	378
Misc. Generation	85
Total Generation	6745
Total Load	7978
Steel Load	289

Ludington DE EE 7293

Transactions
Firm Purchase
Non-Firm Purchase
Firm Sale
Non-Firm Sale
Service Area Load
Retail Schedule

		COAL MILLS	FANS FD	FANS PA	FANS ID	FW PUMPS Cond	FW PUMPS HF	FW PUMPS BF	Circ	VP	HDP	GB
MON	1	1 2 3 4 5 6 7	N S	N S	SW NW NE SE	N C S	N S	N S	N C S	N S	N C S	
	2	1 2 3 4 5 6 7	N S	N S	N S	N C S	N S	N S	N C S	N S	N C S	
	3	1 2 3 4 5 6 7	N S	N S	SW NW NE SE	N C S	N S	N S	E C W	N S	N C S	
	4	1 2 3 4 5 6 7	N S	N S	SW NW NE SE	N C S	N S	N S	E C W	N S	N C S	
BR	1	BF PL YE RE WH GR BL OR	E W	E W	1 2 3 4	E C W	E W	E W	N C S	NE SE NW SW	E C W	
	2	BF PL YE RE WH GR BL OR	E W	E W	1 2 3 4	E C W	E W	E W	N C S	NE SE NW SW	E C W	
STC	1	1 2 3 4 5										
	2	1 2 3 4 5										
	3	1 2 3 4 5	N S		N S	N S	N C S	N NC SC S			E W	
	4	1 2 3 4 5	N S		N S	N S	N C S	N NC SC S			E W	
	6	1 2 3 4 5 6 7 8	N S		N S	N S	N S	N S	N C S		N S	
	7	A B C D E F	N S		N S	N C S			N C S	N S	E W	
RR	2	1 2 3 4 5 6 7 8	E W		E W	E C W	E C W	E C W			E C W	
	3	1 2 3 4 5 6	E W		E W	E C W	E C W	E C W			E C W	
	GW		N S		N S	N C S		E W	N C S	N C S	N S	JF JM
TCH	16	A B C	N S		N			N C S				
	17	A B C	N S		N							
	18	A B C	N S		N			N C S				
	19	A B C	N S		N							
	9	A B C D E F	N S		N S	N C S	N S	N S			E W	

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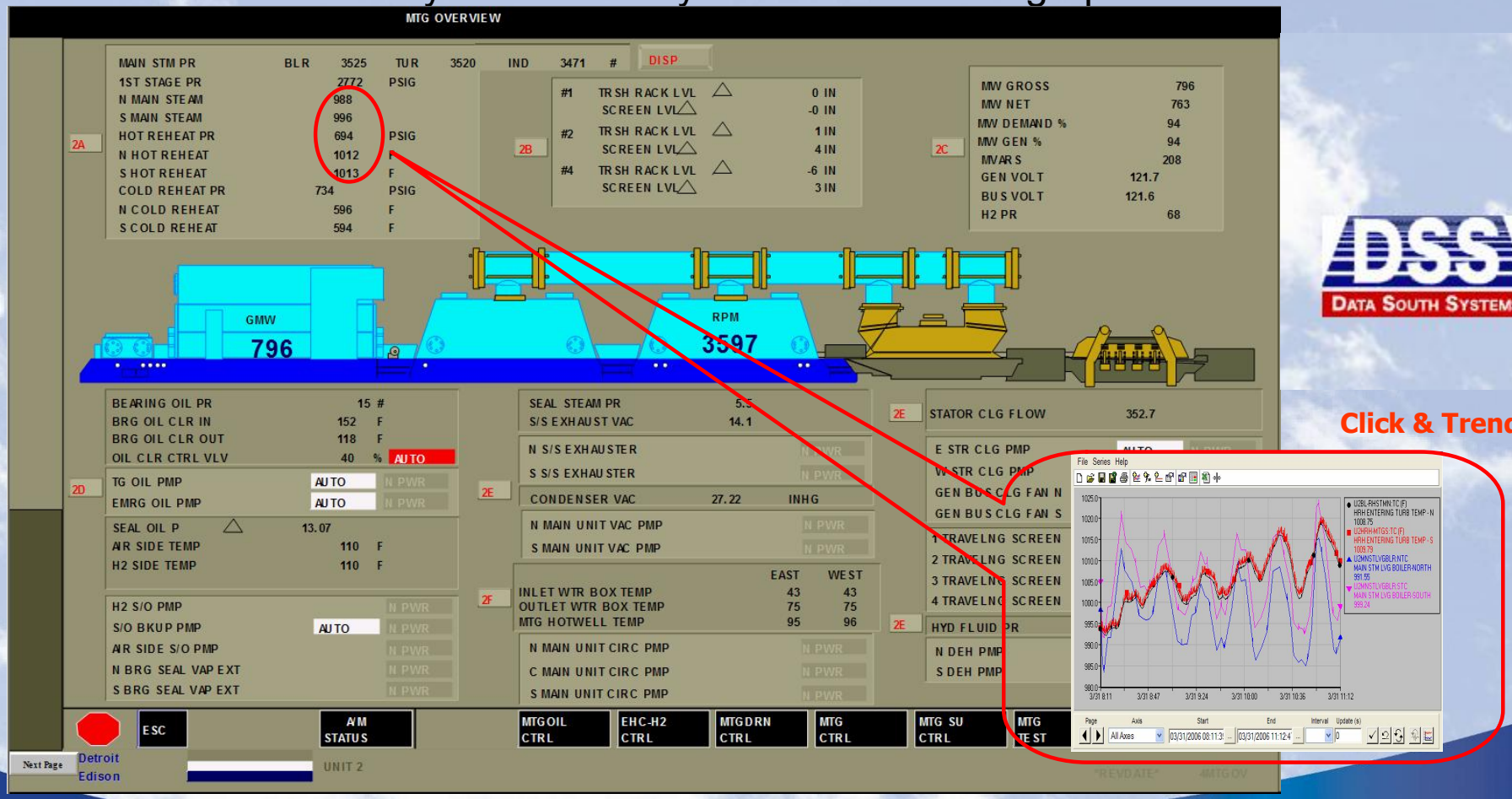
Real-Time DCS Operator Displays

6000 real time dynamic actively linked WEB DCS graphics



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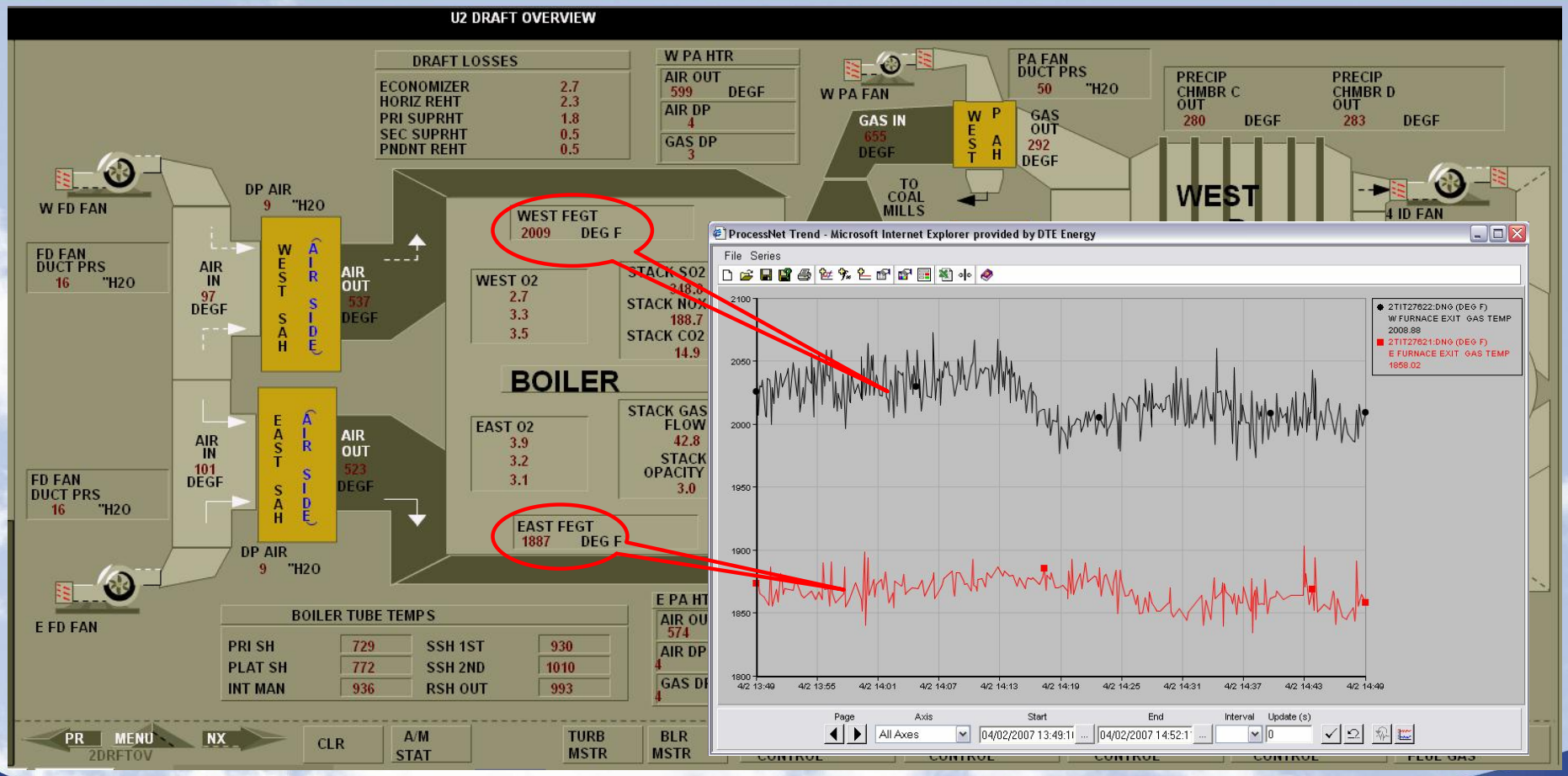
PI enabled - Event Re-play



Re-play events using historical PI data

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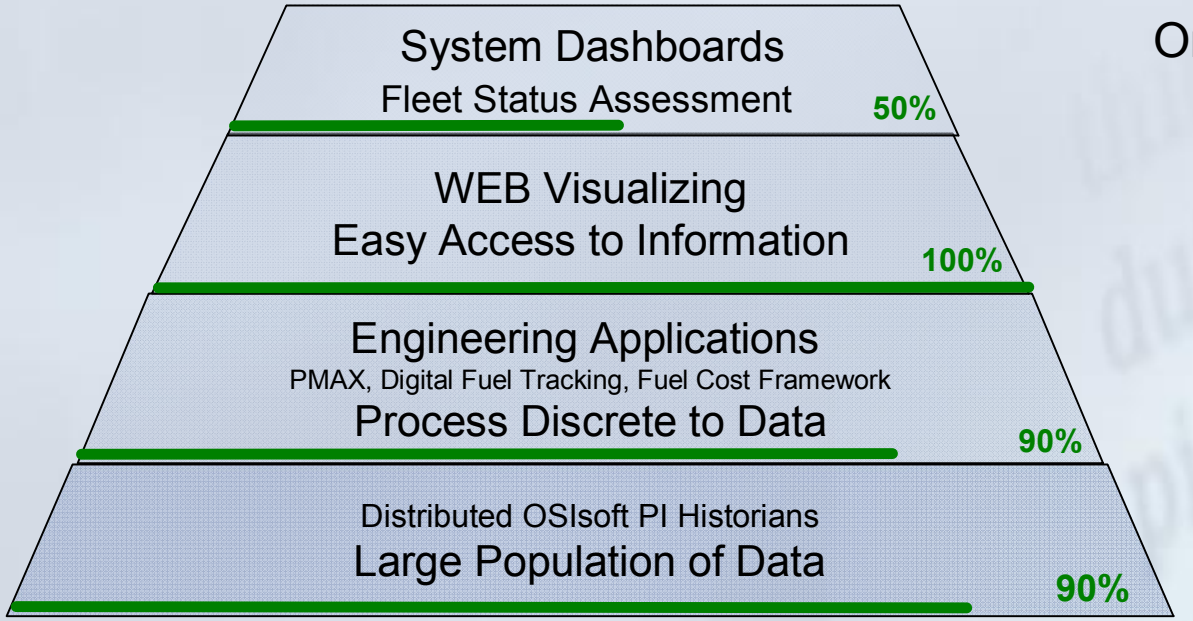
VALUE NOW, VALUE OVER TIME

Technology Framework

Annual Savings

Actionable
Information – KPI's

Discrete data
Limited value



Organized Drill Down
$1,000,000

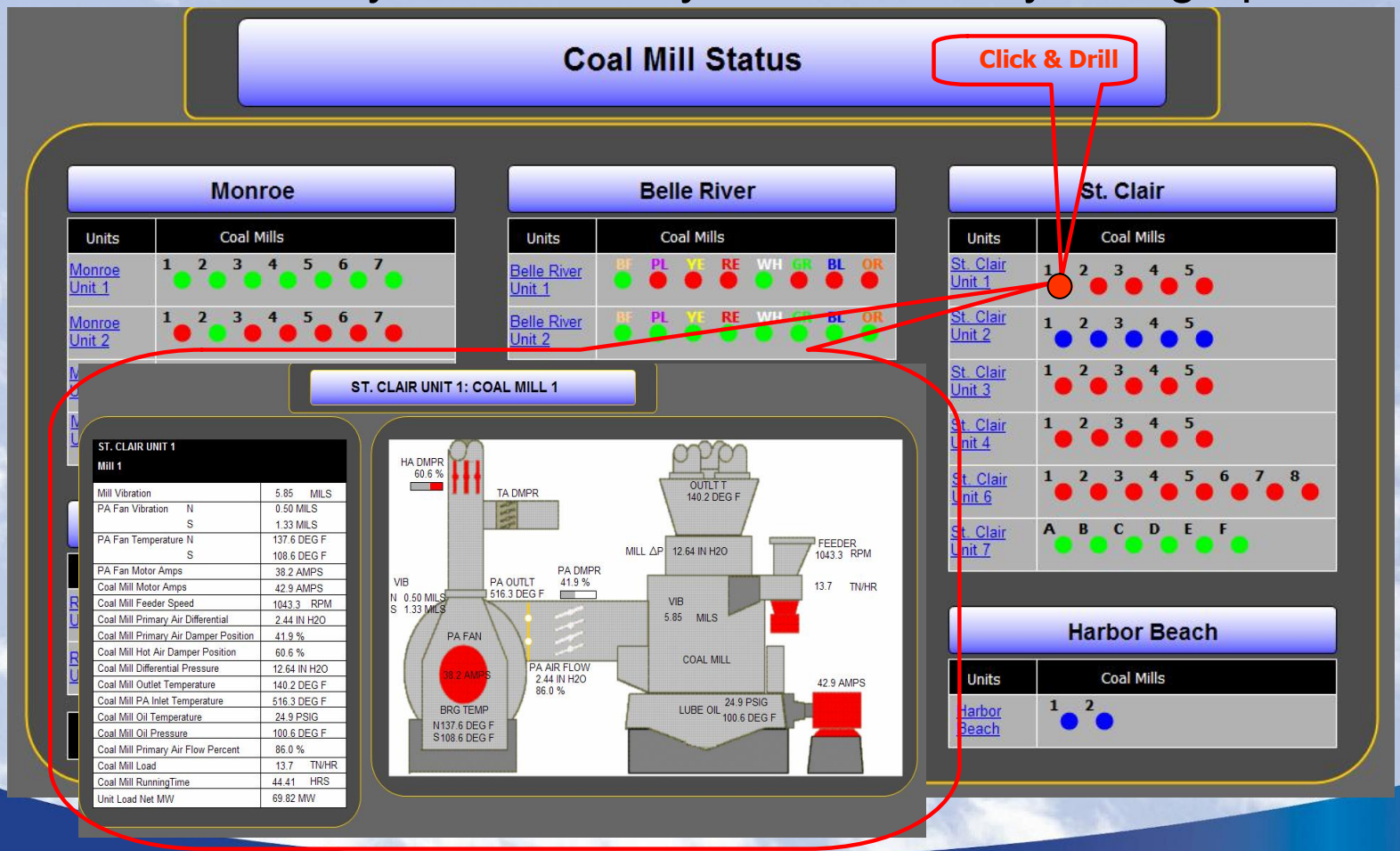
$5,500,000

$4,500,000

$3,000,000

System Dashboards – PI Enabled

2000 real time dynamic actively linked WEB System graphics



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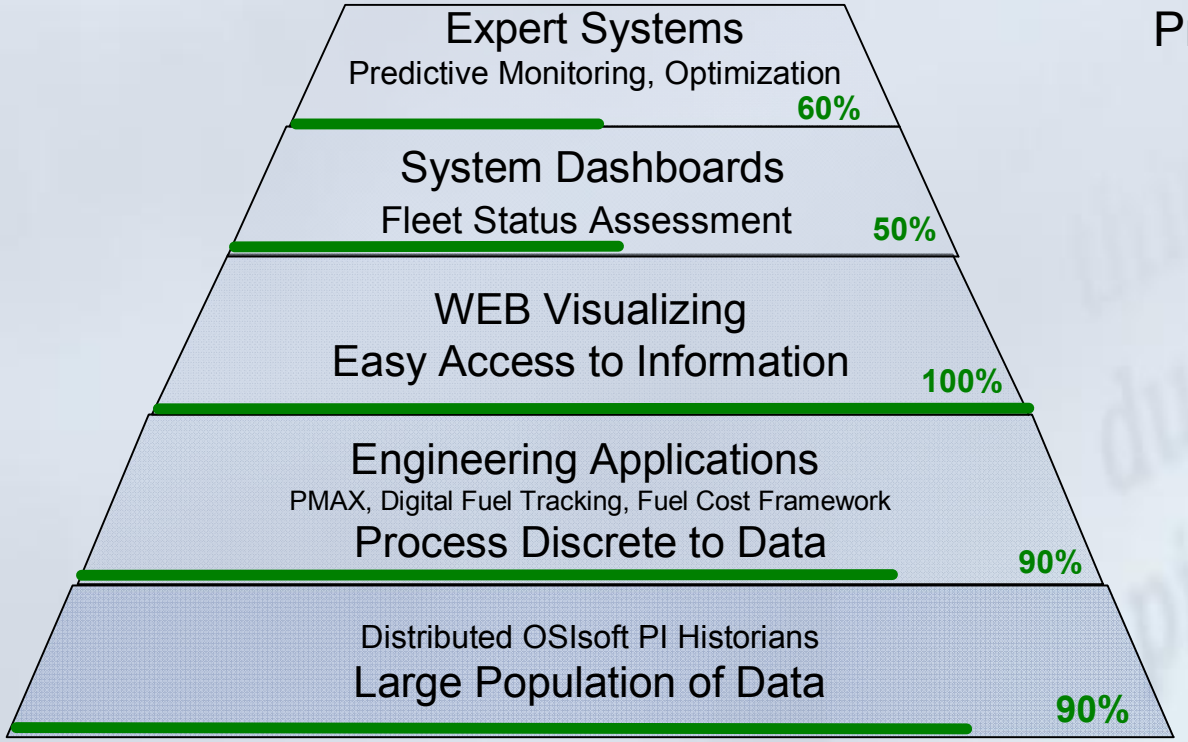
VALUE NOW, VALUE OVER TIME

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

PI Dependant Expert Systems

- Equipment & Process Monitoring – SmartSignal
  - 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!

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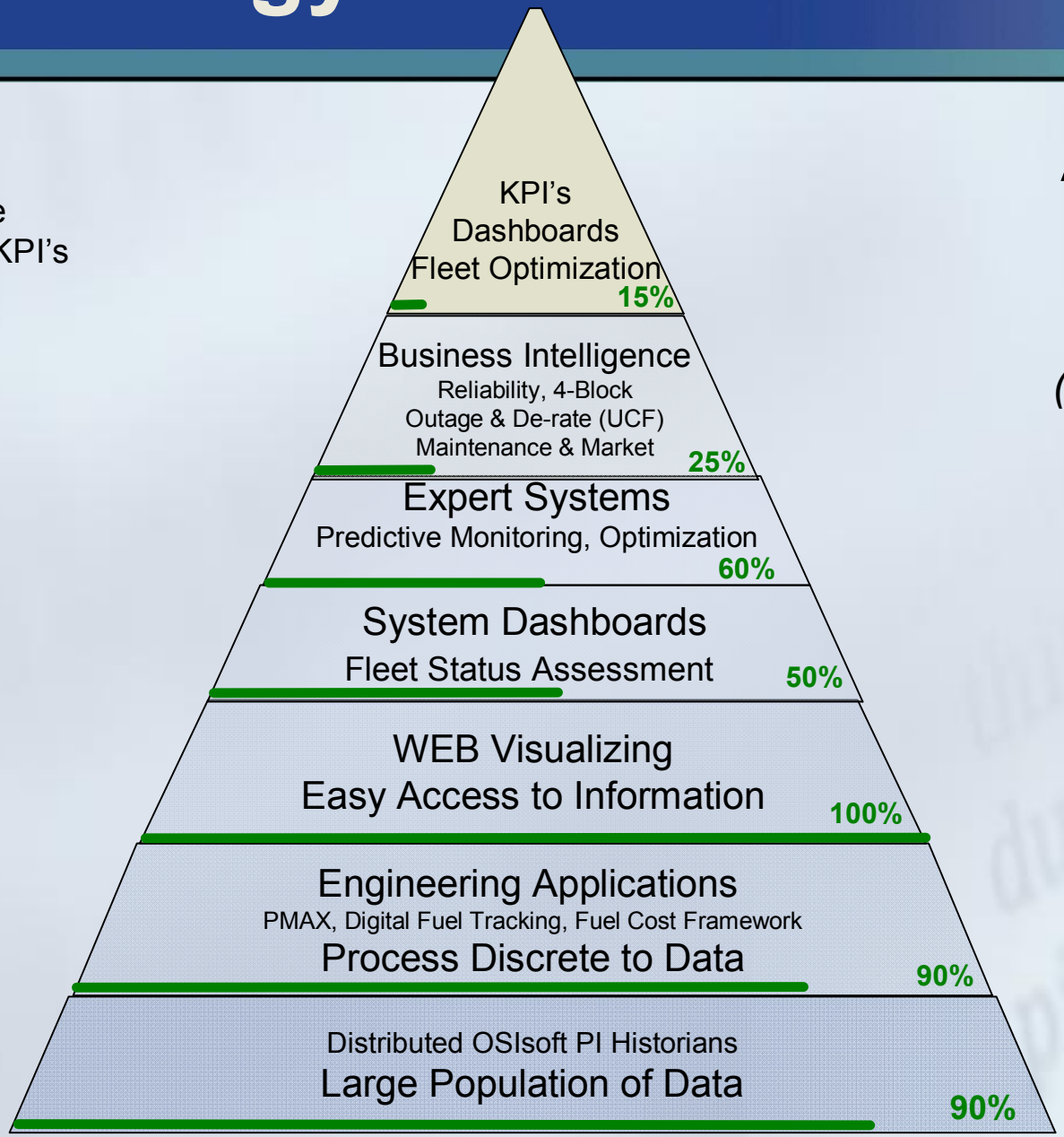
VALUE NOW, VALUE OVER TIME

Technology Framework

Actionable Information – KPI's

Discrete data Limited value



Annual Savings

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

$11,000,000

$1,000,000

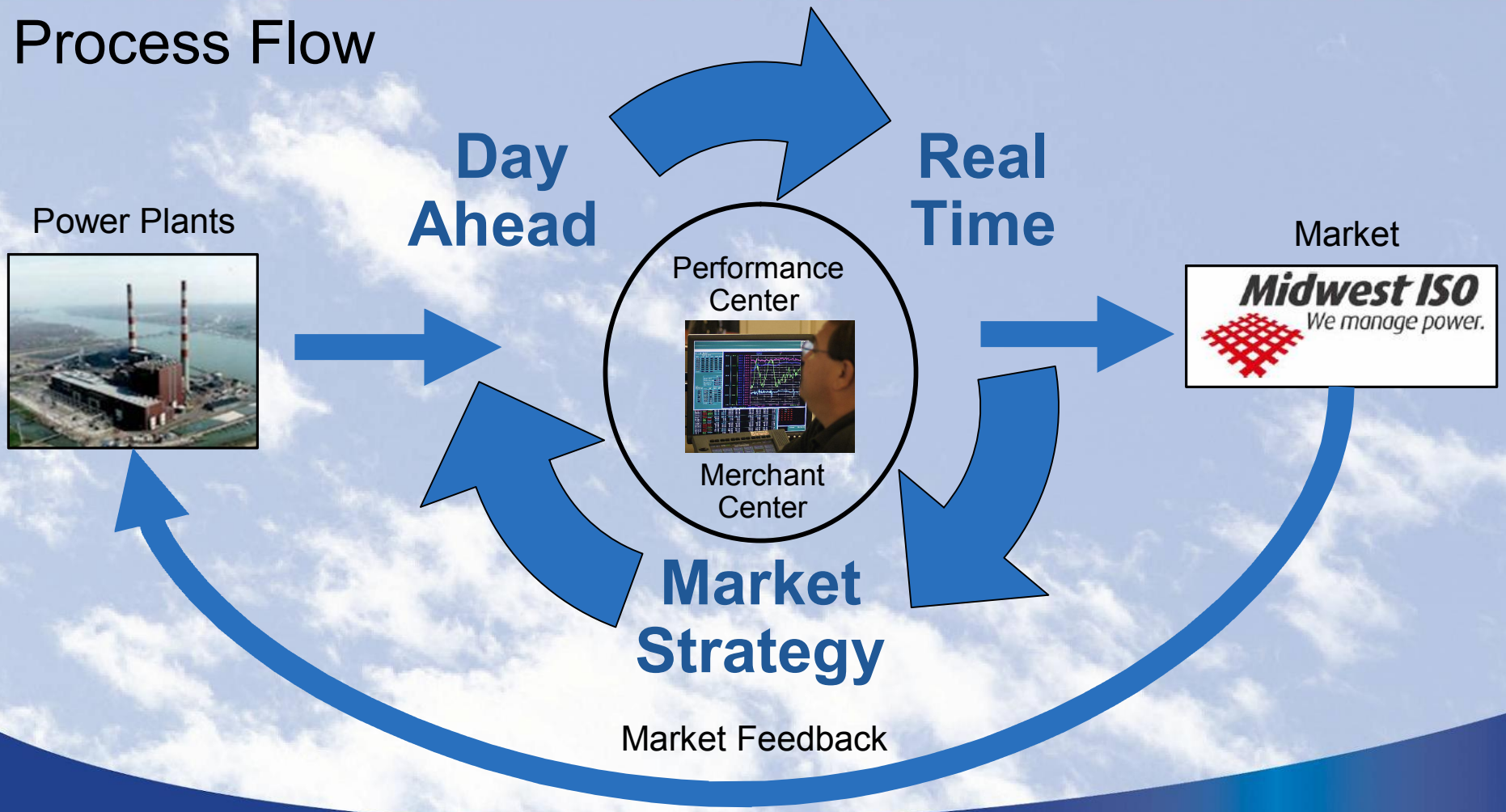
$5,500,000

$4,500,000

$3,000,000

Unit Capacity Framework (UCF)

Process Flow



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Unit Capacity Framework (UCF)

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

$3,200,000
7 months 2007!

Fossil Generation
Unit Capacity Framework

Reports | Data Entry | Options | Quick Links:

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 5K; 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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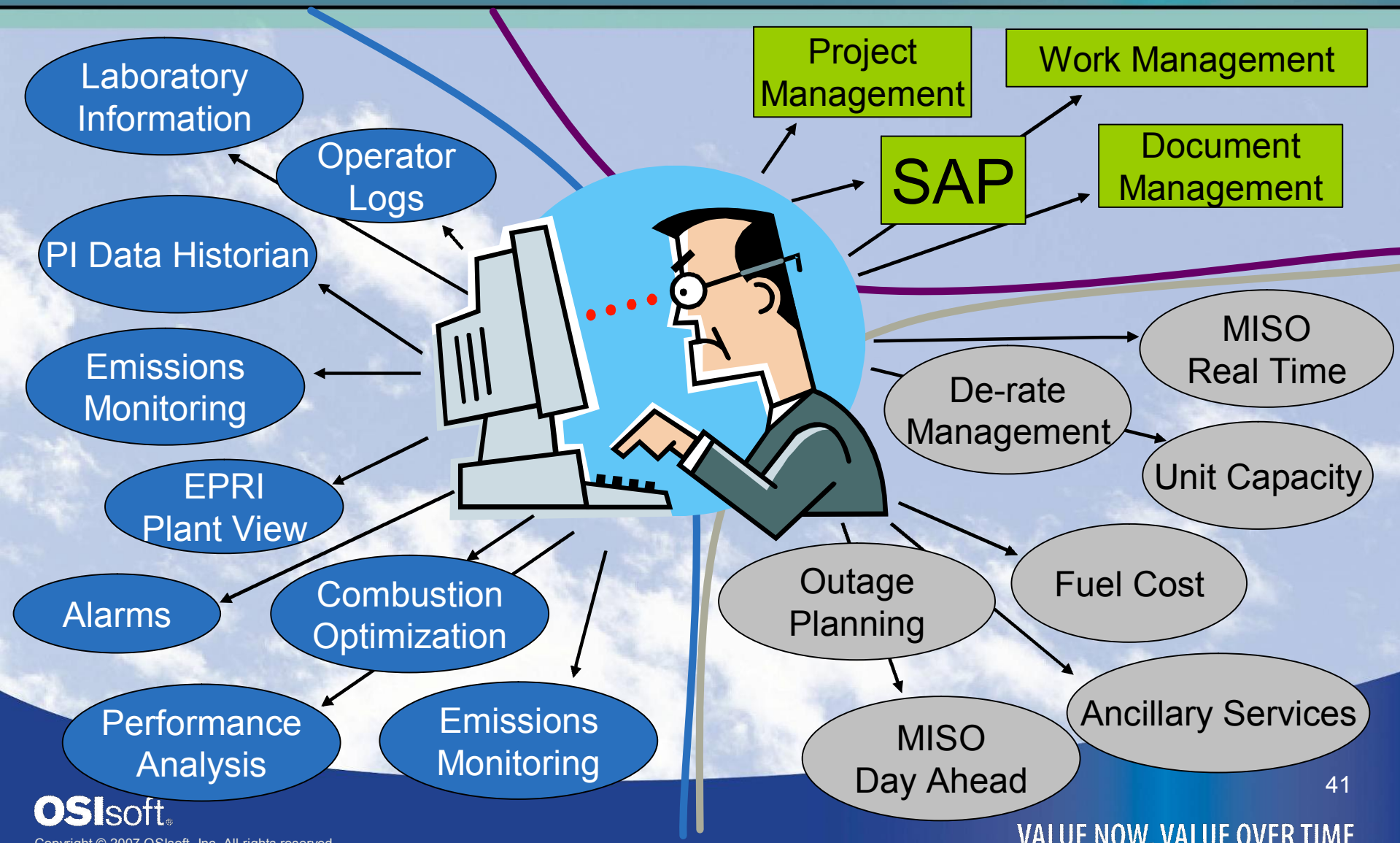
No Shortage of Information!



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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

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VALUE NOW, VALUE OVER TIME

Process Cost Drill Down

MONROE

MONROE UNIT 4

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

ALL PLANTS

MONROE POWER PLANT

Unit Summary

MONROE	UNIT 1	UNIT 2	UNIT 3	UNIT 4
EAF				
Year To Date	96.53	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	14_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	14_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	14_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	14_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	14_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	14_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	14_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	14_DCS	CM6-MTRFBRG:TC	CM6 MOTOR FRONT BEARING TEMP	14	4M6CTL
1/29/2007 10:29:41 AM	Open	MONPP	14_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	14_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	UNCM2-MTRFBRG:TC, CM2 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	UNCM1-MTR:AMP, CM1 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	UNCM7-THRBRG:TC, CM7 GEAR BOX THRUST BRG TLOW	16	4/5/2007 1:03:16 AM	4/5/2007 4:53:14 AM
MILL 2 - MOTOR, BRG TEMPS & CURRENT	MONPP4 PULVERIZERS	UNCM2-MTR:TEMP, CM2 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	UNCM2-MWIND:H2TC, CM2 MOTOR WINDING TEMP HI HIGH	4	4/3/2007 11:53:38 PM	4/4/2007 12:43:37 AM

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Expanded System Dashboard

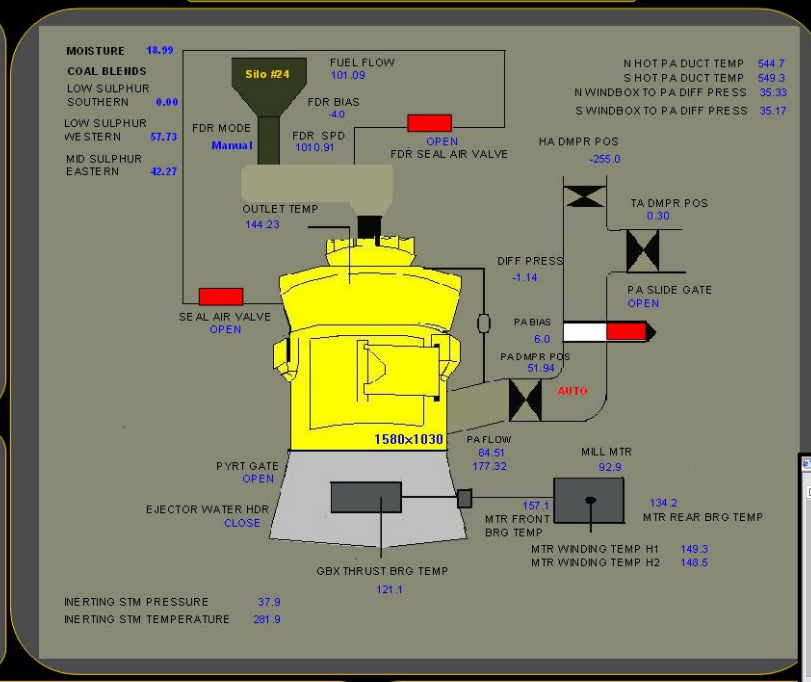
MONROE | UNIT 4

MONROE Unit 4: COAL MILL 5

Net Megawatts 721.1

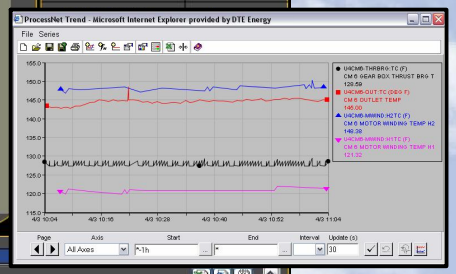
Monroe Unit 4
Mill 5

Coal Mill Running Hours	176964.50 HRS
Coal Mill Outlet Temperature	144.23
Coal Mill PA Differential Pressure	-1.14
Motor Front BRG Temperatre	157.1
Motor Rear BRG Temperature	134.2
Motor Winding Temperature	149.3
Coal Mill Pulvizer Motor	92.9
HA Damper Position	-255.0
TA Damper Position	0.30
PA Damper Position	51.94
PA Flow	84.51
Gear Box Thrust BRG Temperature	121.1
Coal Mill Fuel Flow	101.09
Coal Mill Feeder Speed	1010.91
North PA Fan Inlet Damper Position	-255.0
South PA Fan Inlet Damper Position	100.7



EAF	
Year To Date	100.00
Previous Week	100.00
Milling Cost $/TON	
Year To Date	1.14
Power Cons Cost	0.25
Operation Cost	0.12
Maintenance Cost	0.78
Previous Week	0.41
Power Cons Cost	0.25
Operation Cost	0.16
Maintenance Cost	0.00
SS Count	

IGNITOR 1 2 3 4 STOP
BURNER VALVES 1 2 3 4 5 6 7 8
BURNER DMPRS 1L 2L 3L 4L AT POS
NOX DMPRS 1L 2L 3L 4L AT POS



Net Query - SmartSignal MONPP4-CM5 - Last 10 Items

SmartSignal Watch Items (Last 10)

Group	Asset	Rule	Total	First	Last
No records.					

Net Query - ProcessGuard MONPP4-CM5 - Last 10 Alarms

ProcessGuard Alarms (Last 10)

vl_start	vl_end	plant	unit	tagname	description	groupid	primarydisplay
1/18/2007 8:20:56 AM	Open	MONPP	u4_DCS	CM5FDRTRP	CM5 FEEDER TRIPPED	13	4CM5CTL
1/18/2007 8:20:23 AM	Open	MONPP	u4_DCS	CM5FDRTRP	CM5 FEEDER TRIPPED	13	4CM5CTL
11/30/2006 11:09:47 PM	Open	MONPP	u4_DCS	CM5FDRTRP	CM5 FEEDER TRIPPED	13	4CM5CTL
11/30/2006 11:08:48 PM	Open	MONPP	u4_DCS	CM5FDRTRP	CM5 FEEDER TRIPPED	13	4CM5CTL
11/29/2006 9:48:50 PM	Open	MONPP	u4_DCS	CM5-MTR:TEMP	CM5 MOTOR WINDING TEMP	13	4CM1-7OV
11/29/2006 9:48:36 PM	Open	MONPP	u4_DCS	CM5-MTR:TEMP	CM5 MOTOR WINDING TEMP	13	4CM1-7OV

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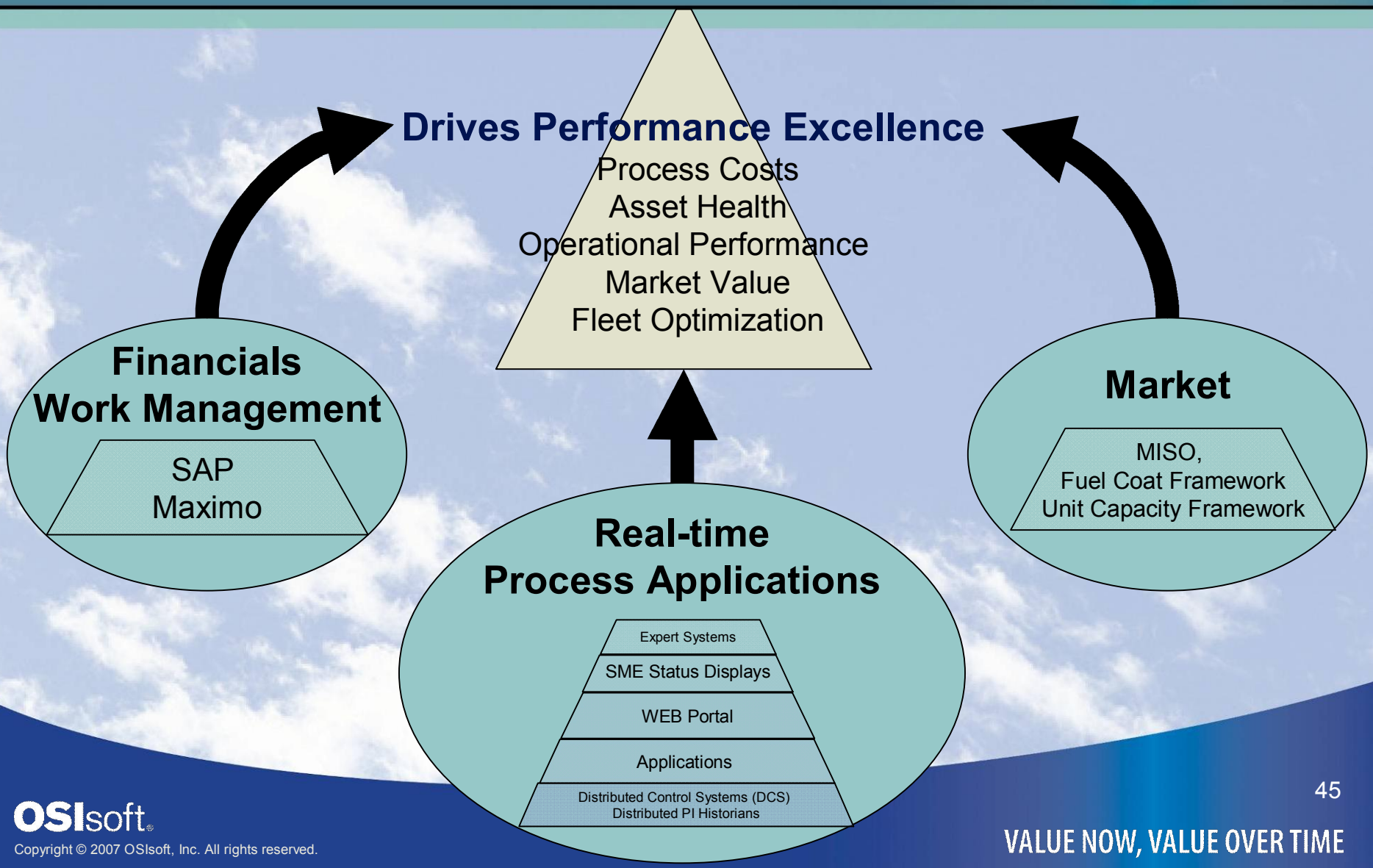
Total Fleet Management



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