



Decision Support System for Online Operations & Maintenance in Power Plants

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About KSK

- **KSK Energy Ventures Limited** - listed on: NSE/ BSE
- Parent Company: **KSK Power Venture plc** - listed on: LSE
- **Track record:**
 - Pioneering work on: Green field power plant development since 2002
 - Captive power, merchant power, renewable power
 - Power plants operational: **2,062 MW**
 - Under construction: **2,400 MW**
- **Approach to Execution & Management:**
 - All plants executed on “EPC” contract basis
 - All plants O&M is outsourced
 - Corporate Management controls ops from Hyderabad Corp. Office

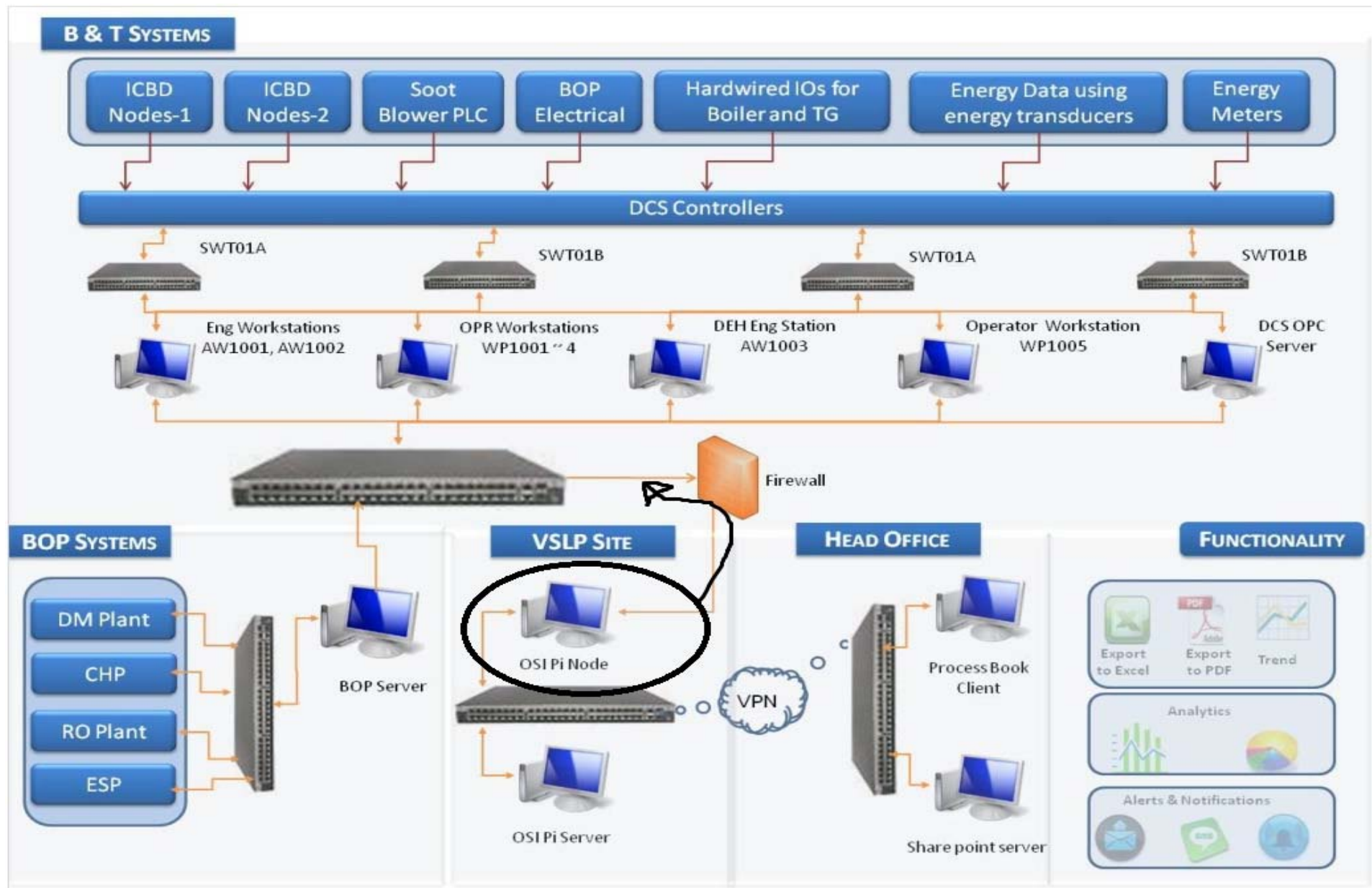
Business Challenges

- Multiple plants (43 MW to 600 MW), multi-location, multiple types (FBC, CFBC, Pulverized fuel) coal, lignite, gas fired units, with multiple vendors
- Fully outsourced O&M
- All plants needed to be controlled with experienced experts centrally available from Corporate Office
- **Effective centralized monitoring was a must!**

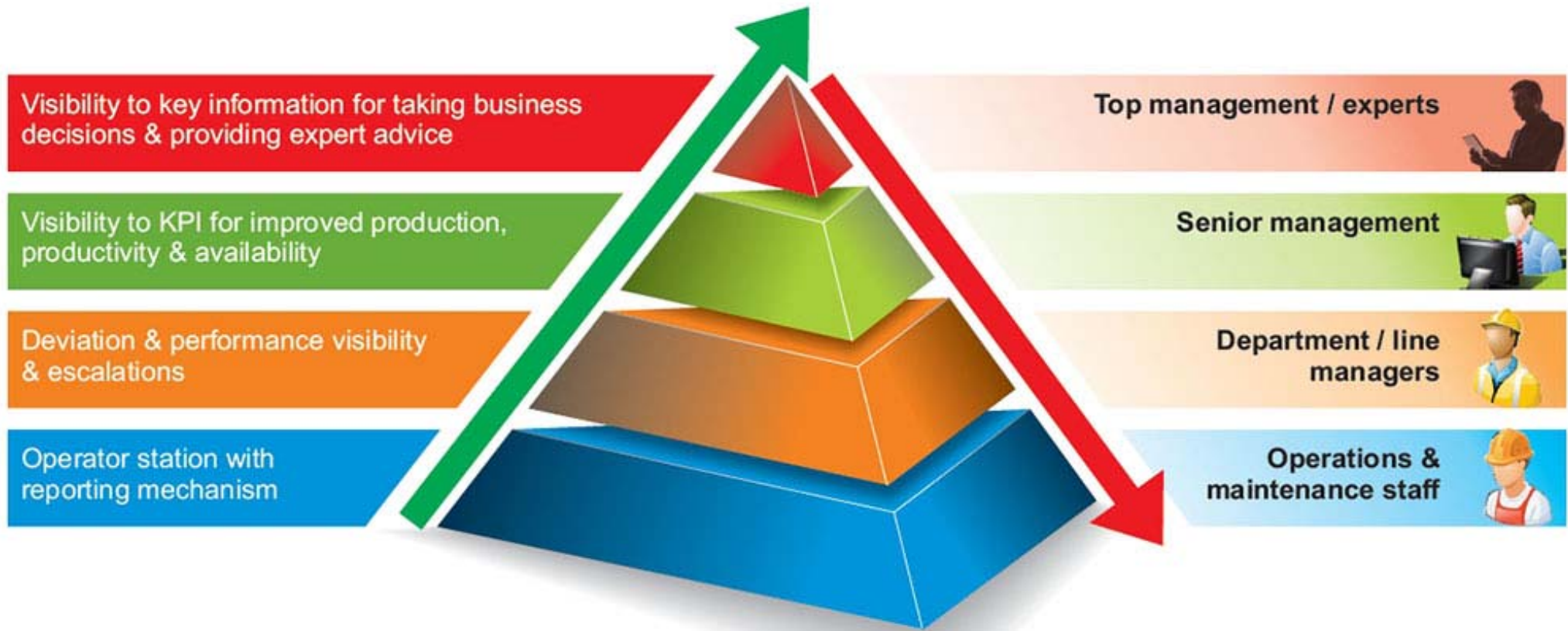
Management Objectives

- Ensure asset optimization
- Obtain high availability & capacity utilization
- Achieve best heat rate and efficiency
- Reduce heat loss
- Minimize cost of O & M
- Implement load-based monitoring & effectively manage demand/supply
- Get reports “on-the- fly” for timely decisions & free manpower engaged on MIS work!

Network Infrastructure



Integrated Decision Support System



KSK
sought it



EcoAxis
provided it



PI System
enabled it

How was it done..

- Picking the brains (most critical step)
- Connecting dots (building solution)
- OSIsoft – products & solutions employed
- Time taken
 - 60% for planning and requirement gathering
 - 40% for development & implementation

Picking the brains user groups

- Understanding management objectives
- Site discussions for process mapping
- Role functionality mapping
- Brainstorming & detailing to decide on information needs for each role, to meet end objectives
- Requirement specification document covering, dashboard / MIS report contents, layouts, business logic, visualization, user usability



Connecting the dots solution building



- Solution detailing on shop floor
 - Data sources identified & parameter crystallized for analytics
 - Additional instrumentation installed
 - Data acquisition system and PI connectors firmed up
 - Networking backbone created
 - Installed server infrastructure: OPC, database, AF
-
- Security ensured: firewall between control and business network

OSIsoft Product & Services Employed

- PI Interface for OPC DA
- PI Interface for ModBus Ethernet
- PI ODBC Client
- PI OLEDB Provider
- PI Web services
- PI System Management Tools
- PI ACE (Advanced Computing Engine)
- PI Coresight
- PI Webparts
- PI AF
- PI Server
- PI Notifications
- OSIsoft vCampus
- OSIsoft Users Community
- **Other tools:**
 - .NET Development
 - Microsoft Share point
 - Adobe Flex visualization framework
 - MS SQL

What got delivered...

- Integrated web portal
- Anytime - anywhere dashboard
- Role based dashboard
- Customized role based reports
- Remote graphics for trouble shooting
- Desktop alerts, SMS/email notifications
- Information on smart devices

....Finally data to decisions

Web Portal of 135 MW Plant



VS Lignite Power Plant

Online Operations & Maintenance System

LOGIN

About OOMS:

- High availability & efficient performance are key needs to achieve quick ROI for capital-intensive power plants. Conventional approach of reactive maintenance & trouble shooting with experts stationed at site, fall woefully short of meeting these objectives.
- Using machine-to-machine (M2M) technology makes it possible to meet these objectives and much more...
- Such On-line Operation & Maintenance System (OOMS) enables critical parameter data capture in real time from control systems(DCS, PLCs, Smart Meters). The 'big data' acquired is then used to generate alerts, reports & dashboards, enabling plant personnel, operations management and experts to achieve high reliability and improved plant performance. Simultaneously it provides top management vital inputs for decision making anywhere, anytime.

[more...](#)

< OOMS

< Milestones

< Highlights

True Power from Knowledge: real-time monitored data

135 MW

Captive fuel

Lignite fired CFBC

Capacity 450 TPH / 135 ATA

<http://vslop-ooms.ksk.co.in/PL/StartUp/LoginPage.aspx>

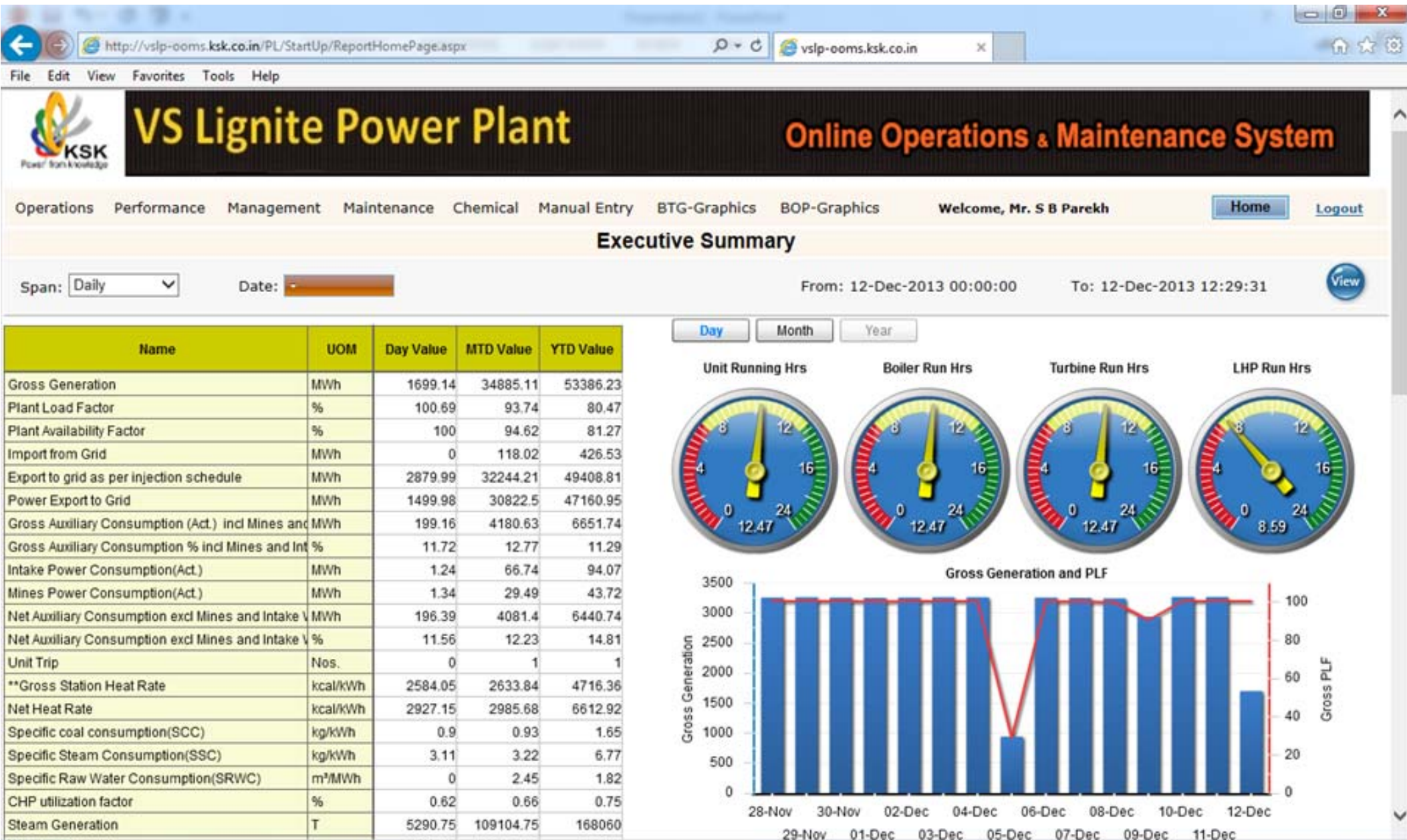
Anytime Anywhere Dashboard...



Role Based Dashboard...



Customization Reports: .NET & Flex based



Role Based Reports



VS Lignite Power Plant

Online Operations & Maintenance System

[Operations](#)[Performance](#)[Management](#)[Maintenance](#)[Chemical](#)[Manual Entry](#)[BTG-Graphics](#)[BOP-Graphics](#)

Welcome, Mr. S B Parekh

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Boiler Important Parameters-Flue Gas

Span: Daily

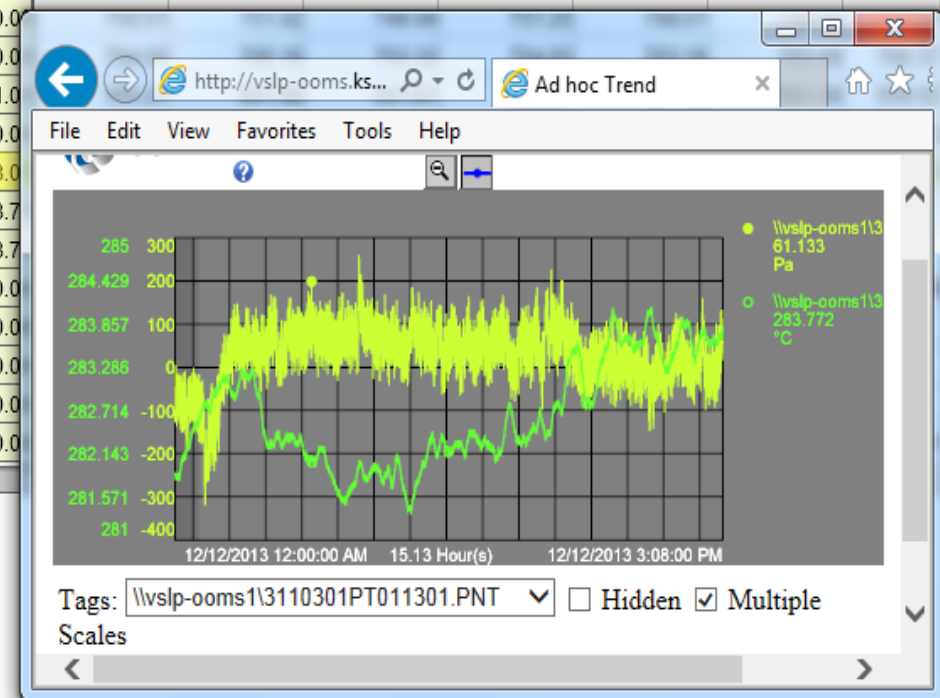
Date:

From: 12-Dec-2013 00:00:00

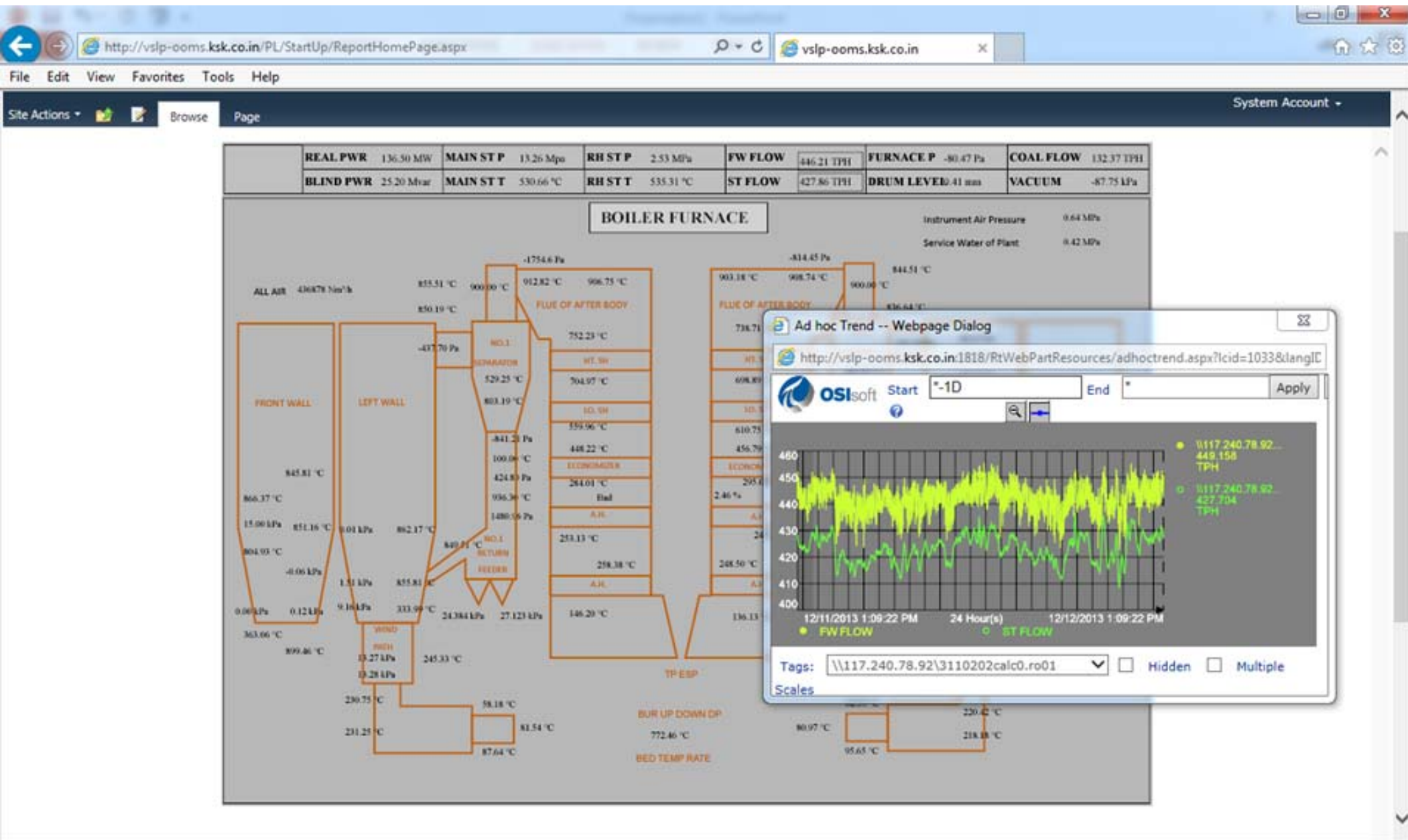
To: 12-Dec-2013 15:08:03



Group	Name	UOM	Design Value	Operating Range		Hourly Avg						
				Min	Max	1:00 AM	2:00 AM	3:00 AM	4:00 AM	5:00 AM	6:00 AM	7:00 AM
Flue Gas	* Combustor outlet pressure	Pa	0.00	-200.00	200.00	-105.36	-5.48	48.18	71.59	67.78	81.23	61.84
	* SH3 inlet flue gas temperature	°C	820.00	700.00	910.00							
	* SH1 inlet flue gas temperature	°C	690.00	650.00	740.00							
	* SH1 outlet flue gas temperature	°C	551.00	501.00	601.00							
	* Economizer inlet flue gas temperature	°C	420.00	370.00	470.00							
	* Economizer outlet flue gas temperature	°C	293.00	243.00	343.00							
	* RHS Oxygen content measuring point at economizer inlet flue	%	2.70	2.00	3.70							
	* LHS Oxygen content measuring point at economizer inlet flue	%	2.70	2.00	3.70							
	* Total Air Flow	Nm³/h	4,50,000.00	1,80,000.00	4,80,000.00							
	* Primary Air	Nm³/h	2,62,000.00	1,14,000.00	3,00,000.00							
	* Secondary Air	Nm³/h	1,80,000.00	1,00,000.00	2,20,000.00							
	* LHS Temperature measuring point at air preheater outlet flue		1,80,000.00	1,00,000.00	2,20,000.00							
	* RHS Temperature measuring point at air preheater outlet flue	°C	146.00	130.00	150.00							

[Show Chart](#)[Save as Excel](#)

Remote Graphics for Trouble Shooting



Desktop Alerts, SMS , E-mail Notifications

The screenshot displays the VSLP-OOMS software interface, which is used for managing industrial alerts and notifications. The main window is titled "VSLP-OOMS1\VSLP - PI System Explorer (Administrator)".

Notifications List: A list of 62 notifications is shown on the left, including various alerts for pumps, motors, and heat rates. The selected notification is "133-PLANT HEAT RATE ALERT (GSHR_PE)".

133-PLANT HEAT RATE ALERT Details: The right pane shows the details of the selected alert. It includes a table of delivery formats:

Name	Delivery Channel
Global Default Email	Email
NT-1	Email
NT-1 Esc	Email

The alert details also show the subject, body, and attachments. The body text includes:

Dear User,

VSLP-OOMS Alert Details:

- Value of Gross Heat Rate is 2660.940
- Gross Heat Rate has gone above the A
- Alert limit : 2675 kcal/kWh
- Operating Range: 2468 kcal/kWh to 27
- Engineering Unit: kcal/kWh

Alert Acknowledgement & Comment: A section for acknowledging the alert and adding comments.

Alert Content: The alert content is displayed in a separate window, showing the subject, body, and attachments. The body text includes:

VSLP OOMS generated new mail: Condition Based 11/27/2013 8:42:45 AM India Standard Time (GMT+05:30:00)

superaxis@ksk.co.in

To: VSLPopemhd

Wednesday, November 27, 2013 8:45 AM

Retention Policy: Online Mails (6 Months) Expires: 5/26/2014

Dear User,

VSLP-OOMS Alert Details:

- Value of NO.2 SEPARATOR OUTLET T is 911.026123046875 °C.
- NO.2 SEPARATOR OUTLET T has gone above the Alert limit value.
- Alert limit : 910 °C
- Operating Range: 750 °C to 900 °C
- Engineering Unit: °C

Acknowledge With Comment: A section for acknowledging the alert and adding comments.

Regards,
VSLP-OOMS
(Online Operation & Maintenance System)

Information on Smart Devices

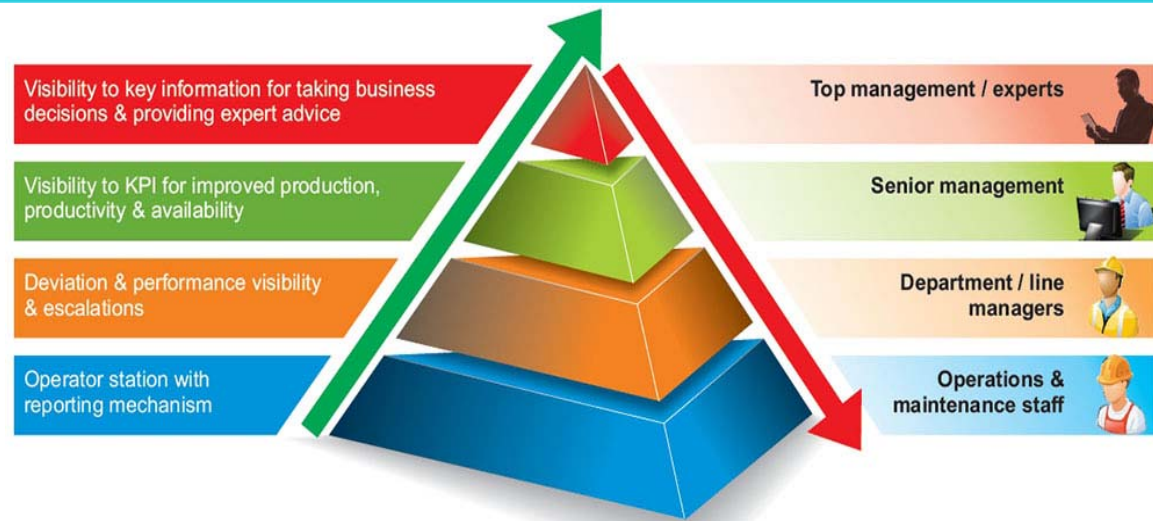


Sharing Key Learnings

- OSI - System & Tool Maker
 - 35 years in business
- EcoAxis - Solution Provider
 - 4 years with OSIsoft System
- Users
 - Mostly first timers
- Most critical steps:
 - Requirement analysis: involvement of people in the process
 - Usability, way of life (like mobile)
 - **Transformation of processes impacting user behavior**
 - Making a difference, ROI is unquestionable

Data to decision...

“Actionable intelligence acquired through continuous monitoring at every level, in typical multi-plant operations, is crucial for improved performance and to control operations and maintenance cost”
- K. A. Sastry



Business Challenge

- Asset optimization
- Expertise available at HO and not at site
- Reduce heat losses
- Reduce cost of operations & maintenance
- Load based monitoring for improved operations and maintenance practices

Solution

Role based integrated application with decision support approach at every level, using asset framework approach to monitor deviations & performance based on load at which plant is operated

Results and Benefits

- Quickly notice the abnormal operation
- Easy historical data retrieval & analysis for optimized plant operations
- Effectively deploying expert manpower without their costly travel to site
- Access current & historical process/production data easily - anytime anywhere on any device
- Dramatically improve plant reporting

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- EcoAxis Systems Pvt. Ltd.



THANK YOU

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