



Sustaining Your EMS and HVAC Assets & Systems (Real-Time Commissioning) May 2010



Introduction

Sustaining Your EMS and HVAC Assets Systems with a Real-Time Commissioning Program

Real-Time Commissioning is a collection of support services and web-based analysis tools to aid in energy management, reduce energy costs, and increase building operational efficiency

Objectives

- Ensure client is continuing to achieve savings from Energy Management Systems (EMS) and energy programs
- Provide analysis tools to enhance the capabilities of existing EMS systems
- Identify new energy savings opportunities
- Provide technical assistance to plants
- Provide management operational performance feedback

Features

- **Technical Assistance Center (TAC)**
 - Live help lines to connect facility personnel with a dedicated technical support team
 - TAC database for tracking the details, history, and resolution of each case
- **WebView Enabled EMS Systems**
 - Remote real-time monitoring
 - Remote assessment of equipment functionality
 - Remote alarm analysis and troubleshooting

Features

- Web Based Information System and Data Analysis Tools
 - Daily Data Collection
 - Enterprise Energy Dashboards (E2D)
 - Trending
 - Reporting
 - Reference Library

TAC Case Detail Report

TAC Case Detail

Case Number	Title	Date Opened	Priority	State	Equipment	Savings	Cost	Work Order #
200900115	LOA Gen - Raise Occ Cooling Set Points	2009-05-29	High	Closed	LOA General	\$33693	\$90	

File Type	File Description
Other	LOA Occ-Unocc Cool Space Temp Cost Analysis

Entry Date	Entry Detail
May 29 2009 8:51AM	Assembly Plant #1 - The occupied cooling setpoints on the majority of the upgraded dual setpoints units (also represented in the attached spreadsheet) need to be raised to the corporate standard of DegF. Currently, these setpoints are 1 to 13 Degrees below the corporate standard. Savings calculations are located in the attached spreadsheet.
Aug 26 2009 8:36AM	We recieved confirmation from the plant contact that these setpoints have been changed. It was verified that all setpoints have been changed except a select few which are on units that are unused. This case is closed.

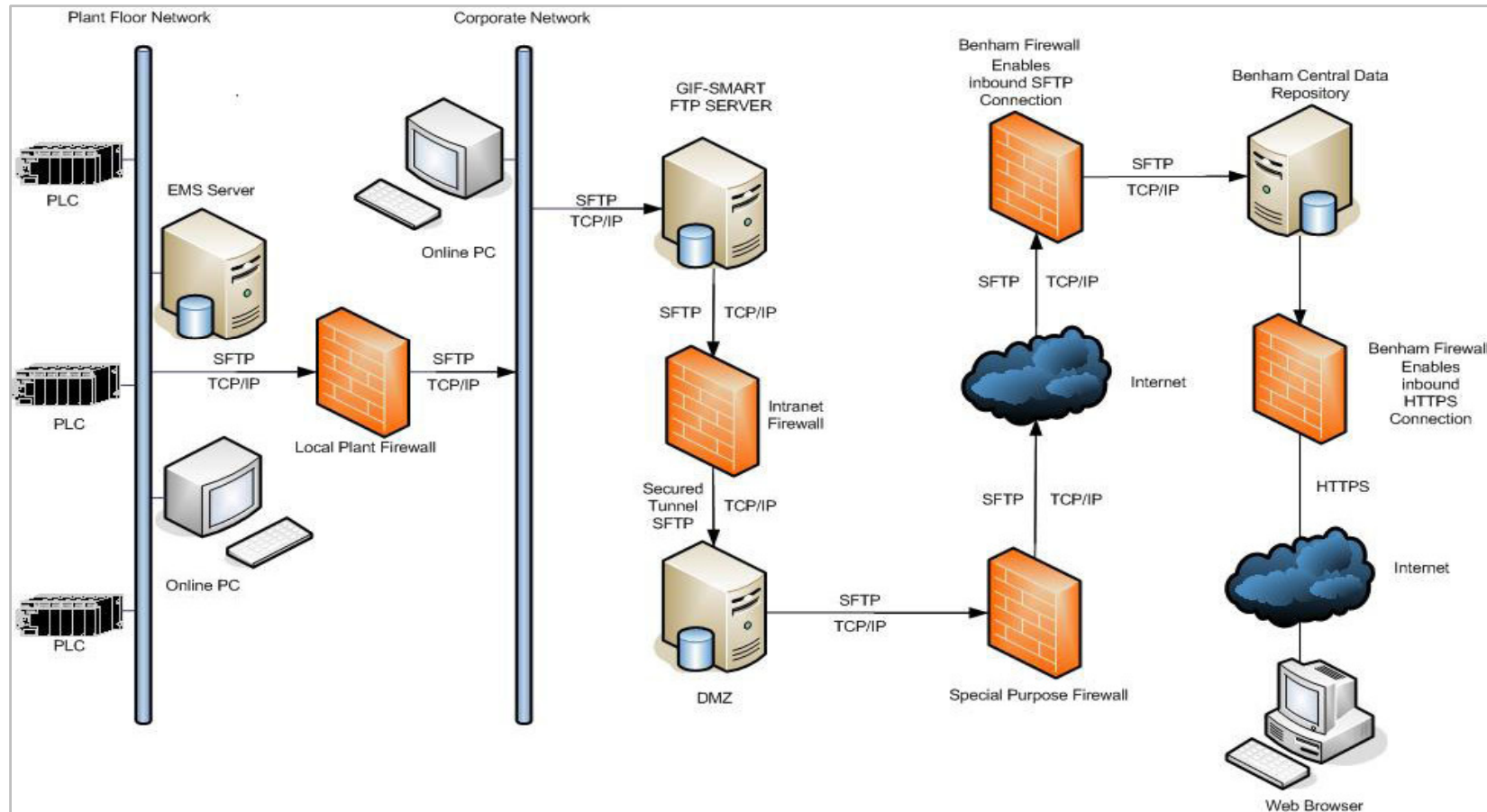
WebView Enabled EMS

- Remote real-time monitoring
- Remote assessment of equipment functionality
- Remote alarm analysis and troubleshooting
- Single point of contact for EMS and database related issues
- Initiate and support EMS upgrades
- Support energy efficiency group

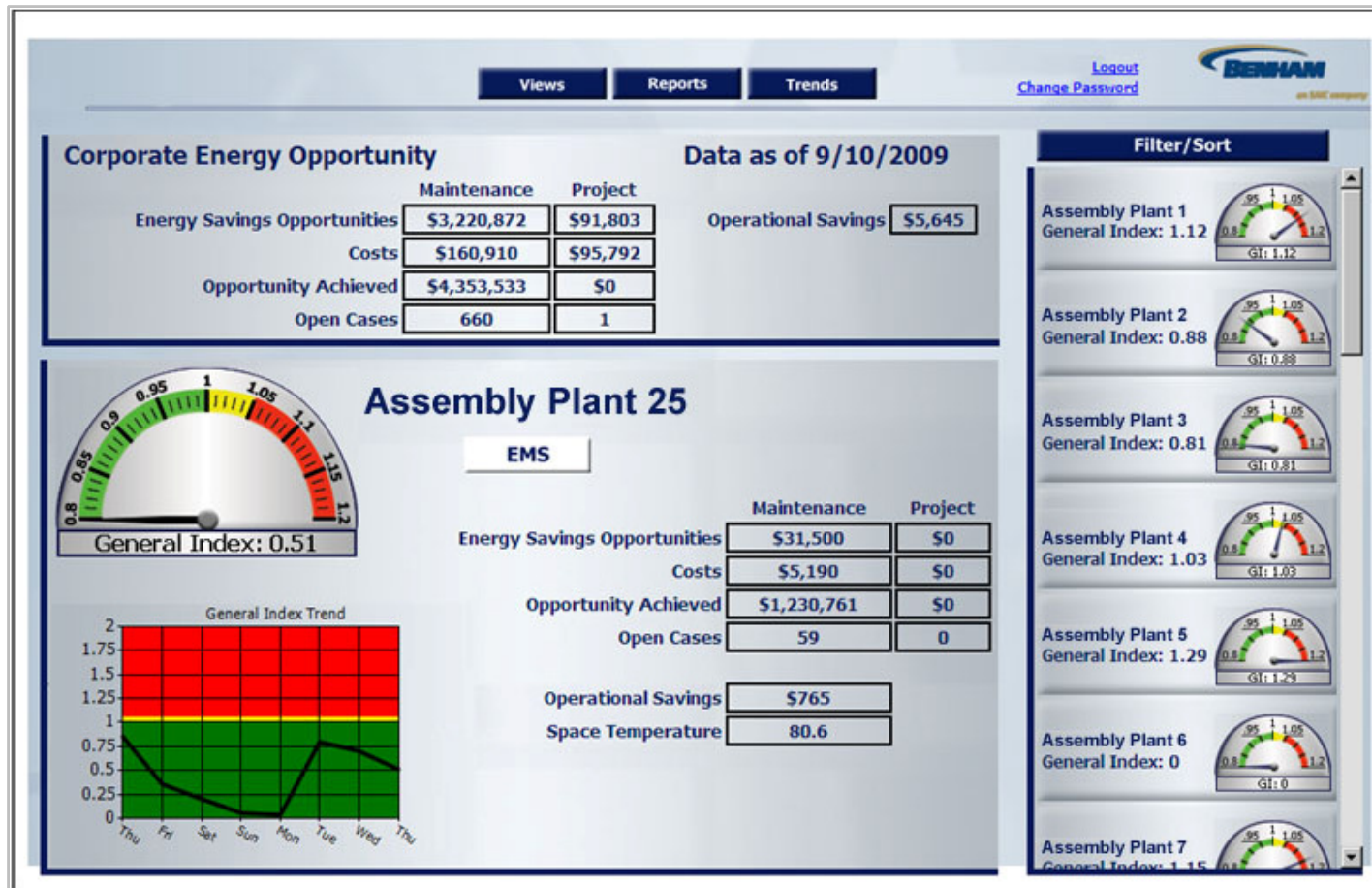
Web Based Tools - Data

- Daily Data Collection
 - Data sent automatically from EMS servers at plants to real-time commissioning web servers (off-site)
 - Data sent once per night for previous day (upgrade to hourly – summer 2010)
 - Data automatically processed for use with web based tools
 - Data stored indefinitely

Network Architecture Diagram



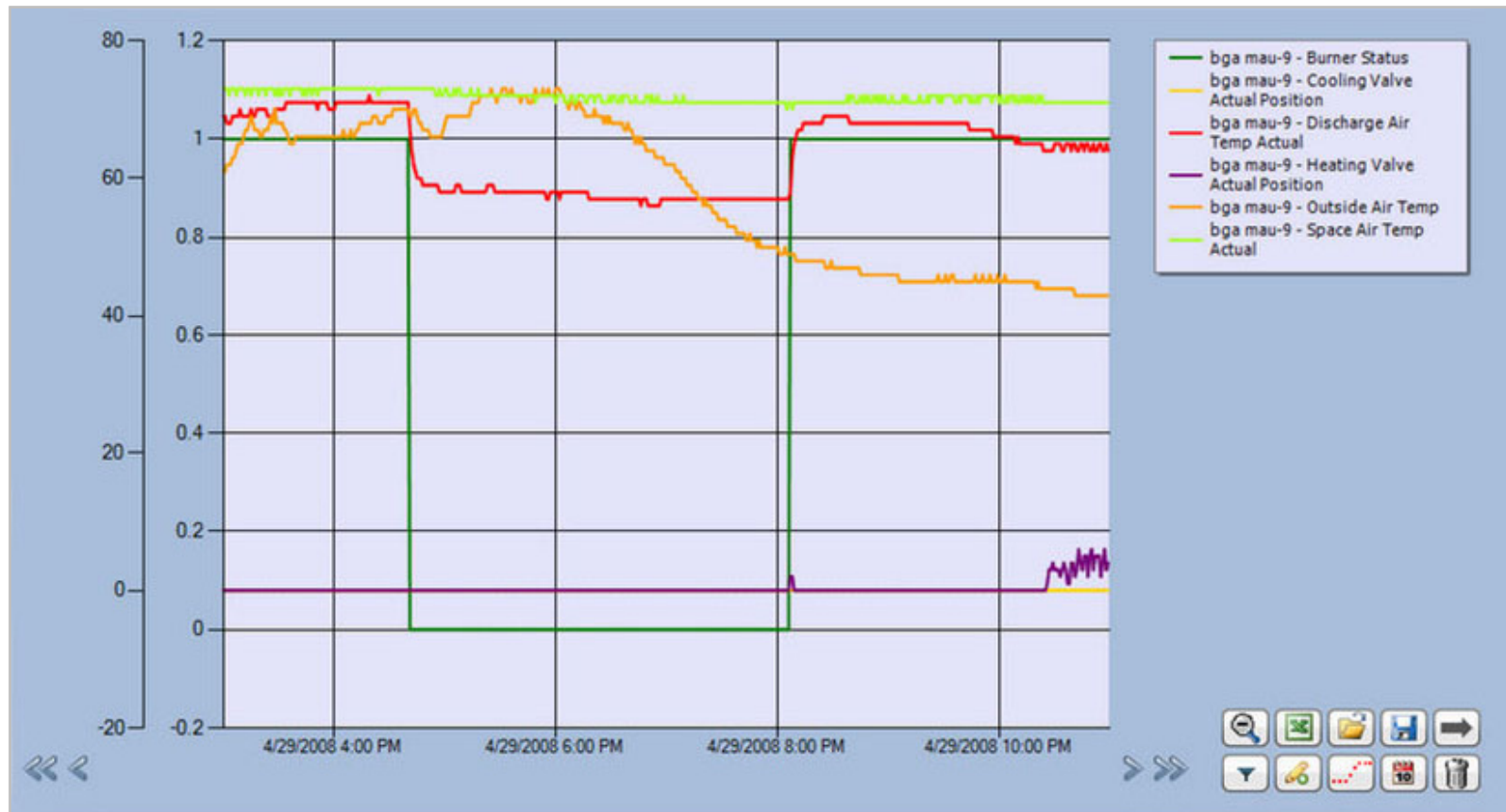
Web Based Tools - Dashboard



Web Based Tools - Dashboard

- Indicates corporate energy savings opportunity with associated cost for open TAC cases
- Indicates corporate savings achieved
- General Index indicator with weekly history trend
- Site Window displays site details, savings achieved and a quick link to the site's web-based EMS
- Site select-window display general index for all sites with filter and sort features
- Links to Trends, Reports, and E2D Views

Web Based Tools - Trends



Web Based Tools - Trends

- Trending available for devices connected to existing EMS systems
- Operational data for HVAC equipment
- Department level electric meter data
- Other departmental level meter data where available
- Compressed air data where available

Web Based Tools - Trends

- Features
 - Uniquely configure each trend chart
 - Save trend chart configurations
 - Easily add points and change devices
 - Overlay different trend charts
 - Selectable zoom area
 - Capture point-in-time data values
 - Quickly remove unwanted points
 - Export data to Excel
 - Print trend chart

Web Based Tools - Reports



The screenshot shows a web interface for "Enterprise Reporting". At the top right, there is a "Logout" link and the BENHAM logo with the text "an SAIC company". The main content area is titled "Enterprise Reporting" and contains two columns of blue underlined links:

- Site File Library Report
- TAC Cases Report
- Site Equipment History Report
- Site Equipment Inventory Report
- Site Air Balance Report
- Site Air Balance Variance Report
- Site General Index Report
- Performance Summary Report - Maintenance
- Performance Summary Report - Project
- Weekly HVAC Operating Report
- Monthly HVAC Operating Report
- FM Scorecard Report

Web Based Tools - Reports

Site File Library

Parameters:

Site = Assembly Plant #1

File Type = -All-

Site	File Type	File Description
Assembly Plant #1	Other	Assembly Plant 1 Users List Rev09
Assembly Plant #1	Drawing	Assembly Plant 1 Drawings
Assembly Plant #1	PLC Program	Assembly Plant 1 Software
Assembly Plant #1	Survey	HVAC Field Survey Assembly Plant 1
Assembly Plant #1	Survey	Assembly Plant 1 Air House Repair Summary
Assembly Plant #1	Survey	Assembly Plant 1 Air House Repair Summary
Assembly Plant #1	Survey	Assembly Plant 1 Air House Condition Summary
Assembly Plant #1	Air Balance	Assembly Plant 1 HVAC Optimization Air Balance
Assembly Plant #1	E-Mail	Email from Assembly Plant 1
Assembly Plant #1	Other	Assembly Plant 1 CWW TAC
Assembly Plant #1	Other	Assembly Plant 1 Units Running Over Scheduler

Web Based Tools - Reports

Weekly HVAC Operating Report

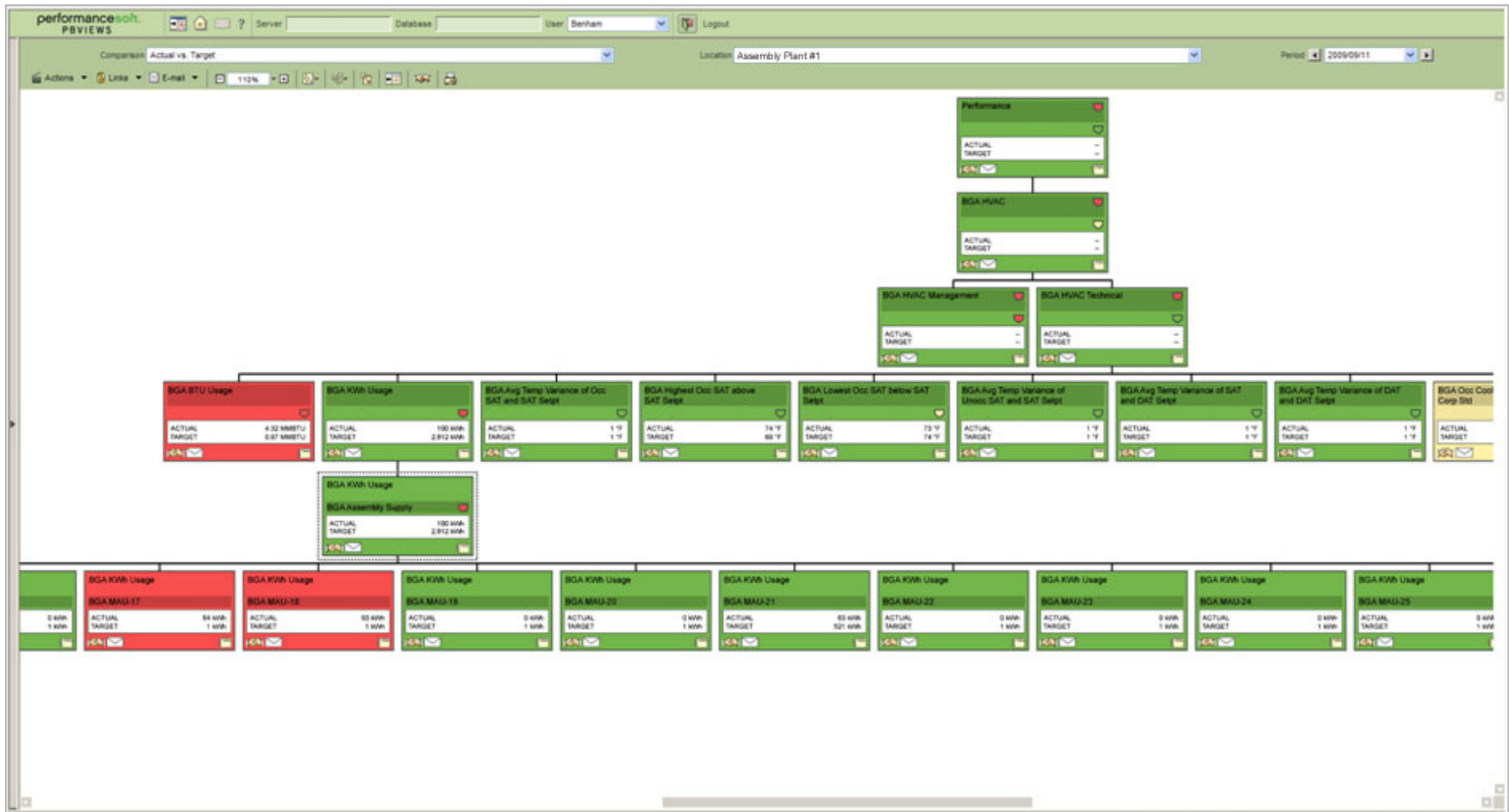
Parameters:

Date Range = 8/31/2009 to 9/6/2009

Region	Plant	Weekly HVAC KWH Total	Weekly General Index Average	Weekly Space Area Average Temperature		Space Temperature Setpoints				Weekly Outside Air Temperature Range		Sunday Equivalent Quantity of Units Running	
				Occupied	Unoccupied	Occupied		Unoccupied		Low	High	Actual	Target
						Heat	Cool	Heat	Cool				
1	Assembly Plant #1	13801	0.69	73	75	66	75	55	55	48	81	2	5
1	Assembly Plant #2	44407	0.55	74	75	69	84	54	91	51	80	3	7
1	Assembly Plant #3	85284	0.62	N/A	N/A	N/A	N/A	N/A	N/A	50	85	0	16
1	Assembly Plant #4	96963	0.51	76	76	78	78	56	95	46	83	2	17
1	Assembly Plant #5	153941	0.96	N/A	N/A	66	77	64	82	52	79	15	15
3	Assembly Plant #6	276555	0.90	75	78	66	78	55	94	69	100	5	10
3	Assembly Plant #7	38918	0.89	74	79	66	76	55	84	52	96	0	4
3	Assembly Plant #8	371870	1.04	76	78	72	72	65	80	52	81	5	12
3	Assembly Plant #9	11142	0.98	72	74	65	78	55	85	46	83	0	1
3	Assembly Plant #10	59930	0.78	78	82	77	77	54	88	58	96	3	11
3	Assembly Plant #11	101941	0.77	74	77	65	79	49	94	51	86	3	16
4	Assembly Plant #12	110230	0.72	N/A	N/A	N/A	N/A	N/A	N/A	74	74	3	6
4	Assembly Plant #13	24981	0.22	N/A	N/A	66	66	55	84	45	85	1	9
4	Assembly Plant #14	59648	0.47	74	74	65	65	47	47	57	99	4	5
4	Assembly Plant #15	12651	0.95	N/A	75	52	52	52	52	83	83	4	3
5	Assembly Plant #16	61691	0.71	73	73	64	77	63	85	46	82	0	9
5	Assembly Plant #17	28466	0.40	N/A	N/A	67	76	60	84	49	96	1	6
5	Assembly Plant #18	43156	0.44	74	75	74	74	55	131	55	82	2	8
6	Assembly Plant #19	40980	0.80	73	N/A	74	74	56	80	52	88	8	8
6	Assembly Plant #20	31957	0.45	72	73	64	64	53	53	-70	83	16	10
6	Assembly Plant #21	82439	1.04	74	76	70	70	51	84	48	84	4	4
6	Assembly Plant #22	98320	0.69	N/A	N/A	65	65	N/A	N/A	46	86	2	5
6	Assembly Plant #23	135982	0.72	75	72	59	75	61	75	48	78	5	24
6	Assembly Plant #24	128516	0.80	75	77	62	76	54	83	52	87	4	9
6	Assembly Plant #25	0	0.00	N/A	72	66	78	55	80	45	87	0	1

Legend	General Index
Good	0.00 - 1.00
Needs Improvement	1.01 - 1.05
Poor	1.05 +

Web Based Tools – E2D Views



Web Based Tools – E2D Views

- Features
 - Distinct HVAC management and technical metrics
 - Green-Yellow-Red indicators showing actual performance vs. targets
 - Device level, business unit level, and plant level performance roll-ups
 - Show all metrics for a particular unit or show all units for a particular metric
 - Trending of metrics

Results

- Savings To Date \approx \$6.9 Million
- Savings YTD \approx \$1.2 Million
- Processed \approx 2500 TAC cases to date
- Adjusting occupied/unoccupied heating/cooling setpoints to corporate standards
- Tightening schedules to production times
- Development of data mining queries

Results

- Database mining with Trending Tool
 - Analyze loads for new design basis for each plant
 - Electrical unit substation loading
 - Compressed air requirements
 - Hot water system requirements for new paint shop
 - Analyze loads for new design basis for each plant
 - New steam and compressed air plants
 - Data used as basis for future product program planning

Results

- Tools Used to Troubleshoot Plant Issues
 - Assembly Plant Example
 - Unplanned outage of paint shop resulted in existing substation metering system database error. Trending Tool used to confirm the issue was not device related, but database related. System restored less than 1 day after initial inquiry.
 - Data gaps indentified and resolved in PH/WWTP project database.

Results

- Dual Setpoint Logic
 - Identified several versions of PLC logic in HVAC units throughout the plant
 - Assisted plant in troubleshooting logic through trending, validated new logic with trending
- Troubleshooting unoccupied temperature setback logic
 - Assisted plant in troubleshooting logic through trending and EMS

Results

- Chilled Water Valves
 - Trending identified malfunctioning valves
 - Detailed report written outlining issues and recommended corrective actions
 - Plant contacted to review report, data, and trend charts
 - Problematic valves repaired or replaced
 - Standard database query developed for data mining to automatically identify problem across inventory

Questions

