



U. S. Department of Energy
Energy Savings Assessment (ESA)

Compressed Air Best Practices Tools

Compressed Air Challenge®
DOE AIRMaster+ Software
CAC LogTool Software

Date: May 15, 2007
Instructor: Tom Taranto



Agenda

- ❑ Training Webcast Introduction
- ❑ Introduction of Tools - 10 minutes
- ❑ Compressed Air Challenge® Tools - 25 minutes
- ❑ AIRMaster+ Software Tool - 25 minutes
- ❑ LogTool v2 - 25 minutes
- ❑ ESA Process - 20 minutes
- ❑ Q&A / Summary - 15 minutes



Training Web Cast Series

❑ Purpose:

To provide information on Compressed Air Best Practices tools used during DOE's Energy Savings Assessments (ESA).

❑ Format:

- Brief introduction to the functionality and use of the DOE Compressed Air System Best Practices tools.
- Provides an overview, not in-depth training. (Formal training is available for most tools.)

❑ Tools in Brief:

- Identify opportunities
- Provide estimates of energy and cost savings
- Not a replacement for in-depth project analysis



Compressed Air Challenge[®] Tools

What is the (CAC) ?

- ❑ The Compressed Air Challenge is a voluntary collaboration of:
 - ❑ Industrial users,
 - ❑ Manufacturers and their associations,
 - ❑ Distributors and their associations,
 - ❑ Facility operating personnel and their associations,
 - ❑ Consultants,
 - ❑ State energy research and development agencies,
 - ❑ Energy efficiency organizations,
 - ❑ United States Department of Energy, and
 - ❑ Utilities.

- ❑ This group has one purpose in mind:
 - ❑ **Helping you improve the performance of your compressed air system.**



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- US Department of Energy Office of Industrial Technologies
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- Pacific Gas & Electric
- NSTAR Electric and Gas Company
- Northwest Energy Efficiency Alliance
- Northeast Utilities Company
- New York State Energy Research and Development Authority
- National Grid USA
- Iowa Energy Center
- Energy Center of Wisconsin
- Consortium for Energy Efficiency
- Compressor Distributors Association
- Compressed Air and Gas Institute
- Association of Ingersoll-Rand Distributors
- Manitoba Hydro
- BC Hydro



CAC Instructors

- ❑ Niff Ambrosino, Scales Industrial Technologies
- ❑ Roger Antonioli, Scales Industrial Technologies
- ❑ Chris Beals, Air Systems Management, Inc
- ❑ David Booth, Sullair Corporation
- ❑ Ken Byrd, Air Services Co.
- ❑ Joe Ghislain, Ford Motor Corp
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- ❑ Bill Scales, Scales Industrial Technologies
- ❑ Gary Shafer, Ingersoll Rand
- ❑ Paul Shaw, Scales Industrial Technologies
- ❑ Dean Smith, Air Science Engineering
- ❑ Roy Stuhlman, Kaeser Corporation
- ❑ Jody Sutter, Compressed Air Systems Solutions
- ❑ Jerry Swedeen, Case Consulting, Inc.
- ❑ Tom Taranto, ConservAIR/Pneumatech
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- ❑ Greg Wheeler, Oregon State University
- ❑ Robert Wilson, ConservAIR/Pneumatech
- ❑ Jeff Yarnall, Rogers Machinery Co.
- ❑ Jan Zuercher, Quincy Compressor



AIRMaster⁺

AIRMaster+ is but one tool in a large portfolio of Compressed Air Challenge offerings designed to assist the end user in improving the performance of compressed air systems. AIRMaster+ allows for objective and repeatable compressed air system assessment results and can be used to improve the performance and efficiency of operation. However, AIRMaster+ is not meant to replace an experienced auditor in the evaluation of a compressed air system. AIRMaster+ is intended to model airflow and associated electrical demands as seen by the supply side of the system. AIRMaster+ does not model the dynamic effects of the distribution and end uses. Such issues should be addressed through consultation with an experienced auditor before implementing efficiency recommendations.

Developed for the U.S. Department of Energy
by the Washington State University Energy Program
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AIRMaster+ Features

- ❑ AIRMaster+ a Windows based software tool used to analyze industrial compressed air systems:
 - Measure / Calculate Annual Baseline Energy & Cost
 - Input 24-hour metered airflow or power data
 - Assign electrical utility energy schedules
 - Simulate compressed air system operation
 - Model system operation at various loads
 - Estimate Savings of Energy Efficiency Measures
 - Is not a substitute for an experienced auditor!



LogTool v2

- LogTool is a public domain tool available from Compressed Air Challenge™ in cooperation with SBW Consulting
 - Import data from different types of data loggers
 - Display trend plots with one or two Y axes
 - assist in the analysis of compressed system performance measurements
 - Display DayType plots
 - a companion tool for AIRMaster+, also available from the Compressed Air Challenge





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Compressed Air Challenge®

Best Practices Tools



Compressed Air Challenge®

□ CAC Seven Step Action Plan

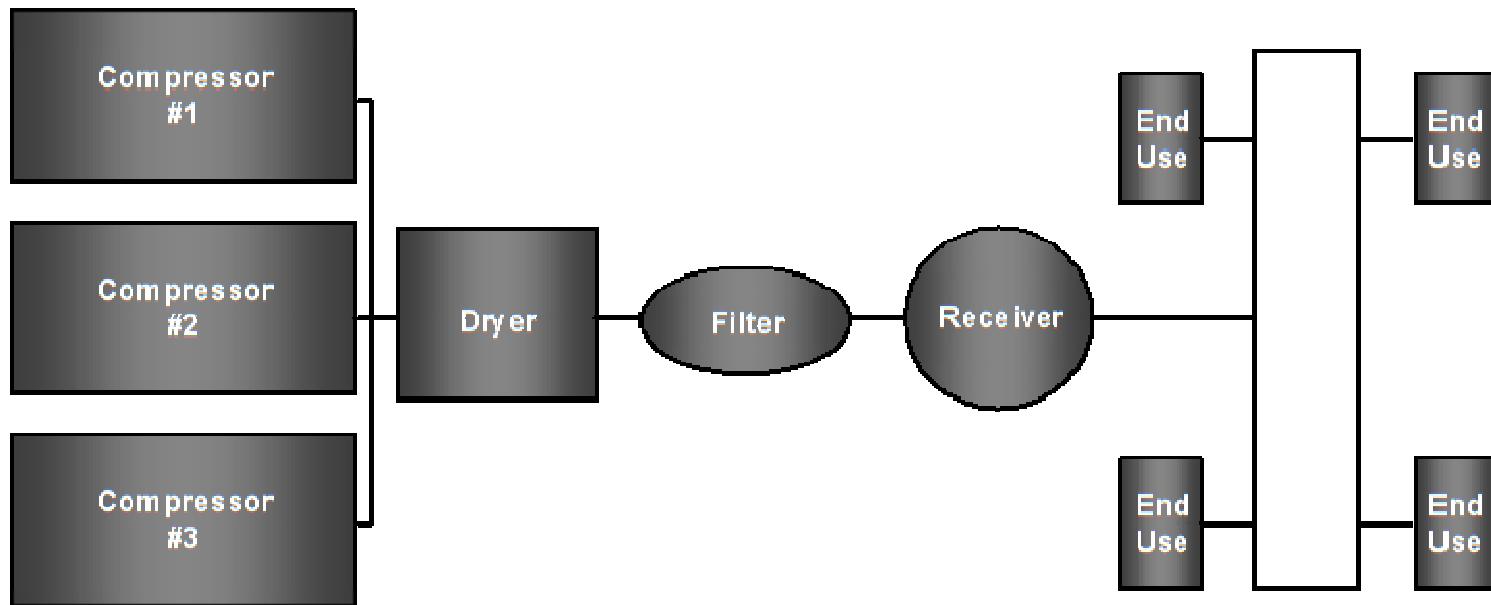
- 1. Develop a basic block diagram.
- 2. Measure your baseline and calculate energy use and costs.
- 3. Work with your compressed air system specialist to implement an appropriate compressor control strategy.
- 4. Once controls are adjusted, re-measure baseline. Re-calculate energy use and costs.
- 5. Walk through to check for obvious preventive maintenance items and other opportunities to reduce costs and improve performance.
- 6. Identify and fix leaks and correct inappropriate uses – know costs, re-measure, and adjust controls as above.
- 7. Evaluate Steps 1-6, implement awareness and continuous improvements programs, and report results to management.



Compressed Air Challenge®

□ Block Diagram

- Graphic representation of compressed air system and the relationship of individual components



CAC End Use Solutions Finder

End-Use Audit Checklist

Potentially Inappropriate Applications

□ On-site work

➤ Potentially Inappropriate Uses

Is compressed air being used for any of the applications on this list?

- Open blowing
- Sparging (agitating, stirring, mixing)
- Aspirating
- Atomizing
- Padding
- Dilute phase transport
- Dense phase transport
- Vacuum generation
- Personnel cooling
- Open hand held blowguns or lances
- Cabinet cooling
- Vacuum venturis
- Diaphragm pumps
- Timer drains/open drains
- Air Motors

Note: A Handout titled *Inappropriate Uses of Compressed Air* has been included.



CAC End Use Solutions Finder

□ On-site work

- High Pressure End-Use Requirements

High End-Use Pressure Requirements

How are the pressure setpoints on the compressors' controls configured?

	Load	Unload/Modulate
Pressure setting:	_____ psig	_____ psig
Pressure setting:	_____ psig	_____ psig
Pressure setting:	_____ psig	_____ psig

What is the pressure going into the main header?

Pressure: _____ psig

What is the end-use pressure required for typical applications in the plant?

Pressure: _____ psig

List any applications that require higher than typical pressure:

<u>Application</u>	<u>Approximate End-Use Pressure Req'd</u>
_____	_____ psig
_____	_____ psig
_____	_____ psig
_____	_____ psig

List any applications that require lower than typical pressure:

<u>Application</u>	<u>Approximate End-Use Pressure Req'd</u>
_____	_____ psig
_____	_____ psig
_____	_____ psig
_____	_____ psig

List any applications where users complain about low pressure:

<u>Application</u>	<u>Approximate End-Use Pressure Req'd</u>
_____	_____ psig
_____	_____ psig
_____	_____ psig
_____	_____ psig

Have compressor setpoints been raised to try and compensate for low pressure at end-use applications? Yes No



CAC End Use Solutions Finder

Taking Stock

End-Use Audit Checklist

High Volume/Intermittent Applications

- On-site work
 - High Volume Intermittent Applications

What is the full load output from the compressors in the system?

_____ cfm @ _____ psig (Summer)

_____ cfm @ _____ psig (Winter)

List any applications that are for a short duration and use a high volume of air

<u>Application</u>	<u>Approximate Vol Req'd</u>	<u>Min on</u>	<u>Min off</u>
_____	_____ cfm	_____	_____
_____	_____ cfm	_____	_____
_____	_____ cfm	_____	_____
_____	_____ cfm	_____	_____
_____	_____ cfm	_____	_____

Have any steps been taken with the control and storage systems to address these applications? Yes No

Advanced Management of Compressed Air Systems
© 1999, The Compressed Air Challenge



Compressed Air Challenge[®]

Do You Want to Cut Costs? **STACOLM**



ST orage
A ppropriate Uses
CO ntrols
L eaks
M aintenance



CAC

Data Forms

- ❑ High Pressure End Use Requirements
- ❑ High Volume Intermittent Applications
- ❑ Potentially Inappropriate Applications
- ❑ Summing End–Use Requirements
- ❑ End–Use Solutions Finder
- ❑ **S**torage Opportunities
- ❑ **A**ppropriate Use Strategy
- ❑ **C**ontrol Strategy
- ❑ **L**eak Estimates / Repair & Ongoing Management
- ❑ **M**aintenance Plan



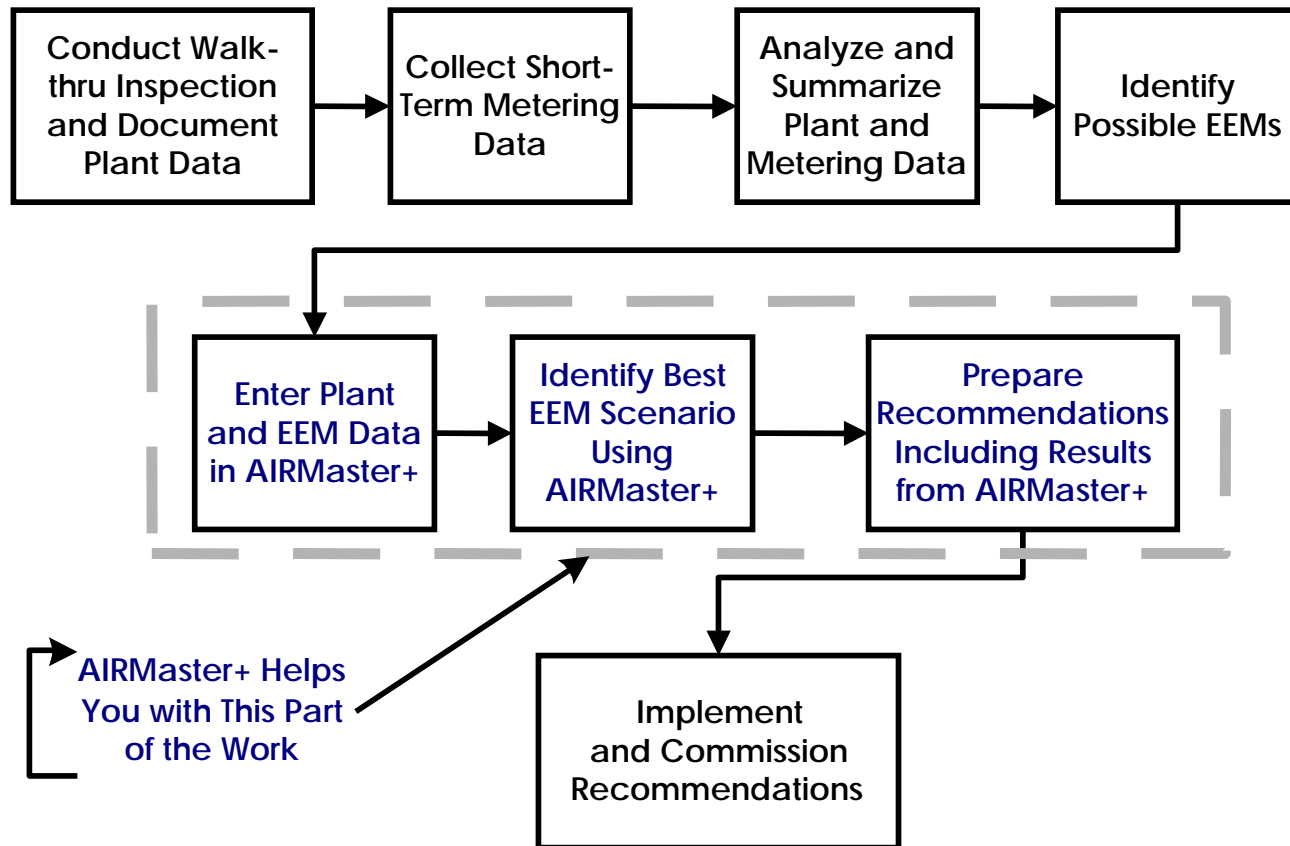


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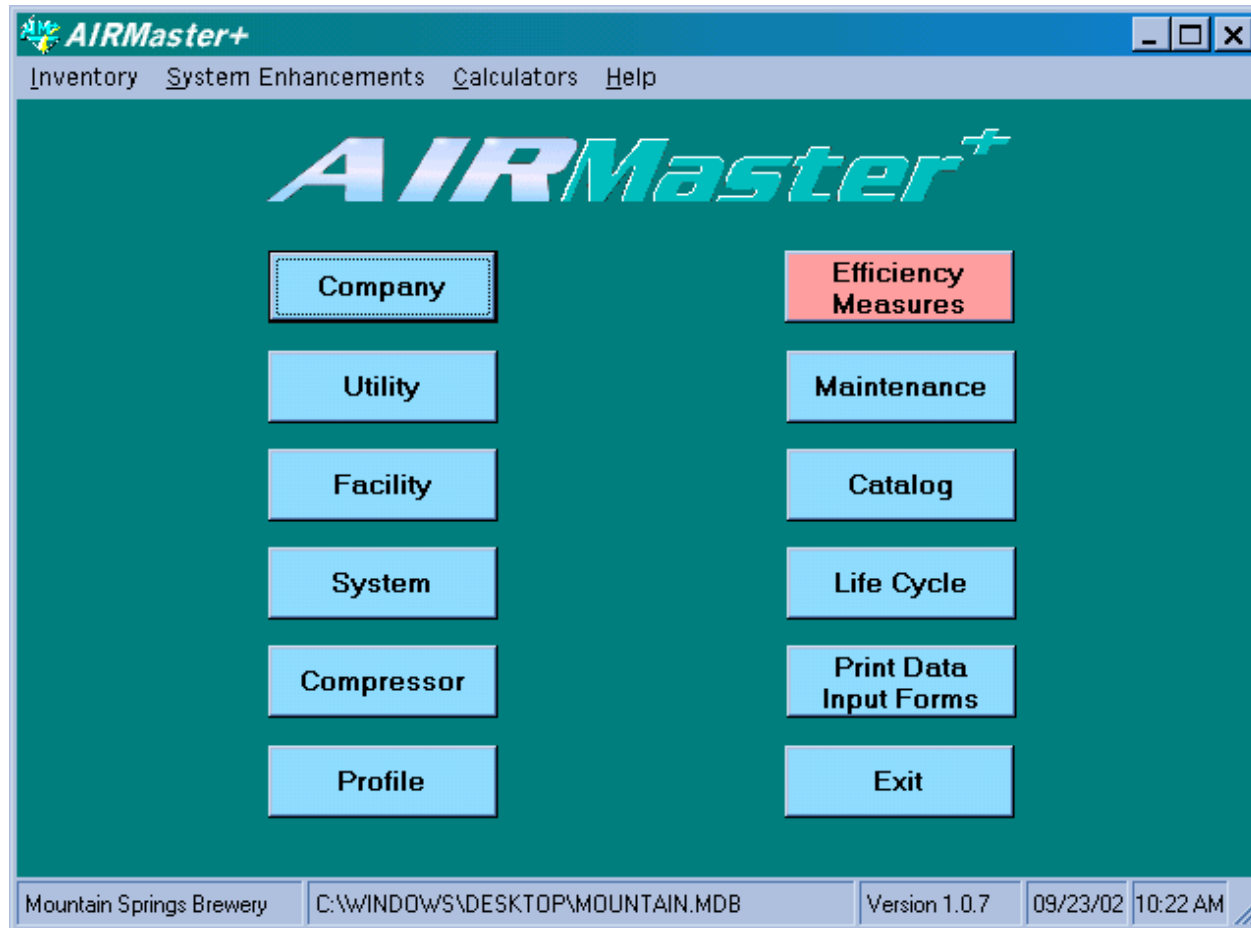
AIRMaster+ Best Practices Tools



How Does AIRMaster+ Help You Conduct a Performance Assessment?



AIRMaster+ Main Menu



AIRMaster+ Data Input Form


Utility Rates

Data Input Form		AIRMaster+	
Utility Rates			
Utility Name : _____ Utility Code : _____ Address 1 : _____ Address 2 : _____ City, State, Zip : _____ Contact : _____ Phone : _____			
Rate Schedule: _____	Season 1	Season 2	
Start Month/Day	_____	_____	
Dem and Rate, \$/kW - mo	_____	_____	
Energy Rate, \$/kWh: Block 1	_____	_____	
Block 2	_____	_____	
Block 3	_____	_____	
Rate Schedule: _____	Season 1	Season 2	
Start Month/Day	_____	_____	
Dem and Rate, \$/kW - mo	_____	_____	
Energy Rate, \$/kWh: Block 1	_____	_____	
Block 2	_____	_____	
Block 3	_____	_____	
Rate Schedule: _____	Season 1	Season 2	
Start Month/Day	_____	_____	
Dem and Rate, \$/kW - mo	_____	_____	
Energy Rate, \$/kWh: Block 1	_____	_____	
Block 2	_____	_____	
Block 3	_____	_____	
Rate Schedule: _____	Season 1	Season 2	
Start Month/Day	_____	_____	
Dem and Rate, \$/kW - mo	_____	_____	
Energy Rate, \$/kWh: Block 1	_____	_____	
Block 2	_____	_____	
Block 3	_____	_____	



AIRMaster+ Data Input Form

□ Compressor

 Data Input Form AIRMaster+																					
Compressor																					
Facility : _____ System : _____ Compressor : _____	User-Assigned ID : _____ In Service, Y/N : _____ Sequencer Used, Y/N : _____																				
Nameplate Information																					
Compressor type : _____ Manufacturer : _____ Model : _____ Horsepower rating : _____ Full load operating pressure, psig : _____ Rated capacity @ full load operating pressure, acfm : _____ Serial # : _____ Installation date : _____ Compressor location : _____																					
Control Information																					
Control type : _____																					
<i>Unloading Controls</i> Unload point, %Capacity : _____ # of unload steps : _____																					
<i>After Cooling info</i>																					
Cooling type : _____ Fan motor rating, HP : _____																					
Unloaded sump pressure, psig : _____ Automatic shutdown timer, Y/N : _____																					
Compressor Performance																					
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Performance Points</th> <th style="width: 25%;">Discharge Pressure, psig</th> <th style="width: 25%;">Airflow, acfm</th> <th style="width: 25%;">Power, kW</th> </tr> </thead> <tbody> <tr> <td>Full Load</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Max full flow</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Unload Point or surge point for centrifugal</td> <td></td> <td></td> <td></td> </tr> <tr> <td>No load (fully modulated or unloaded)</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Performance Points	Discharge Pressure, psig	Airflow, acfm	Power, kW	Full Load				Max full flow				Unload Point or surge point for centrifugal				No load (fully modulated or unloaded)				<i>Inlet Conditions</i> Avg. temperature, °F : _____ Atmos. pressure, psia : _____ Blowdown time, sec. : _____
Performance Points	Discharge Pressure, psig	Airflow, acfm	Power, kW																		
Full Load																					
Max full flow																					
Unload Point or surge point for centrifugal																					
No load (fully modulated or unloaded)																					



AIRMaster+

Data Input Forms

- ❑ Company / Facility
- ❑ Utility Rates
- ❑ System
- ❑ End Uses
- ❑ Compressor
- ❑ Compressor Details
- ❑ Profile Order
- ❑ Profile Data
- ❑ EEM: Reduce Air Leaks
- ❑ EEM: Improve End Use Efficiency
- ❑ EEM: Reduce System Air Pressure
- ❑ EEM: Using Unloading Controls
- ❑ EEM: Adjust Cascading Set Points
- ❑ EEM: Use Automatic Sequencer
- ❑ EEM: Reduce Run Time
- ❑ EEM: Add Primary Receiver Volume



Informational Objectives - Input

□ AIRMaster+ Information

- Company Information => AIRMaster+ Forms
- Utility Information => Energy Bill
- Facility Information => AIRMaster+ Form
- System Information => Compressors
- Compressor Signature => Performance Points
- Nameplate Compressor => Motor Data
- System Profile => Measure Power or Flow Trends
- Typical operating days => Day-types



Informational Objectives

On-Site Assessment

□ System Information

- Measure System Profile Power and/or Airflow
- Pressure & Flow Dynamic Profiles
- Compressor Control Response Dynamics
- Perceived High Pressure Demands
- High Volume Intermittent Demand Events
- Distribution Gradients
- Overall Leakage Estimate



Informational Objectives - Results

□ System Assessment

- Identify Lowest Optimum Target Pressure
- Resolve Pressure Profile & Control Issues
- Validate Perceived High Pressure Uses
- Air Storage for High Volume Intermittent Demand
- Resolve Piping Deficiencies & Eliminate Gradients

□ AIRMaster+ Software

- Assess Various Energy Efficiency Measures
- Consider Multiple Scenarios w/ Various Measures
- Recommend Cost Effective Remedial Measures



AIRMaster+ System Profile – Data

System Profiles [Close]

File Calculators Help

Select
 Facility: Mineral Processing
 System: Main
 Daytype: Mon - Fri
 System pressure control range: 94.0 - 110.0 psig

Data Entry | Profile Summary | Totals

Cascade Order - click cell to toggle stage#/'off'

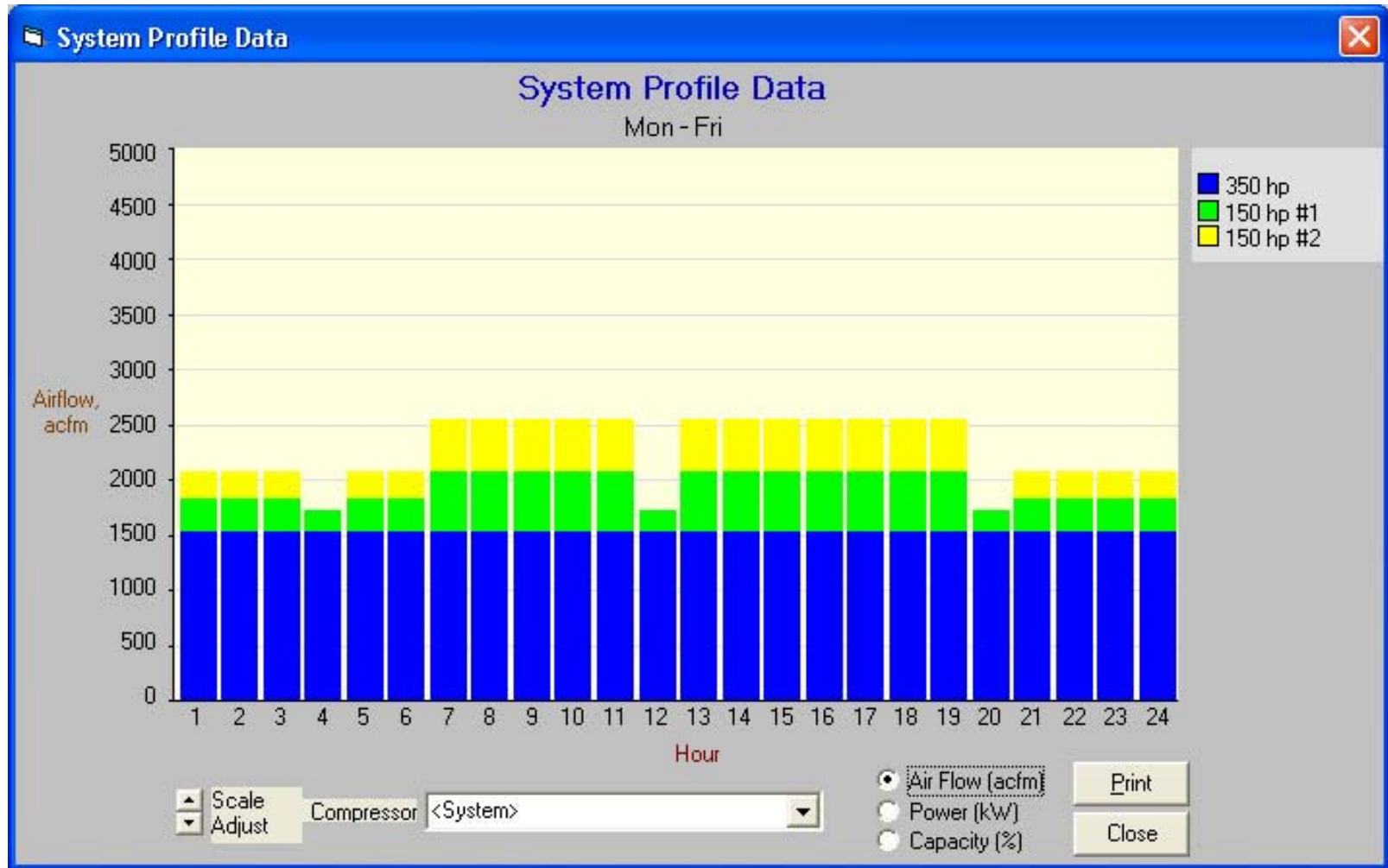
	1	2	3	4	5	6	7	8	9	10
Compressor										
350 hp	1	1	1	1	1	1	1	1	1	1
150 hp #1	2	2	2	2	2	2	2	2	2	2
150 hp #2	3	3	3	3	3	3	3	3	3	3

Profile data type: Airflow, %capacity

	3	4	5	6	7	8	9	10
Compressor								
350 hp	.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
150 hp #1	.0	50.0	30.0	50.0	50.0	90.0	90.0	90.0
150 hp #2	.0	40.0	0.0	40.0	40.0	80.0	80.0	80.0

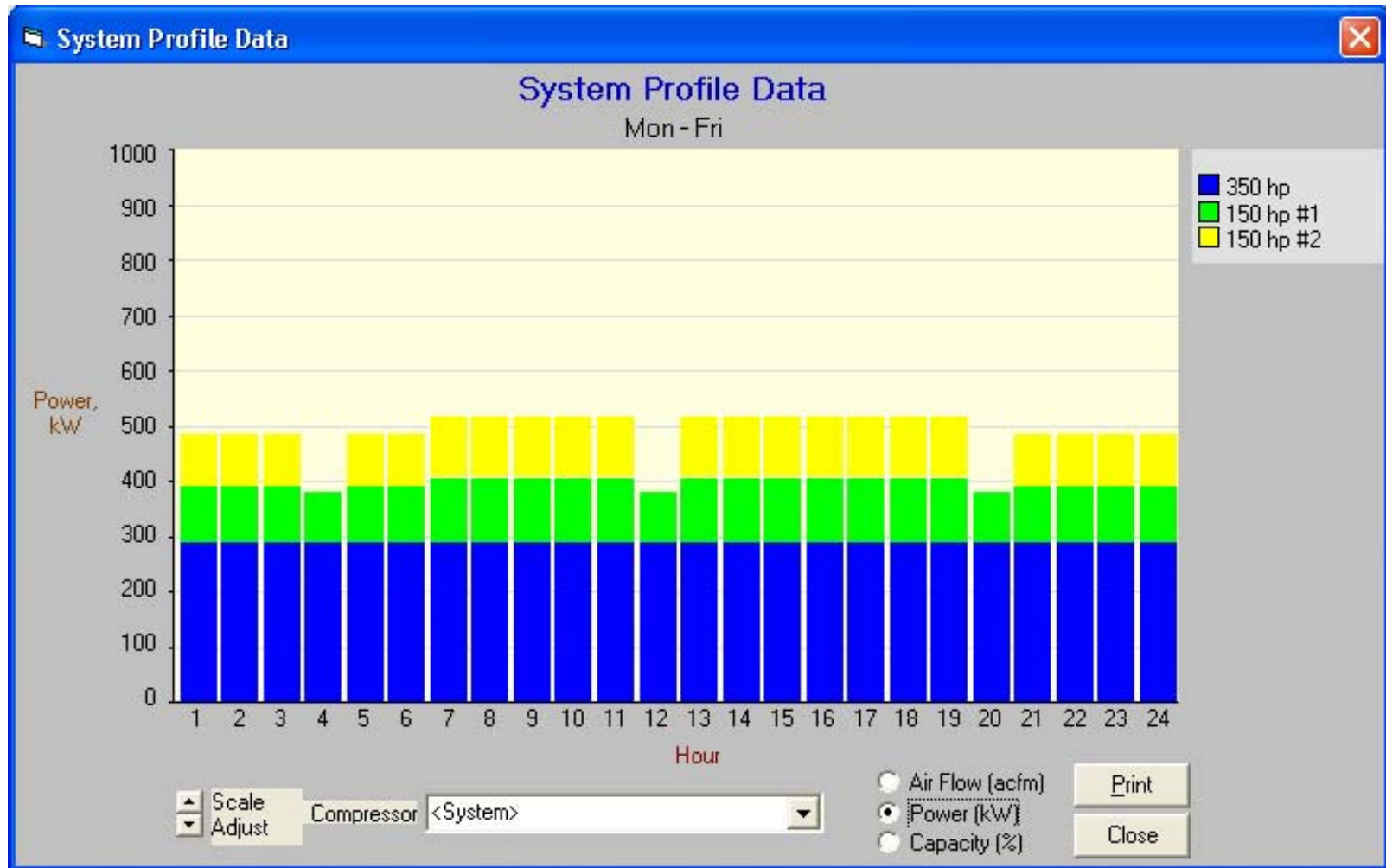


AIRMaster+ System Profile – Air Flow



AIRMaster+

System Profile – Power (kW)



AIRMaster+ Energy Efficiency Measures

- ❑ Reduce Air Leaks
- ❑ Adjust Cascading Set Points
- ❑ Improve End Use Efficiency
- ❑ Use Automatic Sequencer
- ❑ Reduce System Air Pressure
- ❑ Reduce Run Time
- ❑ Use Unloading Controls
- ❑ Add Primary Receiver Volume



Energy Efficiency Measures Savings Summary

Energy Efficiency Measures

File Calculators Help

Copy EEM Scenario Life Cycle Results Close

Facility Mineral Processing EEM Scenario Scenario #1

System Main

Data Entry Savings Summary

Description	Energy Savings, kWh	Energy Savings, \$	Energy Savings, %	Demand Savings, kW	Demand Savings, \$	Installed Cost, \$	Total Savings, \$	Simple Payback, years
Improve Pressure Profile	407,747	14,475	13.5	41.1	2,021	200	16,496	0.0
Use Unloading Controls	-2,862	-102	-0.1	0.8	41	500	-61	0.0
Add Primary Receiver Volume	129,131	4,584	4.3	20.8	1,021	15,000	5,605	2.7
Fix Air Leaks	216,495	7,686	7.2	33.2	1,633	1,000	9,319	0.1
Reduce Run Time	21,935	779	0.7	0.0	0	100	779	0.1
TOTALS	772,445	27,422	25.5	95.9	4,716	16,800	32,138	0.5

Double-click row to view corresponding measure input data

Copy To Clipboard





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CAC LogTool v2

Best Practices Tools



LogTool v2 – Import Data

- The import screen gives you tools to import data from different types of data loggers

Import/Manage Logger Data in: Good Food Company.mdb

Logger File Type: AEC MDL DataManager

[Select Logger Data Files] Folder: C:\LogTool v2 Demonstration\AEC

Logger Data Files									
	Import	File Name	Logger ID	Logger Name	Start	End	Interval (sec.)	File	
	<input checked="" type="checkbox"/>	2941.txt	02941	cw bot 01 12010	12/1/2004 16:22:48	12/18/2004 23:52:48	60	OK	
	<input checked="" type="checkbox"/>	3697.txt	03697	NETAFIM05 09:	9/21/2004 08:00:00	10/6/2004 11:04:00	60	OK	

Channels in Files Checked for Import											
	Import	File Name	Logger ID	Logger Name	Ch #	Name	Type	Units	Period		
	<input checked="" type="checkbox"/>	2941.txt	02941	cw bot 01 12010	1	Q1 KW 1M	Not Assign	kW	Not Assigned		Not Assigned
	<input checked="" type="checkbox"/>	2941.txt	02941	cw bot 01 12010	2	BOTT P 1M	Not Assign	psig	Not Assigned		Not Assigned
	<input checked="" type="checkbox"/>	3697.txt	03697	NETAFIM05 09:	1	AC 1 KW 1 M	Not Assign	kW	Not Assigned		Not Assigned
	<input checked="" type="checkbox"/>	3697.txt	03697	NETAFIM05 09:	2	HEADER P	Not Assign	psig	Not Assigned		Not Assigned

Import Checked Channels Uncheck All Channels

Logger Channels Imported to this MDB File									
	Delete	Name	Type	Units	Period	System	Start	End	
	<input type="checkbox"/>	AC1 KW 1M	Not Assign	kW	Not Assigned	Not Assigned	12/1/2004 16:16:38	12/16/2004	
	<input type="checkbox"/>	AC2 KW 1M	Not Assign	kW	Not Assigned	Not Assigned	12/1/2004 16:16:38	12/16/2004	



LogTool v2 – View Data

- View Data displays a listing of the date/time stamps & data values for the selected channel.

The screenshot shows the LogTool v2 interface. The main window has a menu bar (File, Tools, Help) and a toolbar with buttons for 'Open/Create Database file to store logger data', 'Open an Existing Database (.MDB File)', 'Import Logger Data', 'Trend', 'Scatter', and 'DayType'. Below the toolbar is a table of channels with columns for View, Trend, Scatter, DayType, Name, and Type. The 'View Channel Data' window is open, displaying a table of date/time stamps and data values for the selected channel 'AC 1 KW 1 M'.

DateTime	AC 1 KW 1 M
9/26/2004 12:17:00	21.33
9/26/2004 12:18:00	
9/26/2004 12:19:00	
9/26/2004 12:20:00	
9/26/2004 12:21:00	
9/26/2004 12:22:00	
9/26/2004 12:23:00	
9/26/2004 12:24:00	
9/26/2004 12:25:00	
9/26/2004 12:26:00	
9/26/2004 12:27:00	
9/26/2004 12:28:00	
9/26/2004 12:29:00	
9/26/2004 12:30:00	
9/26/2004 12:31:00	
9/26/2004 12:32:00	
9/26/2004 12:33:00	
9/26/2004 12:34:00	
9/26/2004 12:35:00	
9/26/2004 12:36:00	
9/26/2004 12:37:00	
9/26/2004 12:38:00	
9/26/2004 12:39:00	
9/26/2004 12:40:00	
9/26/2004 12:41:00	
9/26/2004 12:42:00	
9/26/2004 12:43:00	
9/26/2004 12:44:00	

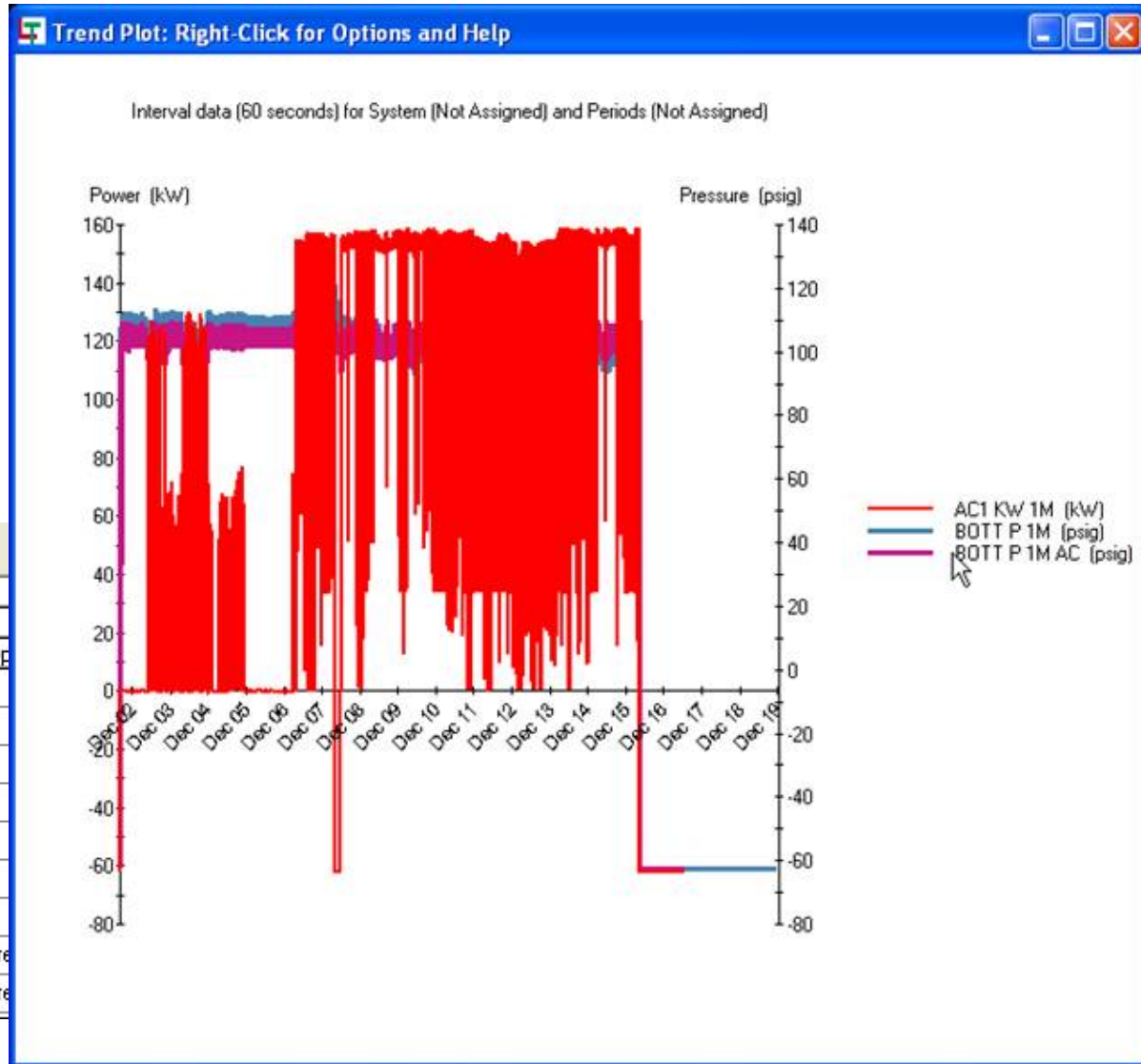
View	Trend	Scatter	DayType	Name	Type
Data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AC 1 KW 1 M	Power
Data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AC1 KW 1M	Power
Data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AC1 KW 3S	Power
Data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AC1 KW 3S2	Power
Data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AC2 KW 1M	Power
Data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AC2 KW 3S	Power
Data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AC2 KW 3S2	Power
Data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	BO TT P 1M	Pressure
Data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	BO TT P 1M AC	Pressure
Data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	BO TT P 3S	Pressure



LogTool v2

Trend Plot

- Select Channels to Plot



LogTool v2 Trend Plot

- Create Day Types for AIRMaster+ System Profile

DayType Analysis

System: Main, Period: Baseline

Not Assigned (kW)

Hour of the Day

Date: Jul-11-2004
Hour: 21
Not Assigned (kW) :

Right click on data points to select day type. Left click to highlight the trace.

Click a date to highlight profile in graph.

Date	Day	Day Type
Jul-07-2004	Wed	Excluded Days
Jul-08-2004	Thu	Wed-Thu-Fri Production
Jul-09-2004	Fri	Down Day
Jul-10-2004	Sat	Down Day
Jul-11-2004	Sun	Down Day
Jul-12-2004	Mon	Mon-Tue Production
Jul-13-2004	Tue	Mon-Tue Production
Jul-14-2004	Wed	Wed-Thu-Fri Production
Jul-15-2004	Thu	Wed-Thu-Fri Production
Jul-16-2004	Fri	Wed-Thu-Fri Production
Jul-17-2004	Sat	Down Day
Jul-18-2004	Sun	Excluded Days

Plot Day Type ... All Days

Remove Day Type...

Caution: Day profiles can be similar even though different equipment, e.g., compressors, is operating. Use Trend Plots to examine the details of equipment operation before determining whether days should be assigned to the same daytype.

Create System DayType Profiles Copy Plot to Clipboard Copy Profiles to Clipboard Help

System DayType Profiles							
	System	Type	Period	DayTypeName	ChannelName	Hr_01	Hr_C
▶	Main	Not Assigne	Baseline	Down Day	COMP1 KW	23.32	24
	Main	Not Assigne	Baseline	Down Day	COMP2 KW	9.91	9
	Main	Not Assigne	Baseline	Mon-Tue Productio	COMP1 KW	22.99	23
	Main	Not Assigne	Baseline	Mon-Tue Productio	COMP2 KW	9.69	10
	Main	Not Assigne	Baseline	Wed-Thu-Fri Produc	COMP1 KW	26.52	26
	Main	Not Assigne	Baseline	Wed-Thu-Fri Produc	COMP2 KW	10.73	10

Trend Scatter DayType

	Trend		Scatter		DayType		Name	Type
View	Y1	Y2	X	Y	Include			
Data	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		COMP2 KW	Power
Data	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		COMP2 P	Not Assign
Data	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		COMP1 KW	Power
Data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		COMP1 P	Not Assign
Data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		REMOTE P 1 MIN	Not Assign



LogTool v2

Paste DayTypes into Excel

□ View DayType Profiles in Excel

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	System	Type	Period	DayTypeName	ChannelName	Hr_01	Hr_02	Hr_03	Hr_04	Hr_05	Hr_06	Hr_07	Hr_08	Hr_09	Hr_10	Hr_11
2	Main	Not Assign	Baseline	Down Day	COMP1 KW	23.31883	24.38368	23.99265	24.65419	23.7827	23.71069	24.28172	24.15927	25.39152	23.63532	23.96068
3	Main	Not Assign	Baseline	Down Day	COMP2 KW	9.910972	9.341657	9.070322	9.302085	9.140594	9.738995	9.929728	9.99265	10.0878	11.38923	10.3626
4	Main	Not Assign	Baseline	Mon-Tue Production	COMP1 KW	22.99389	23.60305	22.91625	22.05635	22.2651	23.15486	37.79541	42.5151	46.79852	47.95091	48.1047
5	Main	Not Assign	Baseline	Mon-Tue Production	COMP2 KW	9.685127	10.14379	9.830324	9.53877	10.17374	9.15433	15.1418	17.93814	20.51559	17.90414	16.9320
6	Main	Not Assign	Baseline	Wed-Thu-Fri Production	COMP1 KW	26.51718	26.63203	27.18745	26.84604	26.56435	25.37759	39.44926	43.28663	45.11143	46.40184	44.5422
7	Main	Not Assign	Baseline	Wed-Thu-Fri Production	COMP2 KW	10.73021	10.35054	10.04517	8.220376	8.71347	9.667829	12.07147	13.08926	17.01233	22.11389	32.21388
8																
9																
10																
11	Date	Day	Day Type													
12	Jul-07-200	Wed	Excluded Days													
13	Jul-08-200	Thu	Wed-Thu-Fri Production													
14	Jul-09-200	Fri	Down Day													
15	Jul-10-200	Sat	Down Day													
16	Jul-11-200	Sun	Down Day													
17	Jul-12-200	Mon	Mon-Tue Production													
18	Jul-13-200	Tue	Mon-Tue Production													
19	Jul-14-200	Wed	Wed-Thu-Fri Production													
20	Jul-15-200	Thu	Wed-Thu-Fri Production													
21	Jul-16-200	Fri	Wed-Thu-Fri Production													
22	Jul-17-200	Sat	Down Day													
23	Jul-18-200	Sun	Excluded Days													
24																



LogTool v2

Paste DayTypes into AIRMaster+

- Select DayType Profile Data to Paste into AM+

Microsoft Excel - DayType-ExcelSample.xls [Read-Only]

File Edit View Insert Format Tools Data Window ACT! Help Adobe PDF

Type a question for help

Arial 10 B I U

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	System	Type	Period	DayTypeName	ChannelName	Hr 01	Hr 02	Hr 03	Hr 04	Hr 05	Hr 06	Hr 07	Hr 08	Hr 09	Hr 10	Hr 11
1	Main	Not Assign	Baseline	Down Day	COMP1 KW	23.31883	24.38368	23.99265	24.65419	23.7827	23.71069	24.28172	24.15927	25.39152	23.63532	23.96068
2	Main	Not Assign	Baseline	Down Day	COMP2 KW	9.910972	9.341657	9.070322	9.302085	9.140594	9.738995	9.929728	9.99265	10.0878	11.38923	10.3626
3	Main	Not Assign	Baseline	Mon-Tue Production	COMP1 KW	22.99389	23.60305	22.91625	22.05635	22.2651	23.15486	37.79541	42.5151	46.79852	47.95091	48.1047
4	Main	Not Assign	Baseline	Mon-Tue Production	COMP2 KW	9.685127	10.14379	9.830324	9.53877	10.17374	9.15433	15.1418	17.93814	20.51559	17.90414	16.9320
5	Main	Not Assign	Baseline	Wed-Thu-Fri Production	COMP1 KW	26.51718	26.63203	27.18745	26.84604	26.56435	25.37759	39.44926	43.28663	45.11143	46.40184	44.5422
6	Main	Not Assign	Baseline	Wed-Thu-Fri Production	COMP2 KW	10.73021	10.35054	10.04517	8.220376	8.71347	9.667829	12.07147	13.08926	17.01233	22.11389	32.2138
7																
8																
9																
10																
11	Date	Day	Day Type													
12	Jul-07-200	Wed	Excluded Days													
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21	Jul-16-200	Fri	Wed-Thu-Fri Production													
22	Jul-17-200	Sat	Down Day													
23	Jul-18-200	Sun	Excluded Days													
24																

Sheet1 / Sheet2 / Sheet3





U. S. Department of Energy
Energy Savings Assessment (ESA)

Energy Savings Assessment Process



Energy Savings Assessment Process



- ❑ Teams are DOE Energy Experts and plant personnel
- ❑ Teams focus on fans, pumps compressors, steam or process heating systems.
- ❑ Plant personnel trained on DOE software tools



Gather Preliminary Data

- ❑ Company / Facility
- ❑ Utility Rates
- ❑ System
- ❑ End Uses
- ❑ Compressor
- ❑ Compressor Details
- ❑ Block Diagram
- ❑ Measurement Plan
- ❑ Coordinate preparation of measurement points
- ❑ High Pressure End Use Requirements
- ❑ High Volume Intermittent Applications
- ❑ Potentially Inappropriate Applications
- ❑ Summing End–Use Requirements
- ❑ End–Use Solutions Finder



Assessment Expert spends 3 days on site

□ Day 1

- Safety briefing, tour plant
- Overview of DOE Tool to plant personnel
- Agree on potential energy efficiency opportunities to investigate
- **Initiate Data Collection For Potential Opportunities**

□ Day 2

- Continue data collection
- Apply DOE tool to quantify potential opportunities
- Plant lead & expert agree on opportunity results



□ Day 3

- Wrap up tool analyses
- Plant lead & expert ensure they agree on opportunity results
- Closeout meeting in p.m. to review results



Questions and Answers



Acknowledgments

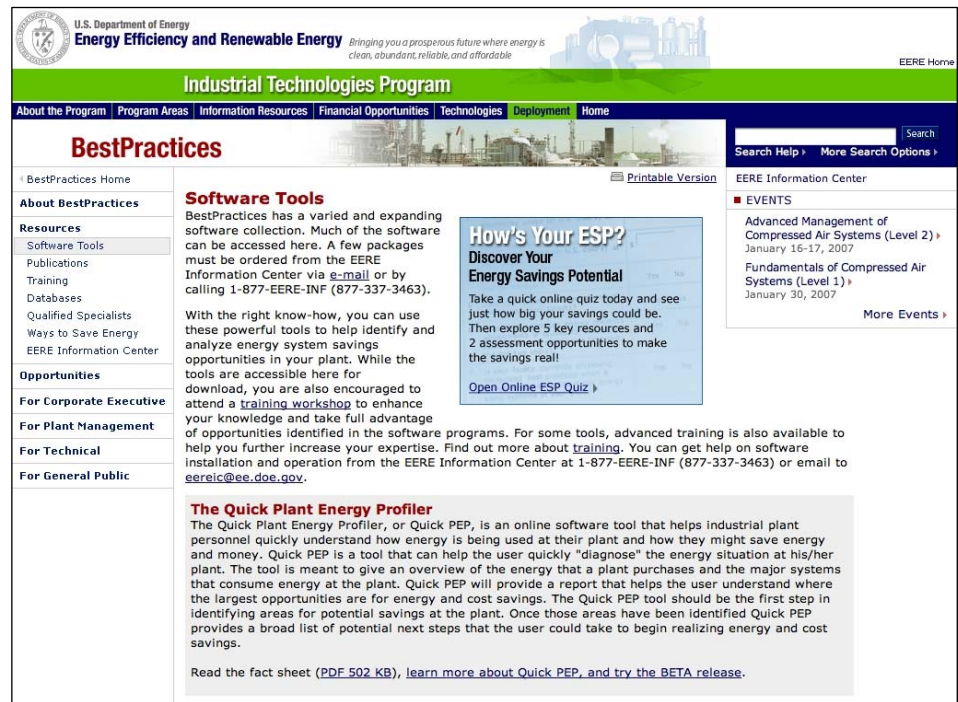
- ❑ U.S. Department of Energy's Industrial Technology Program
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 - Michael Baker, SBW Consulting; Frank Moskowitz, Draw Professional Services
 - Energy Savings Assessment Process
 - Bob Gemmer, Technology Manager, Industrial Technologies Program



Download the Tool

DOE BestPractices Web site:

<http://www.eere.energy.gov/industry/bestpractices/software.html>



The screenshot shows the DOE BestPractices website. At the top, it features the U.S. Department of Energy logo and the text "Energy Efficiency and Renewable Energy" with the tagline "Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable". Below this is the "Industrial Technologies Program" header. A navigation bar includes links for "About the Program", "Program Areas", "Information Resources", "Financial Opportunities", "Technologies", "Deployment", and "Home". The main content area is titled "BestPractices" and includes a search bar and a "Printable Version" link. On the left, there is a sidebar with "About BestPractices" and "Resources" (Software Tools, Publications, Training, Databases, Qualified Specialists, Ways to Save Energy, EERE Information Center). The main text under "Software Tools" describes the collection and provides contact information. A sidebar on the right lists "EVENTS" such as "Advanced Management of Compressed Air Systems (Level 2)" and "Fundamentals of Compressed Air Systems (Level 1)". A featured box titled "How's Your ESP? Discover Your Energy Savings Potential" includes a link to an online quiz. At the bottom, there is a section for "The Quick Plant Energy Profiler" with a link to a fact sheet.



Find Additional Training

Visit the DOE BestPractices Training Web site:

www.eere.energy.gov/industry/bestpractices/training

See the Training Calendar for events in your area:

www.eere.energy.gov/industry/bestpractices/events_calendar.asp

Become a Qualified Specialist:

www.eere.energy.gov/industry/qualified_specialists.html

U.S. Department of Energy
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Bringing you a prosperous future where energy is
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Industrial Technologies Program

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Ways to Save Energy
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Opportunities
For Corporate Executive
For Plant Management
For Technical
For General Public

Training

Do you want to learn how to manage your motors and optimize your pumping system? Or do you need to calculate the energy cost of compressed air in your facility?

Whatever your industrial concern, you've come to the right place.

BestPractices offers system-wide and component-specific training programs to help you run your plant more efficiently. The training is offered throughout the year and around the country.

Please contact the [Training Coordinator](#) for further information on training sessions.

Visit the [Training Calendar](#).

Training Sessions

- Compressed Air Systems
- Fan Systems
- Motor Systems
- Process Heating
- Pumping Systems
- Steam Systems

[Printable Version](#)

EERE Information Center

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EVENTS

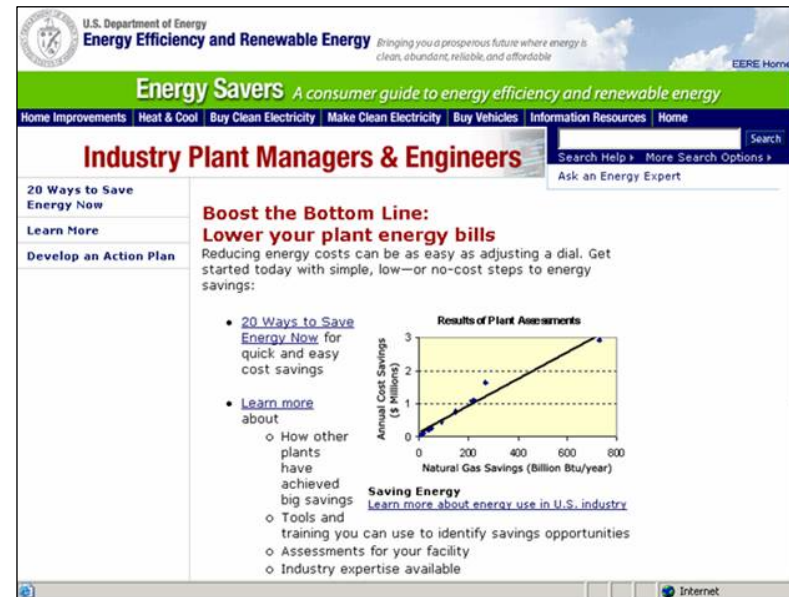
- Advanced Management of Compressed Air Systems (Level 2) | January 16-17, 2007
- Fundamentals of Compressed Air Systems (Level 1) | January 30, 2007

More Events |



See the “Industrial Energy Savers” Web Site

- 20 ways to save energy now
- Tools & training you can use to identify savings opportunities
- Industry expertise available
- Assessments for your plant
- Develop an Action Plan
- Learn how others have saved
- Access the National Industrial Assessment Center (IAC) Database



The screenshot shows the "Energy Savers" website, a U.S. Department of Energy initiative. The page is titled "Industry Plant Managers & Engineers" and features a navigation menu with links for "Home Improvements", "Heat & Cool", "Buy Clean Electricity", "Make Clean Electricity", "Buy Vehicles", "Information Resources", and "Home". A search bar is located in the top right corner. The main content area is divided into two columns. The left column contains a sidebar with links for "20 Ways to Save Energy Now", "Learn More", and "Develop an Action Plan". The right column features a section titled "Boost the Bottom Line: Lower your plant energy bills" with a sub-header "Results of Plant Assessments". This section includes a line graph showing a positive correlation between "Natural Gas Savings (Billion Btu/year)" on the x-axis and "Annual Cost Savings (\$ Millions)" on the y-axis. The graph shows a linear trend with data points at approximately (0,0), (100,0.5), (200,1), (300,1.5), (400,2), (500,2.5), (600,3), and (700,3.5). Below the graph, there are several bullet points and links, including "20 Ways to Save Energy Now", "Learn more about", "How other plants have achieved big savings", "Tools and training you can use to identify savings opportunities", "Assessments for your facility", and "Industry expertise available".

U.S. Department of Energy
Energy Efficiency and Renewable Energy *Bringing you a prosperous future where energy is clean, abundant, reliable and affordable*

Energy Savers *A consumer guide to energy efficiency and renewable energy*

Home Improvements Heat & Cool Buy Clean Electricity Make Clean Electricity Buy Vehicles Information Resources Home

Industry Plant Managers & Engineers

Search Help More Search Options Ask an Energy Expert

20 Ways to Save Energy Now
Learn More
Develop an Action Plan

**Boost the Bottom Line:
Lower your plant energy bills**

Reducing energy costs can be as easy as adjusting a dial. Get started today with simple, low—or no-cost steps to energy savings:

- [20 Ways to Save Energy Now](#) for quick and easy cost savings
- [Learn more](#) about
 - How other plants have achieved big savings
 - Tools and training you can use to identify savings opportunities
 - Assessments for your facility
 - Industry expertise available

Results of Plant Assessments

Annual Cost Savings (\$ Millions)

Natural Gas Savings (Billion Btu/year)

Saving Energy
[Learn more about energy use in U.S. industry](#)



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Fax: 360-236-2023

E-mail: eereic@ee.doe.gov

Web site: www.eere.energy.gov/informationcenter



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U.S. Department of Energy's
Industrial Technologies Program

