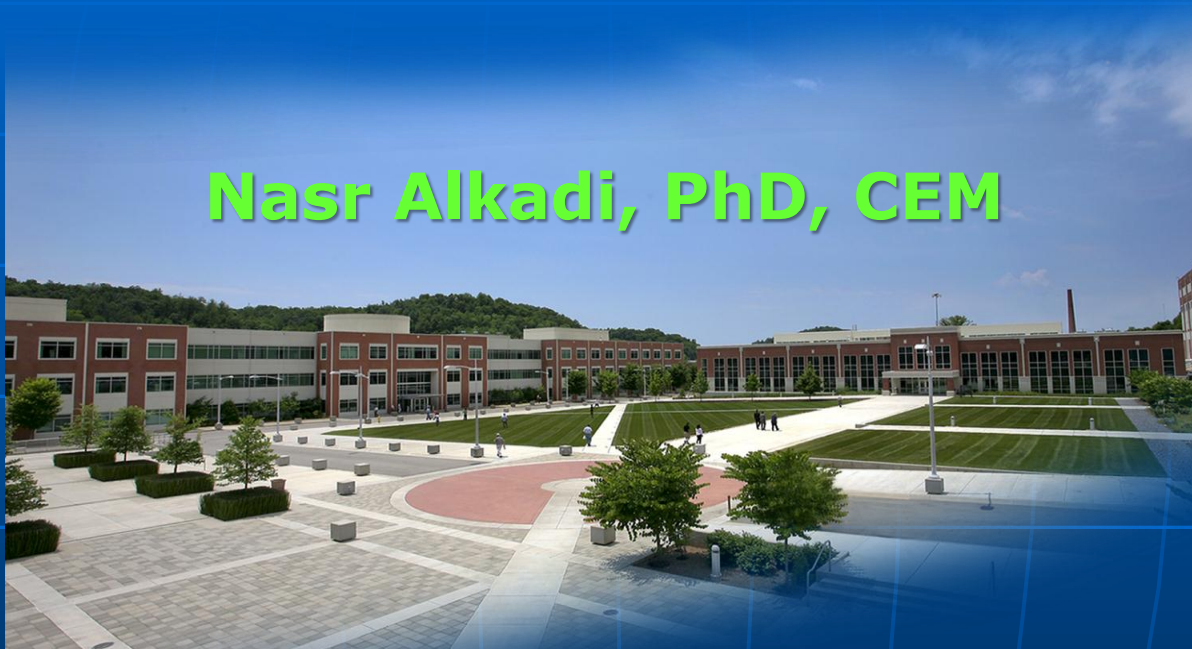


What the World's GREATEST Energy Managers Do Differently?

Nasr Alkadi, PhD, CEM



**U.S. DOE Advanced Manufacturing Office (AMO)
Tuesday Webcast for Industry
Role of an Energy Manager
July 10, 2012**

Oak Ridge National Laboratory (ORNL) is DOE's Largest Science and Energy Laboratory



- \$1.4B budget
- 4,550 employees
- 4,000 research guests annually
- \$500M invested in modernization
- World's most powerful open scientific computer
- Operating the world's most intense pulsed neutron source and a world-class research reactor
- Nation's most diverse energy portfolio
- Nation's largest concentration of open source materials research
- Managing the billion-dollar U.S. ITER project

World's Greatest Energy Managers:

- I. DO Understand the GAME**
- II. DO Build A Strong Coalition**
- III. DO Stay Focused and Sustain Momentum**

Approach – Bottom/UP and Top Down

Use Inverted Pyramid Approach (IPA) – **Your best friend!**

**Know your Plant
Energy GOAL**

Determine how many BTUs you need to CUT to make the GOAL

(Tools: Plant Energy MODEL)

**Identify Actions
Per Business Unit**

Discuss Actions with Each Business Unit - Set Realistic Targets for Each Business Unit – Help make it happens

(Weekly Meetings with Business Units (BU))

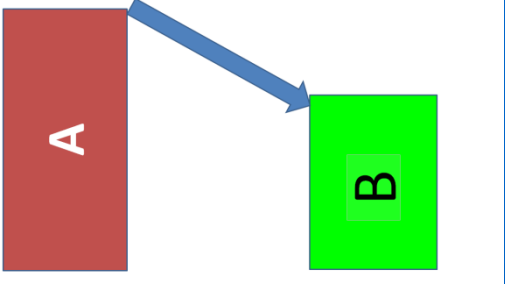
**Provide Real-
World Proof**

Show Results to Gain Confidence and Sustain Momentum

**Develop & Deploy
Plant Energy
BUSINESS PLAN**

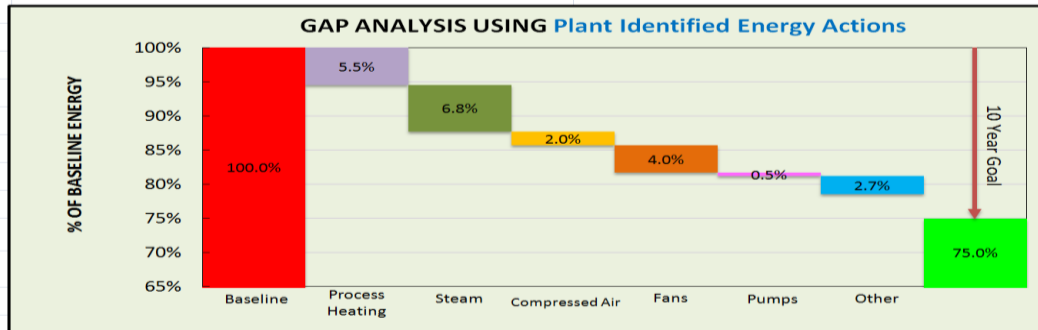
Define Goals/Objectives/
Methods/Owners/Targets
Publish-Share-Follow up

Start with the End in mind and work backwards!



GAP Analysis Tool
Ask your TAM!

PLANT CONTACT INFORMATION	
Name	Terry Brooks – Site Energy Manager
Address	1400 State Docks Road
City/State	Decatur, Alabama 35609
Phone	256-552-6184



GAP Analysis using Plant Identified Energy Actions:

Click on System Type to Enter DATA	% Energy Savings (Calculated)
Process Heating Energy Actions Items	5.5%
Steam Energy Actions Items	6.8%
Compressed Air Energy Actions Items	2.0%
Fans Energy Actions Items	4.0%
Pumps Energy Actions Items	0.5%
Other Energy Actions Items (HVAC - Lighting,...)	2.7%

Detailed Energy Action Items

[Back To Data Input Sheet](#)

PROCESS HEATING ENERGY SAVINGS ACTION ITEMS - SUMMARY INFORMATION								Implementation Followup			
#	Year Identified	Who Identified	ENTER Your Energy Action Item	ENTER Energy Savings/Year				Responsible	Due Date	Status	Issues
				\$	kWh	MMBtu	Fuel Type				
PH1	2008	DOE Expert	Install Blowdown Energy Recovery	\$180,000	0	50,000	Natural Gas	3.0		In Planning	
PH2	2009	DOE Expert	Repair Dyneon Condensate Pumps	\$55,000	0	30,000	Natural Gas	1.0		Implemented	
PH3	2009	DOE Expert	Oven Steam Trap Replacement	\$80,000	0	20,000	Natural Gas	2.0		In Planning	
PH4	2009	Internal Energy Team	Oven Optimization	\$10,000	0	1,250	Natural Gas	4.0		In Progress	
PH5	2009	Internal Energy Team	Repair observed insulation issues	\$3,000	0	375	Natural Gas	5.0		Implemented	
PH6	2010	Private Expert	Repair failed steam traps in Building 4	\$30,000	0	3,750	Natural Gas	2.0		In Planning	
PH7	2010	Private Expert	Implement World-Class Trap Management	\$150,000	0	18,750	Natural Gas	1.0		Implemented	
PH8	2011	Private Expert	XX		0	40000					
PH9					0						
PH10					0						
Total Energy Savings				\$508,000	0	164,125					
Plants Total Energy Consumption (MMBtu/Year)				3,000,000							
% Source Energy Savings Potential - Process Heating				5.5%							

Plant Energy Health⁽¹⁾

Model your Plant Energy Systems – Use Simple Engineering Calcs.

Fatty Electricity + High LDL Cholesterol CA System + Unhealthy NG/Coal

During Weekdays – **Need to Cut down** *

Required BTU For Production should all Energy Waste Streams are Eliminated + Design for Energy is Considered

Fatty Electricity + High LDL Cholesterol CA System + Unhealthy NG/Coal

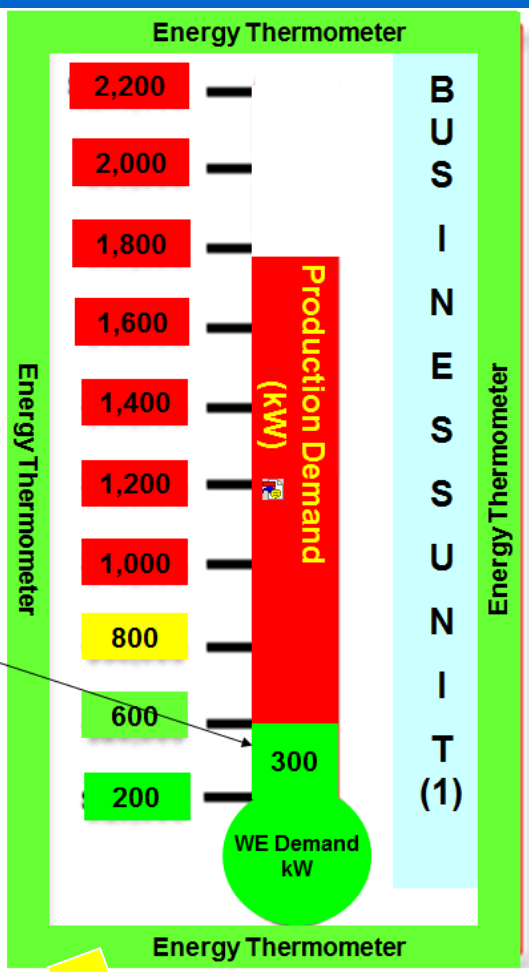
During Weekends **Need to Cut down** *

(1) Alkadi, N.M., "Energy and Productivity, two sides of a coin in US Auto Industry", SAE, Detroit, USA, April 2006

Give Each Business Unit their Energy Thermometer

A Visual that shows the Weekend Energy Shutdown Goal (If Applicable to your Plant/Process)

Movable Weekend Shutdown GOAL
 Push the Envelope
 Every Quarter – Can you achieve Near ZERO?



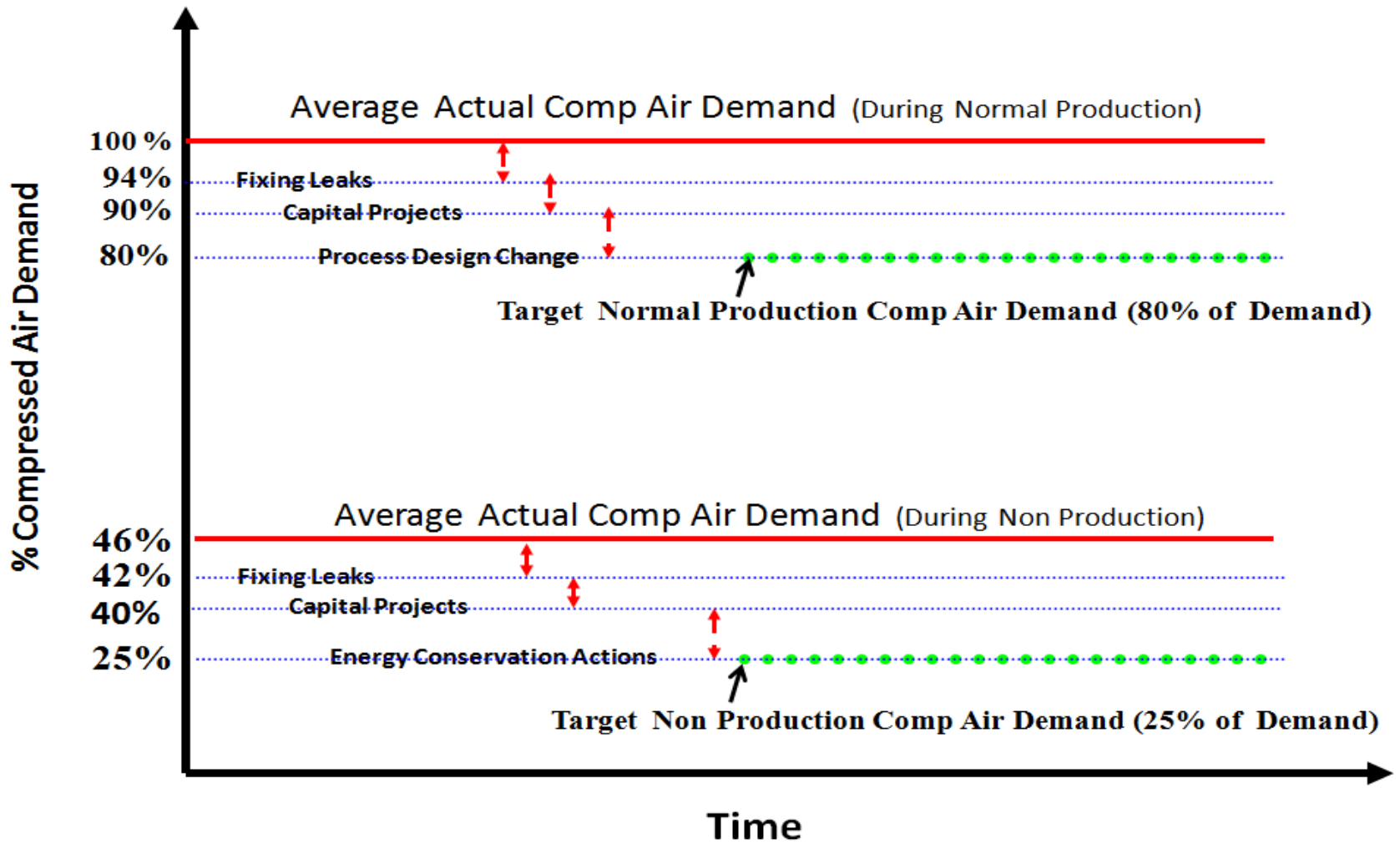
Setting the shutdown Goal requires Familiarity with Equipment/Devices that Can be safely shutdown during Non-production hours

Report Performance to Management on a Weekly Basis

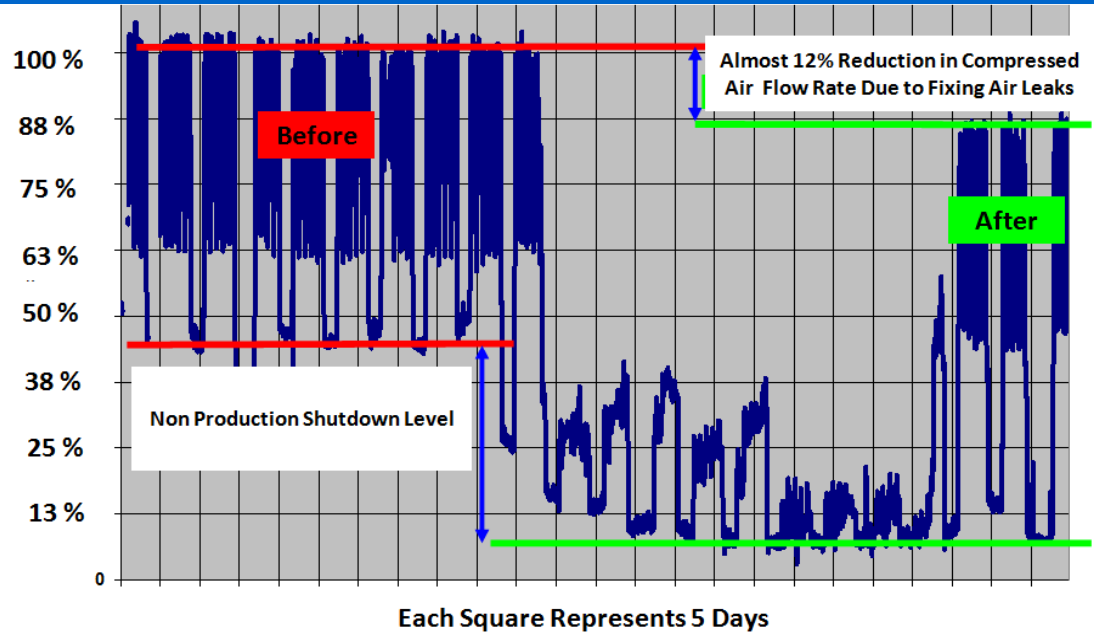
Business Unit	WE 1	WE 2	WE 3	WE 4	WE 5	WE 6	WE 7			
BU A	Goal Made	Goal Made	Goal Made	Goal Made	Goal Made	Goal Made	Goal Made			
BU B	Goal Missed	Goal Made	Goal Made	Goal Made	Goal Made	Goal Made	Goal Made			
BU C	Goal Made	Goal Made	Goal Made	Goal Missed	Goal Made	Goal Made	Goal Made			
BU D	Goal Missed	Goal Missed	Goal Made	Goal Made	Goal Made	Goal Made	Goal Made			
BU E	Goal Missed	Goal Missed	Goal Missed	Goal Missed	Goal Made	Goal Made	Goal Made			
BU F	Goal Missed	Goal Made	Goal Made	Goal Made	Goal Made	Goal Made	Goal Made			
BU G	Goal Missed	Goal Made	Goal Made	Goal Made	Goal Missed	Goal Made	Goal Made			
BU H	Goal Missed	Goal Missed	Goal Made	Goal Made	0	Goal Made	Goal Made			

Give Details on how to get there

- Compressed Air Reduction Plan (Example)



Compressed air demand before and after a dedicated effort to fix compressed air leaks



Walk the Talk & Show Results!

Turn off one Air Compressor Permanently

**Support
Maintenance Staff
Make the Business
Case – Solicit
Funds – Sell to
Mgmt**



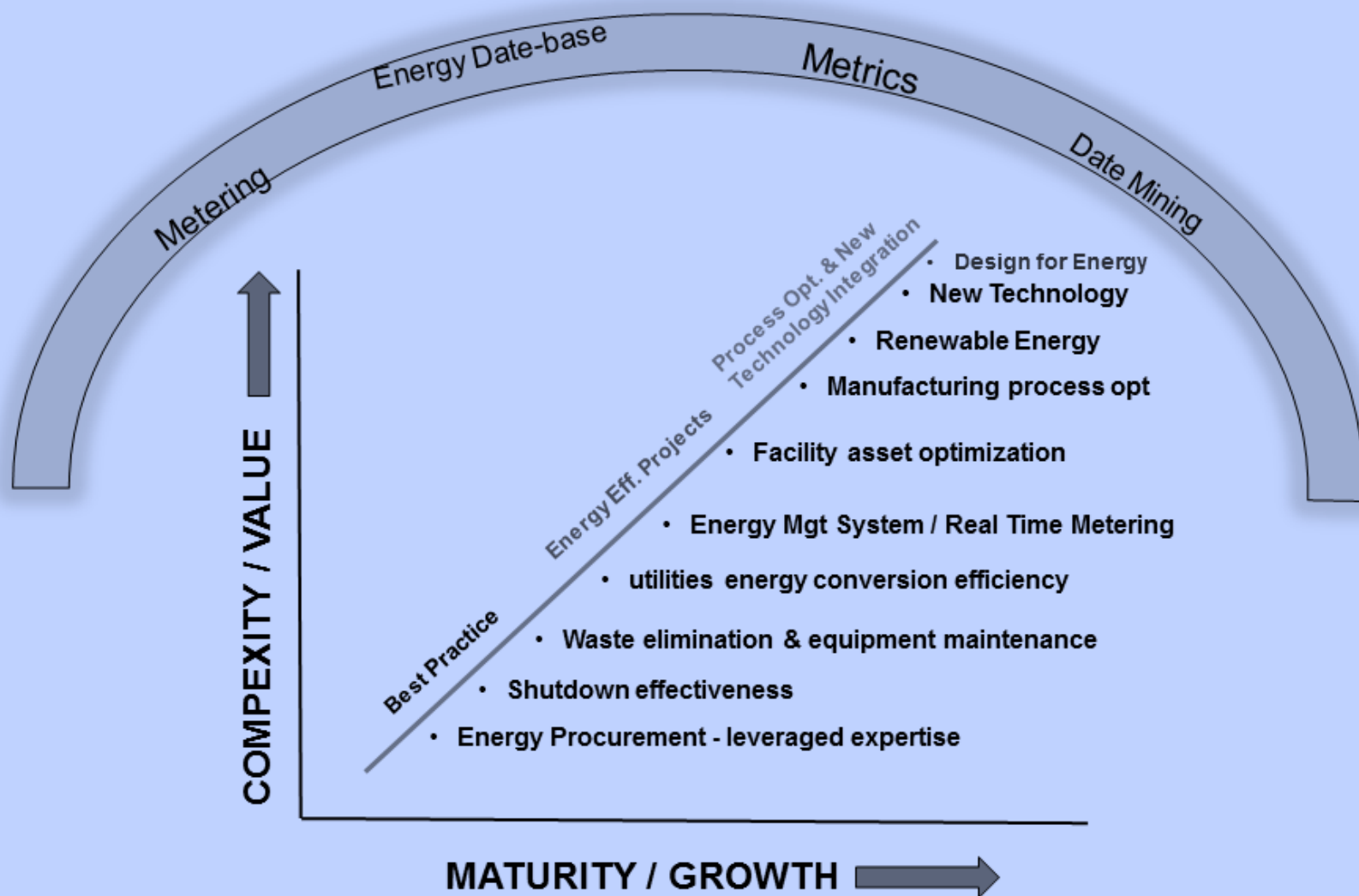
Each Square Represents 5 Days

Impact of Compressed Air Reduction on Number of Operating Air Compressors

Source: Alkadi, N.M., Kissock, J.K., "Improving Compressed Air Energy Efficiency in Automotive Plants - Practical Examples and Implementation" SAE International, April 2011. Website: <http://papers.sae.org/2011-01-0325>

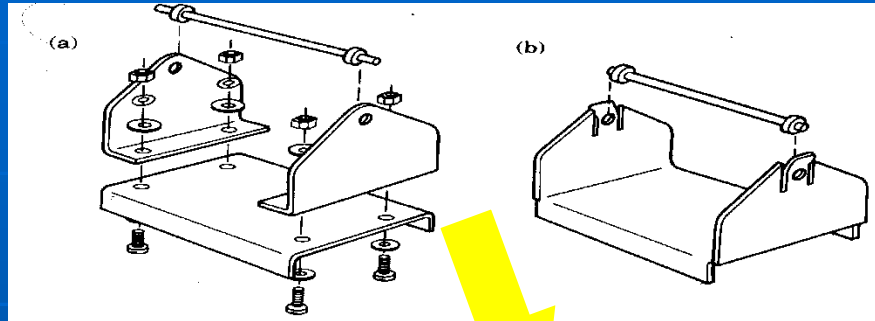
Lead with Vision

ENERGY / CO2 REDUCTION HIERARCEY



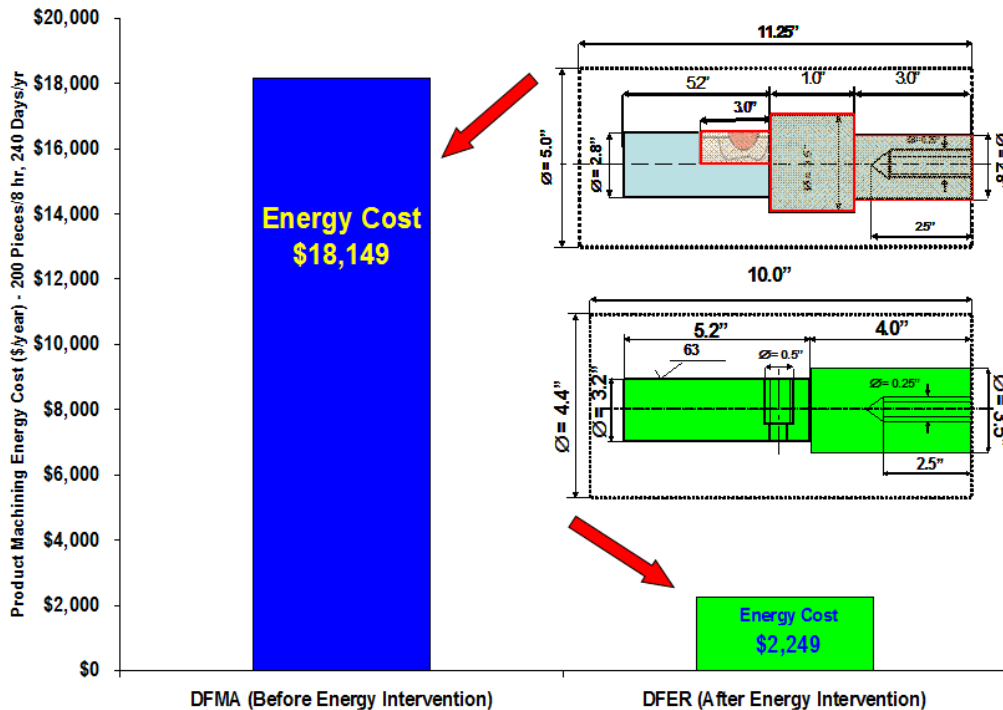
Think "OTB" outside of the Box

DFA (Design for Assembly)



DFER (Design for Energy Reduction)

Design Your Product and Process For Energy



Simplify the design
Reducing # of pieces
Product assembly became easier and faster
Product cost is less

II. Build A Strong Coalition

(Communication)[^]

- 1) Meet one on one with your Plant Manager at least once per year**
(Why: Show him that you Understand the Playing Field + Ask for Support)
- 2) Meet with your Maintenance Staff one day before Energy Meeting**
(Why: Show/Discuss with him/her Meeting Agenda so that No Surprises!)
- 3) Meet with your Production Manager/Department/Month During Energy Meeting**
(Why: Get Support to Make Things Happen)
- 4) Meet one on one with Safety & IH on Monthly Basis**
(Why: Show him that you care about safety & Get buy-in straightforward Energy ideas)
- 5) Meet with Team Leaders from Production & Maintenance Once per Quarter**
(Why: Give overview on State of Plant Energy & how they can make a Difference)
- 6) Facilities and Engineering Director Staff Corporate Office**
(Your Biggest Support – Work with them and keep them in the Loop)

III. Sustain Momentum

✓ Speak Dollars

•[How: Issue Checks & Balance once a month]

✓ Look for New Opportunities

Open your eyes to Suggestions – Talk to Floor People – READ ENERGY

✓ Keep a High Profile

Try to attend Production meetings at least once per month

✓ Increase top Management's Visibility

•Keep open Line of Communication with Leadership Team through VME, email, Face to Face Meetings.

✓ Grow the Grass Roots

Educate All Plant Levels with Simple Home Energy Saving Ideas – Use Powerful Weekly Energy Letters

✓ Compare to Competitors/Show Brutal Facts

✓ Share SUCCESS!



\$HOW

Check\$ and Balance



On a Monthly Basis – REPORT:

1. Total Energy Bill This Month (A) = X\$
2. Total Energy Bill Month (A) Last Year = Y\$
3. **Total Energy Saved = X\$ - (Y\$)**Adjusted*

- Make sure to Adjust for Weather, Production, and other Variables to reflect True Savings attributed to REAL ENERGY PROJECTS
IMPLEMENTED
- Use DOE Baseline Tool (ENPI 2.0) to do that – Will be public soon
- (Talk to your DOE-AMO Technical Account Manager - TAM)

Thank You!

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ENERGY

 OAK RIDGE NATIONAL LABORATORY

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Next Month's Webcast

**Please
join us
for our
next
Webcast.**

Topic: Public Relations Aspect of
Energy Efficiency Projects

Date and Time: Tuesday, August 14
at 11:00 a.m. PDT/2:00 p.m. EDT

To Register:
<https://www1.gotomeeting.com/register/965278200>
