



Building the Next Generation of Industrial Energy Managers

Tuesday, May 16

11:15 am-12:30 pm

Panelists

- Walt Brockway, Oak Ridge National Laboratory
- Uli Schildt, Darigold
- Sean West, UTC
- Bruce Lung, U.S. Department of Energy (Moderator)

Walt Brockway

Oak Ridge National Laboratory



Next Generation Energy Managers

May 17, 2017



TOPICS

- Tools of the next Generation Energy Manager
- Tools of “last Generation” Energy Manager
 - What I would do differently

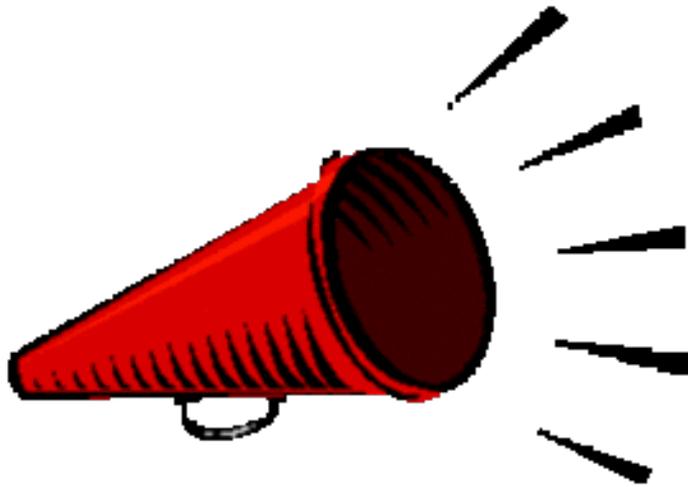
Walt Brockway, PE, CEM

- Owner Brockway Consulting LLC
- 32 Years with Alcoa
 - Engineer, Engineering manager, plant manager
- 5 years with GE Nuclear
- Started the Alcoa EE program in 2002
- More than \$100 million identified
- Performed more than 30 Energy Treasure Hunts
- Consulting with US Department of Energy, Food, metals, pharma, building products.

What Elements in the future

- Abundance of Data
- More focus on process (vs auxiliary)
- Speed of information flow – Communication
- Energy as a crosscutting item
- Greater integration with suppliers
- Standardization / Best Practices
- Energy as a specialty
- Rapid Execution
- Continued partnering with DOE and others

Some Basics



??????r?????

??????r?????

??????r?????

Data Data Data ...

Metering systems

Historians

Process control integrated with energy

Real-time use data from suppliers

Real-time pricing data

Etc.

Information Flow

Make friends with communications



Torrance Energy Kaizen Finds 6.4% Savings Close



Front row from left: Spencer Lee, Greg Harrell, Dave Lawton, Steve Zhang, Michael Howard, Paul King. Back row from left: Walt Brockway, Adam Vucelich, Mike Urbanovit, Sharon Wang, Tom Lightfoot, Ellen Dempsey, Kenny Cochran and Curtis Lea.

A recently completed energy Kaizen at Alcoa Fastening Systems (AFS) in Torrance, California (USA) found 6.4% in savings that could be implemented quickly. The estimated savings add up to approximately \$125,000 per year, with very little capital expenditure for implementation.

In addition to Torrance employees, representatives from six Alcoa locations in the California cities of Fullerton, Newbury Park-Republic, Newbury Park-Van Petty, Simi Valley Distribution and City of Industry, as well as Tucson (Arizona, USA) took part in the Kaizen. Involving multiple locations brought new ideas to Torrance and also sent the team members back to their own facilities with blueprints for savings.

Participants divided themselves into two teams to find savings in Torrance's North and South buildings and focused on several energy resources:

Kaizen Series Takes Aim at Energy Reduction

It's all about the energy.

In June, representatives of Massena AFE, Massena West Primary, Massena East, Warrick Power Plant, Warrick Rolling Mill and the Quebec smelters were joined at the NYPA Visitor's Center at Hawkins Point by representatives of the Alcoa Global Energy Group, U.S. Department of Energy and outside companies to discuss

ways to reduce electricity, natural gas, steam and compressed air usage. The event, an Alcoa Energy Workshop, included an energy reduction kaizen in AFE, which played host to the workshop.

"This is one of four regional energy workshops," said Alcoa Global Energy Efficiency Manager Walter Brockway. "We held an event in Brazil in Jan-

uary, we have another event planned in Europe, and we're hoping to do an additional session on the U.S. west coast."

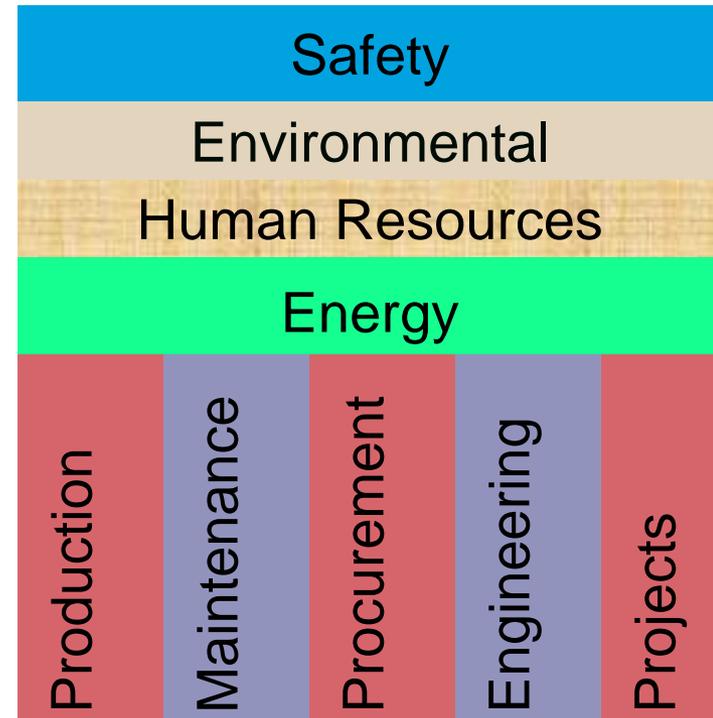
Brockway said the events were focused on low-cost and no-cost energy reduction solutions that could be implemented quickly and easily.

"We have folks sharing what they've been doing at their lo-

Continued on Page 2

Wouldn't it be nice

- Energy on par with:
 - Environment
 - Safety
 - Production
 - Financials



Interface with suppliers

Demand Response

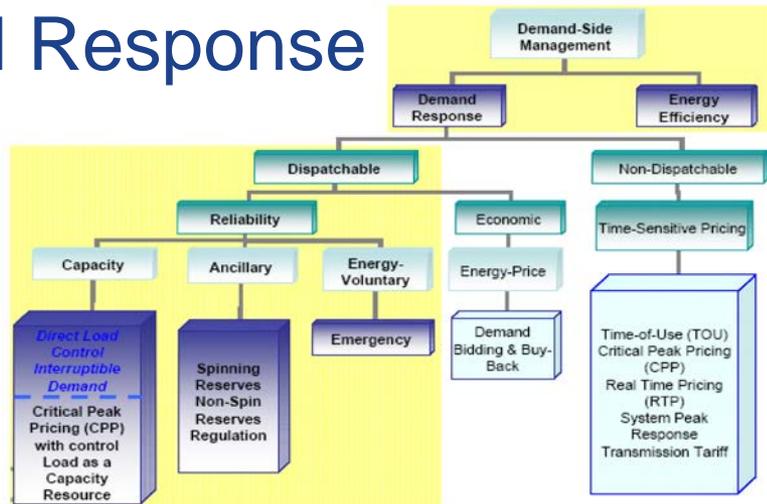
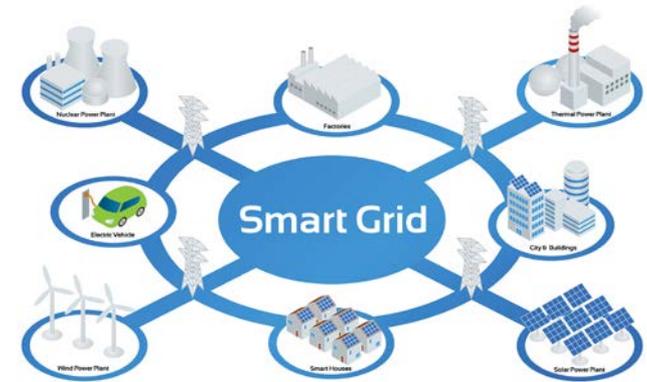


Figure 2 NERC demand side management categorization. (NERC, 2007)



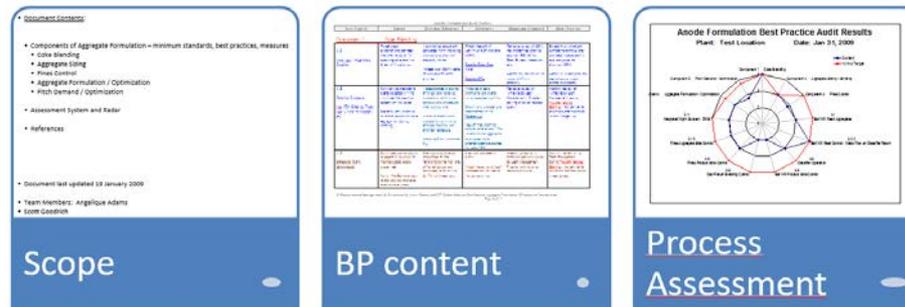
CHP DEPLOYMENT



Standardization

ISO 50001 - Energy management

Using energy efficiently helps organizations save money as well as helping to conserve resources and tackle climate change. ISO 50001 supports organizations in all sectors to use energy more efficiently, through the development of an energy management system (EnMS).



Energy as a specialty

Certifications



The Certified Energy Manager® (CEM®)
Program for Professional Certification

CEM Utilized Around the World & Recognized Standard of Professional Achievement



Energy Engineers

IAC Centers

Figure 1. IAC Assessments Nationwide, 2016 Jan - Mar



Looking Back...

- Don't ignore the “soft side”
- PR, GR, Marketing
- Be relentless on sponsorship
- Greater employee engagement
- Push for rewards and recognition
- Embrace Energy providers more
- Suppliers can bring knowledge and solutions

Questions / Comments



Thank You!

Uli Schildt

Darigold

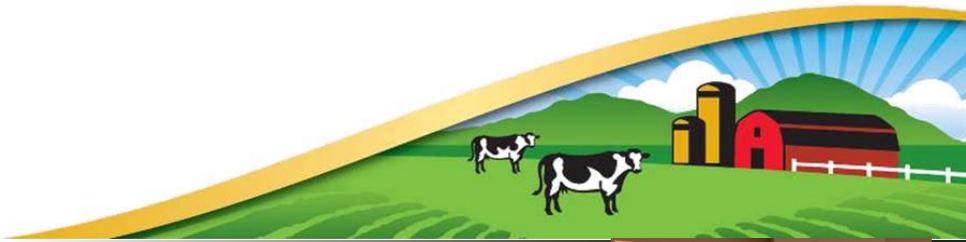


Better Buildings Summit – May 16, 2017



Building Next-Generation Energy Managers

Uli Schildt



DARIGOLD

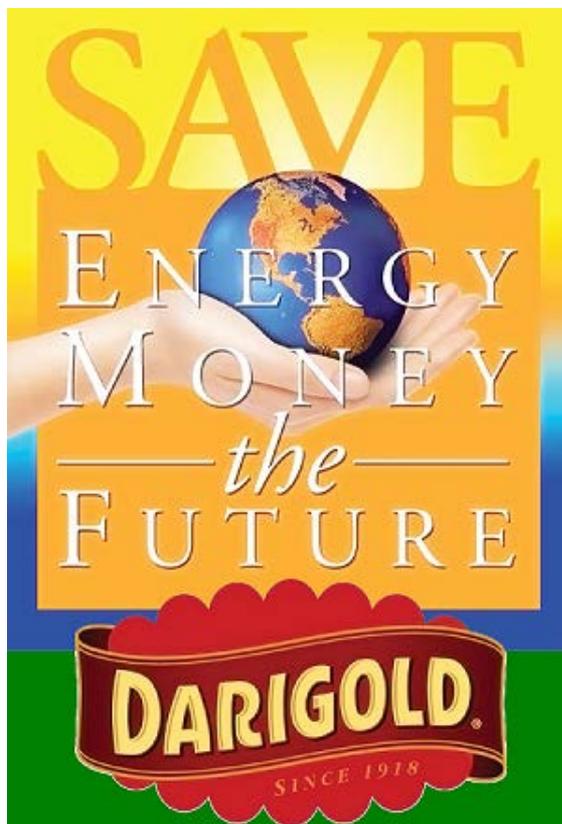
- 500 farmer owned co-op
- 2.5 million gallons of milk per day
- 11 manufacturing facilities WA, OR, ID & MT
- Consumer products and ingredients divisions
- 1400 employees
- \$2 billion sales annually





Developing an Integrated Energy Management Program

Some of our Partners





Plant Energy Teams

Energy is a controllable cost, each plant needs to be responsible for that cost.

- Plant Energy Teams are the backbone of the program and do all the heavy lifting.**
- Teams identify and implement energy saving opportunities.**
- Plant Energy Team Leader is a vital function but it needs to be a group effort. (don't rely on only one person)**

Corporate Energy Manager provides assistance, training, guidance and direction but does not do the plant's work.



Continuous Training

Involve everybody, do not focus on an individual or small group.

- **Weekly educational flyers**
- **Energy Team bulletin boards**
- **Computer-based energy training module**
- **Guest speakers on bi-weekly Energy Team conference calls covering various technical topics**
- **Annual Energy Fairs**
- **Annual Plant Energy Program Assessment**
- **Intranet Energy Website**
- **Participation in utility-company training programs**
- **Energy Treasure Hunts**



August 13, 2012

Energy Efficiency Education

Weekly Energy Flyer

Air Leaks

- Air is the most costly utility
- It requires about 8 electrical horsepower to produce 1 equivalent air horsepower
- Air leaks consume a lot of energy
- Some industrial air systems waste 10 - 35 % of energy on leaks
- A single 1/8" leak will cost about \$3,000 per year (@ 8 cents per kwh)



Air leaks are like money flying out the window !

Please let maintenance know when you detect a leak.



Computer - based energy awareness training module



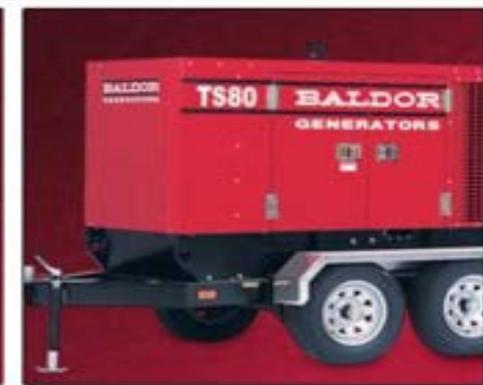
Each employee has to answer questions correctly



Guest speakers on bi-weekly conference calls

BALDOR®

A MEMBER OF THE ABB GROUP



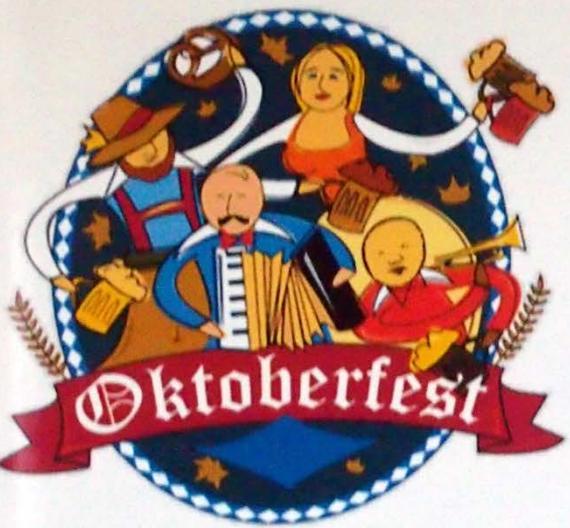
Efficiency from the motor up: Considerations for calculating system efficiency

Presentation for Darigold – May 16, 2012



Annual Energy Fairs at each plant

Please join us on Tuesday October 18th,
from 11am to 3pm for the
Annual Darigold Energy Fair!



Oktoberfest Theme!
German Food!

Vendors & Swag!
Raffle Prizes!
Exclamation Points!



ENERGY FAIR
BBO **PRIZES AND FOOD**



Be sure to stop by and visit our Special Guests:
Benton REA
Branom
Instruments
Sarco/Spirax
CH2O
Ecolab/Nalco
& KIE
They're sure to have great Info and money Saving info

Where: Dairy Fair Courtyard
When: October 14 & 15
Time: 11am-1pm & 8pm-10pm

Join us as we learn more about energy conservation, ways Darigold is saving energy, and how you can save energy and \$\$ too.



Energy Fairs - Utility companies and vendors provide information





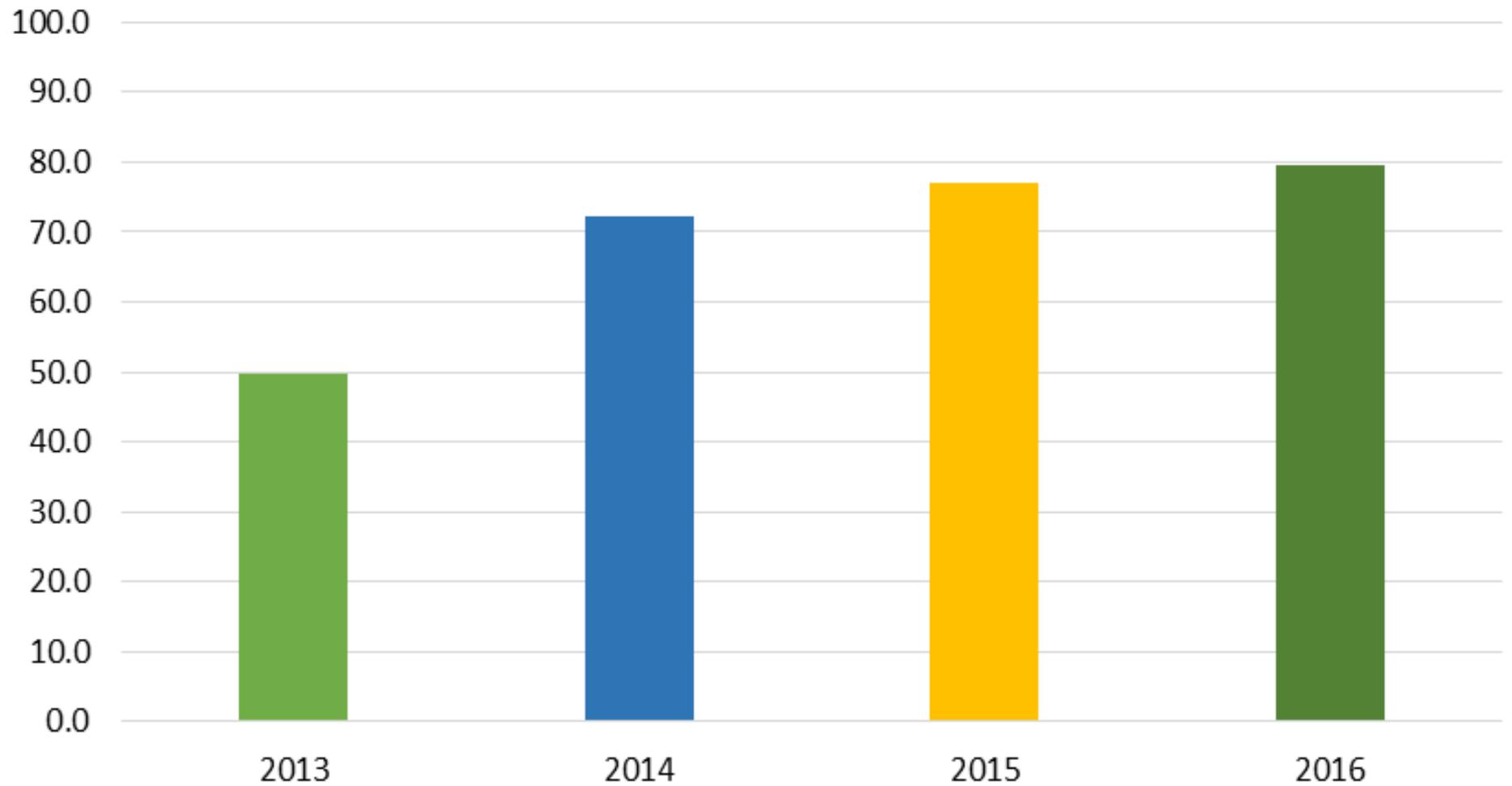
The public was invited







Darigold - Plant Energy Program Assessment Average





Celebrate Success

Prizes for the plant with the highest score





Dedicated Energy Efficiency Intranet Site

Energy Efficiency

View All Site Content

- Home
- Audit ▶
- Consumer Products ▶
- Corporate Safety
- Crisis Management
- Energy Efficiency ▶

Intranet > Energy Efficiency

Energy Efficiency Document

Type	Name
Folder	Employee Energy Suggestions
Folder	Plant Energy Teams
Folder	Monthly Energy Reports
Folder	DG Energy Team, meeting minutes



Free Utility Company Training

Industrial Refrigeration Operator Certification

Cooling off refrigeration loads

Industrial refrigeration comprises nearly nine percent of the Northwest's regional industrial load. Energy management and efficiency are playing an increasingly important role in industrial refrigeration, offering these facilities energy savings, financial savings and a stronger bottom line.

NEEA has collaborated with the [Refrigerating Engineers & Technicians Association \(RETA\)](#) to develop an energy efficiency certification for industrial refrigeration professionals, including engineers, managers, operators, technicians, contractors and service providers. Refrigeration professionals who become Certified Refrigeration Energy Specialists (CRES) have the skills and capabilities to optimize the energy efficiency of their plants. CRES professionals have a competitive edge, and can contribute to the bottom line in their plants while maintaining production, product quality and safety.

CRES will be an ANSI-accredited certification, requiring passing a comprehensive examination and completing and documenting five energy management activities.

Typical cost reductions range from about 3 to 10 percent refrigeration electricity use after a year or more of consistent effort by a CRES-certified operator. Continued improvement is expected since, in addition to continuing education, refrigeration professionals must complete additional energy management activities every three years to maintain their certification.

The collaborative efforts between NEEA, NEEA's utility partners, and RETA to bring the CRES certification to the market will allow facilities to save energy and lower costs across the Northwest.

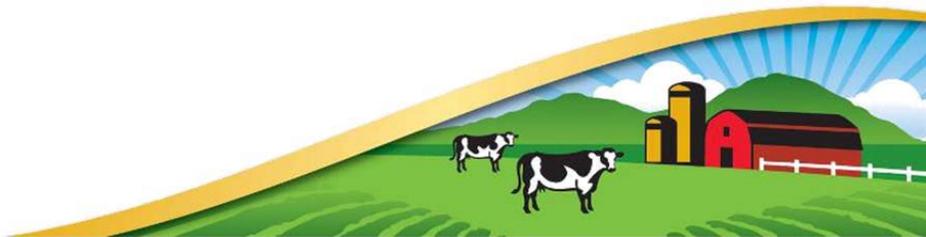


Energy Treasure Hunts





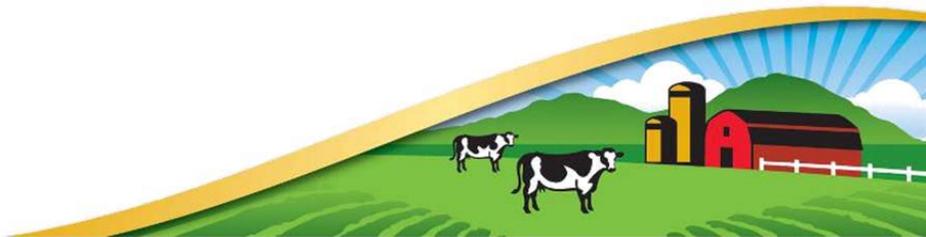
Teams discuss findings



1/4" HOLES
DSIG
IG

Tom	Kathy	Armando	C =
Erin		Aaron	M =
Jose	Andrea	Ryan	S =
Lorenzo	Judy	Wayne	W =
Don	Ariel	Walt	
Brent	Travis	Rich	
Ron	Antonio	Paul	
Maurice	Jaime	Brian	
Tom	Juan		
Jeff	Brandon		
Nick			
Greg			

Training Session



Sunnyside Treasure Hunt Participants



Portland Dari-Gold-Dig

January 31, 2017

- One-Day event
- Energy Trust of Oregon
- 3 Teams
- Identified numerous opportunities in short time
- Sorted opportunities
- Created hit-list



“There is wasted energy in them thar plant”



Team decides on energy savings opportunity findings priorities



Hit-list of 5 items

Top 5 Energy Quick-Hits / GEMS

- ① Standardize Refrigeration
Operating Procedures / Setpoints
(est. monthly P.M.)
Owner: Don
Next Step: Establish setpoints/procedures
- ② Calibrate Refrigeration
System Sensors
Owner: Alex
Next Step: Buy Calibration gauge
- ③ C DP Light Shutdown
owner: Peter
Next Step: Research remote wireless
switch
- ④ Fix leaks (water, air, steam)
Owner: Paul
Next Step: Submit work requests
- ⑤ Delamp Maintenance Shop
owner: Ben
Next step: take light measurements



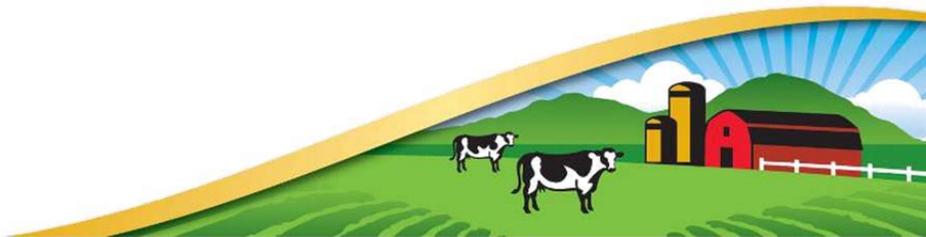
Main Takeaways:

- Training should be a continuous effort
- Get all employees involved
- Measure Energy Program performance annually
- Let others step in your shoes from time to time



**Let's Start Building
Next-Generation
Energy Managers at
a Young Age.
(Our Future Depends on it)**

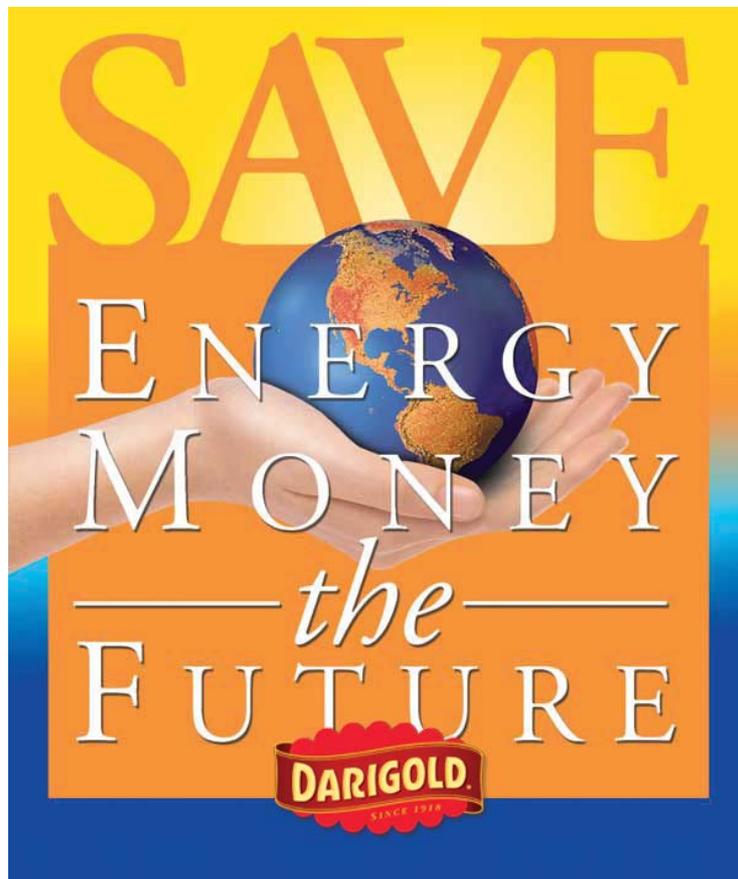




Energy \$avings are small,.... message is **HUGE!**



Saving Energy Is Everybody's Responsibility



Thank You

uli.schildt@darigold.com (206) 795-3731

Sean West

UTC



United Technologies

DOE 2017 Energy Summit
Training Energy Managers

Sean West

UTC

EH&S Associate Director



Environment, Health & Safety

United Technologies Corporation

UNITED TECHNOLOGIES

Agenda

1. UTC at a glance
2. Energy Management Training Options
 - AEE
 - UTC Energy Guidebook
 - OJT - Treasure Hunts, Energy Audits
 - Partnerships
 - Formal Training Programs

UNITED TECHNOLOGIES

2016 revenue \$57.2B



Heating, ventilating, cooling & refrigeration systems



Security & fire protection services



Elevators, escalators, moving walkways, people movers & horizontal transportation systems



Industrial & aerospace systems



Aircraft engines, gas turbines & space propulsion systems

GLOBAL PRESENCE

Manufacturing Sites Worldwide



No technical data subject to the EAR or the ITAR

2020 SUSTAINABILITY GOALS

Greenhouse gas reductions



UTC Energy Management Training

CEM Class of 2015

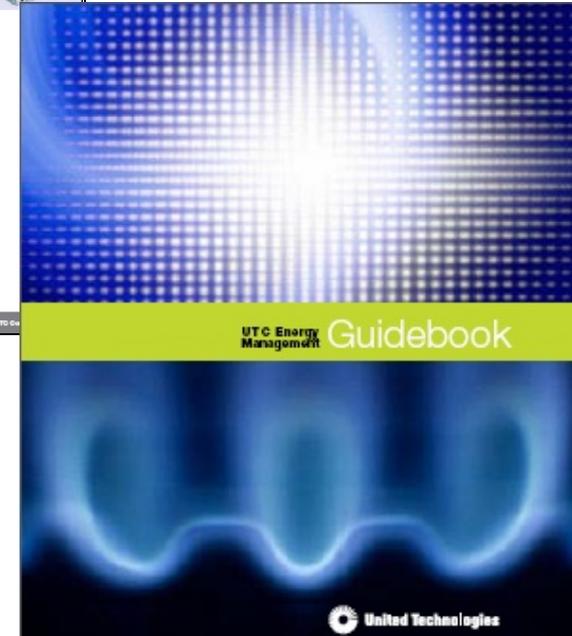
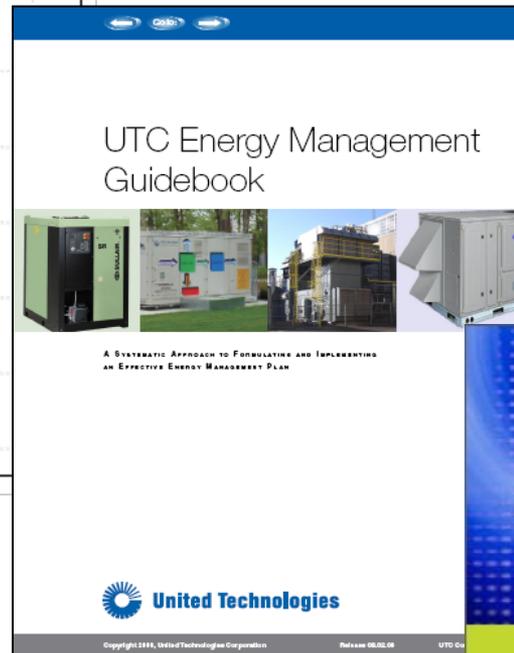
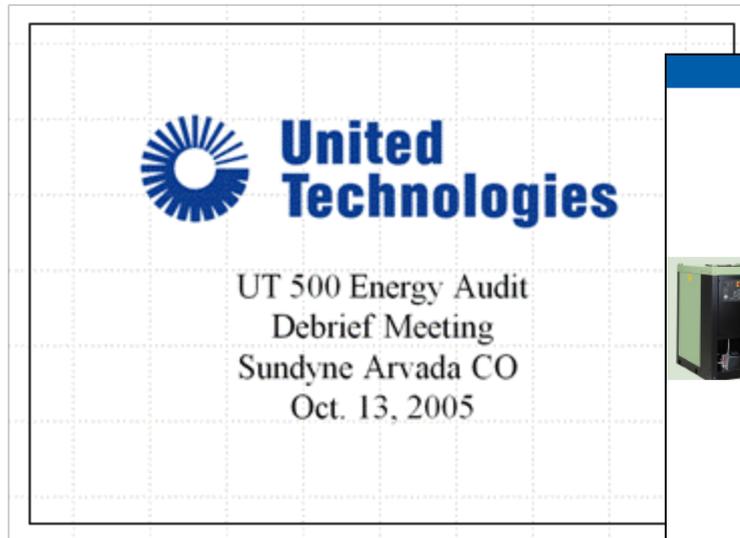
2014 and 2015 AEE Certified Energy Management (CEM) In-house training classed in CT and FL

UTC has a total of 122 CEM's on staff working in Facilities departments and Carrier applications engineers



Environmental Leadership Program (ELP)

ENERGY MANAGEMENT GUIDEBOOK



*A systematic approach to
formulating and implementing an
effective energy management plan*

ENERGY MANAGEMENT GUIDEBOOK

Table of contents

1. Energy & GHG Data Management
2. Utility Rate Review
3. Load Management
4. Energy Procurement
5. Shut-it-Off
6. Lighting
7. Compressed Air
8. Boilers and Steam
9. HVAC Systems & Controls
10. CHP
11. Building Envelope
12. Appendix

UTC ENERGY MANAGEMENT

Document status of EM Best Practices

- #1 Complete UTC Energy Handbook review
- #2 Create a site energy team
- #3 Shut-it-off Program
- #4 Lighting
- #5 Compressed Air
- #6 HVAC
- #7 Boilers
- #8 Building Automation System
- #9 Process Energy Management
- #10 Motor Management
- #11 Utility Review
- #12 Fleet Management

Energy Best Management Practice			
Edit a Record			
Energy GHG Best Practice	Implementation Status	Comments	Target Completion Date
Complete UTC Energy Handbook review	Complete	fmg	<input type="text" value="MAR-29-201"/>
Create a site energy team	Not Started		<input type="text"/>
Shut it off Program	Not Started		<input type="text"/>
Lighting	Not Started		<input type="text"/>
Compressed Air	Not Started		<input type="text"/>
HVAC	Not Started		<input type="text"/>
Boilers	Not Started		<input type="text"/>
Building Automation System	Not Started		<input type="text"/>
Process Energy Management	Not Started		<input type="text"/>
Motor Management	Not Started		<input type="text"/>
Utility Review	Not Started		<input type="text"/>
Fleet Management	Not Started		<input type="text"/>

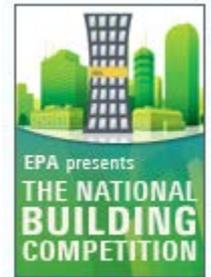
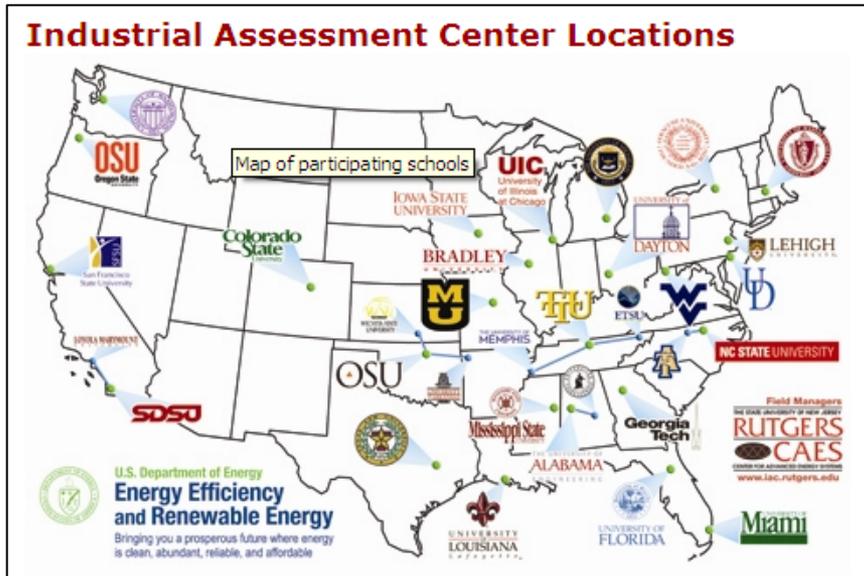
UTC Energy Management Training

Energy Workshop & Treasure Hunt

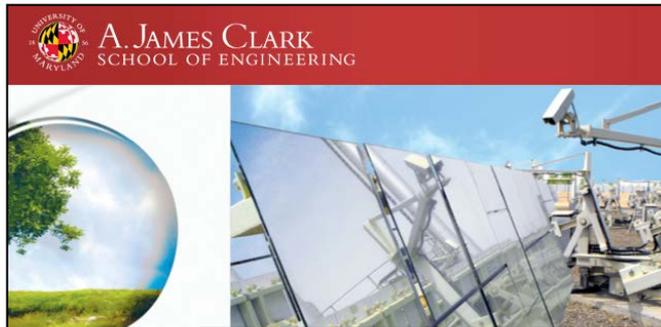


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ENERGY PROGRAM PARTNERSHIPS



ENERGY MANAGEMENT EDUCATION



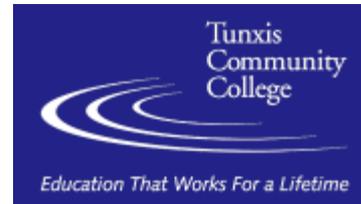
Northeastern University

GRADUATE
ENERGY
MANAGEMENT

ENGINEERING
CHALLENGES



Prepare for a leadership role in the global energy economy



ENERGY MANAGEMENT

Traditional topics:

Lighting, HVAC, Compressed Air, Process Energy Use, Supply Management, Building automation

Advanced topics:

Advanced manufacturing processes, Renewable energy, GHG accounting, Distributed generation, Virtual net metering, Additive manufacturing, Real time data management

Future concepts:

Ultrasonic heat treating, Utility scale energy storage, Robots in manufacturing, Solid state cooling,

Q&A

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Thank You

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