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
• 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
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
Metering systems

Historians

Process control integrated with energy

Real-time use data from suppliers

Real-time pricing data

Etc.
Make friends with communications

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, Norbury Park-Republic, Norbury Park-Van Petty, Simi Valley Distribution and City of Industry, as well as Tucson (Arizona, USA) took part in the Kaizen, involving multiple locations bringing 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 NTCA 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 January, 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 location. Continued on Page 2
Wouldn’t it be nice ... 

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

![Diagram showing categories: Safety, Environmental, Human Resources, Energy, Production, Maintenance, Procurement, Engineering, Projects.]}
Interface with suppliers

Demand Response

Figure 2 NERC demand side management categorization. (NERC, 2007)
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
Thank You!
Uli Schildt

Darigold
Better Buildings Summit – May 16, 2017

Uli Schildt

Building Next-Generation Energy Managers
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
Energy Efficiency Education

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.
Rainier Energy Team

Reduction goal of 25% over 10 years

Darigold Rainier is actively working on reducing our energy consumption and its impact on the environment. We welcome any suggestions or ideas from our Visitors, Vendors or Contractors for improving our energy program.
Computer-based energy awareness training module

Each employee has to answer questions correctly
Guest speakers on bi-weekly conference calls

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 BBQ

Be sure to stop by and visit our Special Guests: Bentus REA Bromnow Instruments Sarco/Spirax CH2O Ecolab/Naico & 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
## Plant Energy Program Assessments

### Plant Energy Program Assessment Summary - FY 2016

<table>
<thead>
<tr>
<th>Last Updated</th>
<th>6/30/2016</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Plant</th>
<th>Assessment Date</th>
<th>Functional Energy Team</th>
<th>Results</th>
<th>Plant Energy Team Meeting</th>
<th>Utilization of Energy Team Conference Cate</th>
<th>Contact Energy Program Assessment</th>
<th>Employee Awareness</th>
<th>Water Use/Potential</th>
<th>Energy Use/Potential</th>
<th>Conservation/Model Effort</th>
<th>No/Loss Air Audits</th>
<th>Contact Annual Steam Trap Audits</th>
<th>Partnership Regulation/Agreement</th>
<th>Energy Use/Potential</th>
<th>Company Average</th>
<th>Notation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5/10/16</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>25</td>
<td>28</td>
<td>33</td>
<td>0</td>
<td>20</td>
<td>18</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>950</td>
<td>100%</td>
</tr>
<tr>
<td>B</td>
<td>6/22/16</td>
<td>23</td>
<td>25</td>
<td>100</td>
<td>125</td>
<td>48</td>
<td>138</td>
<td>25</td>
<td>46</td>
<td>25</td>
<td>25</td>
<td>21</td>
<td>96</td>
<td>21</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>C</td>
<td>5/12/16</td>
<td>25</td>
<td>25</td>
<td>100</td>
<td>0</td>
<td>52</td>
<td>160</td>
<td>25</td>
<td>21</td>
<td>23</td>
<td>25</td>
<td>95</td>
<td>5</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>D</td>
<td>4/20/16</td>
<td>24</td>
<td>25</td>
<td>93</td>
<td>75</td>
<td>53</td>
<td>150</td>
<td>25</td>
<td>49</td>
<td>25</td>
<td>24</td>
<td>26</td>
<td>103</td>
<td>14</td>
<td>25</td>
<td>24</td>
</tr>
<tr>
<td>F</td>
<td>5/11/16</td>
<td>25</td>
<td>25</td>
<td>100</td>
<td>25</td>
<td>25</td>
<td>178</td>
<td>25</td>
<td>38</td>
<td>25</td>
<td>16</td>
<td>25</td>
<td>100</td>
<td>25</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>G</td>
<td>4/13/16</td>
<td>20</td>
<td>24</td>
<td>100</td>
<td>125</td>
<td>50</td>
<td>168</td>
<td>25</td>
<td>41</td>
<td>21</td>
<td>25</td>
<td>0</td>
<td>48</td>
<td>20</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>H</td>
<td>4/19/16</td>
<td>26</td>
<td>25</td>
<td>100</td>
<td>75</td>
<td>48</td>
<td>188</td>
<td>25</td>
<td>47</td>
<td>21</td>
<td>17</td>
<td>22</td>
<td>115</td>
<td>27</td>
<td>7</td>
<td>25</td>
</tr>
<tr>
<td>I</td>
<td>5/4/16</td>
<td>22</td>
<td>25</td>
<td>100</td>
<td>75</td>
<td>50</td>
<td>150</td>
<td>25</td>
<td>45</td>
<td>19</td>
<td>25</td>
<td>14</td>
<td>91</td>
<td>5</td>
<td>0</td>
<td>23</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Score</th>
<th>Grade %</th>
</tr>
</thead>
<tbody>
<tr>
<td>950</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>248 26.1</td>
</tr>
<tr>
<td>832 87.6</td>
</tr>
<tr>
<td>716 75.4</td>
</tr>
<tr>
<td>810 87.6</td>
</tr>
<tr>
<td>784 82.5</td>
</tr>
<tr>
<td>688 76.4</td>
</tr>
<tr>
<td>742 80.2</td>
</tr>
<tr>
<td>859 90.3</td>
</tr>
<tr>
<td>736 77.5</td>
</tr>
<tr>
<td>868 91.2</td>
</tr>
<tr>
<td>951 100.1</td>
</tr>
</tbody>
</table>

### Notes:
Plant Energy Program assessments are conducted on an annual basis. The assessment criteria is made available well in advance. Plants are notified of the assessment date and time at least several weeks prior. Assessments are performed by a team consisting of 2 - 4 people. Each assessment score is the average of all team member’s individual evaluations.
Darigold - Plant Energy Program Assessment Average

2013: 40.0
2014: 70.0
2015: 80.0
2016: 80.0
Celebrate Success

Prizes for the plant with the highest score
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
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
Sorting energy saving opportunities
Hit-list of 5 items

**Top 5 Energy Quick-Hits/6Mns**

1. Standardize Refrigeration Operating Procedures/ setpoints
   Owner: Dan
   Next Step: Establish setpoints/procedures

2. Calibrate Refrigeration System Sensors
   Owner: Alex
   Next Step: Buy calibration gauge

3. CDP 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 savings are small, .... message is **HUGE!**
Saving Energy Is Everybody’s Responsibility

Thank You

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

UTC
DOE 2017 Energy Summit
Training Energy Managers

Sean West
UTC
EH&S Associate Director
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

United Technologies
Climate | Controls | Security

Heating, ventilating, cooling & refrigeration systems

Security & fire protection services

Otis
A United Technologies Company

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

UTC Aerospace Systems

Industrial & aerospace systems

Pratt & Whitney
A United Technologies Company

Aircraft engines, gas turbines & space propulsion systems

No technical data subject to the EAR or the ITAR
GLOBAL PRESENCE

Manufacturing Sites Worldwide

No technical data subject to the EAR or the ITAR
2020 SUSTAINABILITY GOALS

Greenhouse gas reductions

United Technologies

2020 SUSTAINABILITY GOALS
MOVING THE WORLD FORWARD

- Reduce greenhouse gas emissions 15%
- Reduce water consumption 25%
- Implement global water best practices 100%
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)
A systematic approach to formulating and implementing an effective energy management plan

No technical data subject to the EAR or the ITAR
<table>
<thead>
<tr>
<th>1. Energy &amp; GHG Data Management</th>
<th>7. Compressed Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Utility Rate Review</td>
<td>8. Boilers and Steam</td>
</tr>
<tr>
<td>3. Load Management</td>
<td>9. HVAC Systems &amp; Controls</td>
</tr>
<tr>
<td>4. Energy Procurement</td>
<td>10. CHP</td>
</tr>
<tr>
<td>5. Shut-it-Off</td>
<td>11. Building Envelope</td>
</tr>
</tbody>
</table>
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

No technical data subject to the EAR or the ITAR
UTC Energy Management Training

Energy Workshop & Treasure Hunt

This document contains no data that is subject to the EAR or ITAR
ENERGY PROGRAM PARTNERSHIPS

No technical data subject to the EAR or the ITAR
ENERGY MANAGEMENT EDUCATION

Prepare for a leadership role in the global energy economy

No technical data subject to the EAR or the ITAR
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

Sean West
EH&S Associate Director
Sean.west@utc.com
(860) 728-7619
Thank You

Provide feedback on this session in the new Summit App!

Download the app to your mobile device or go to bbsummit.pathable.com