Using Service and Product Providers to Leverage Your Energy Efforts

Prenova/Owens Corning Energy Process Optimization

Thomas Pagliuco – Prenova
Fred Dannhauser – Owens Corning

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Who is Owens Corning?

- World leader in building materials systems and composites systems
- $5 billion in sales in 2003
- 70+ Manufacturing Facilities
- Proactive approach to managing energy costs
Who is Prenova?

- Expertise in Energy Process Management Solutions
- Independent broker for energy supply/demand ideas
- $1.6 billion in energy spend - 35,000 locations
- Collaborative approach to energy management
- Customers
  - pay less for energy
  - use less energy
  - risk less as they manage future energy strategies
Since 2002, Prenova provides an energy management solution to Owens Corning’s North American facilities for:

- Energy Supply Management
- Energy Price Risk Management
- Energy Process Optimization
- Bill Payment and Data Management
- Utility Due Diligence
- Remote Monitoring, Scheduling, Alarming and Trending
Owens Corning – Prenova
Energy Process Optimization Overview

- **11** Insulation and Composite Glass plants
- Total energy spend of over $50 million per year
- Optimization phase: 4 - 7 months per plant
- No process area off limits for energy savings investigation
What is Energy Process Optimization?

• A methodology that realizes energy savings by leveraging existing assets and implementing processes and procedures that create sustainable results

• Benefits are:
  ✓ Improves Return on Net Assets (RONA)
  ✓ Establishes and propagates best practices
  ✓ Offers low barrier to implementation
  ✓ Requires little capital
  ✓ Provides process for continuous improvement
  ✓ Reduces maintenance and raw material costs
Energy Process Optimization

Principles

• Process focused approach
  ✓ Paretto analysis of energy usage
  ✓ Statistical process control methodology
  ✓ Cross functional team involvement

• Data driven decision making

• No cost or low cost to implement
  ✓ Operations and maintenance opportunities
  ✓ Capital opportunities identified - not essential to success

• Provide resources focused on energy reduction

• Ensure sustainable savings/continuous optimization
Energy Process Optimization Process

- **Phase One - Energy process optimization using a five step approach:**
  - Culture Change
    - Education and increased energy awareness
    - Processes and procedures developed and implemented
  - Assess the facility
    - Paretto analysis of energy use by process area
    - Material and energy balancing
  - Define the process
    - Regression analysis
    - Measurement and verification systems defined
    - Define the infrastructure to support sustainability and continuous improvement
  - Understand and manage process variation
    - SPC techniques
  - Improve the process
    - Savings opportunities identified, quantified, and implemented
    - Web based reporting of opportunities
    - Project Management for the opportunity implementation effort

- **Phase Two – Sustainability and Continuous Improvement**
  - System in place to measure and monitor energy process performance
  - Alarming and reporting
  - Data analysis enables additional opportunities to be identified and implemented
## Energy Process Optimization System - Optimization Phase Project Schedule

### Key Tasks

<table>
<thead>
<tr>
<th>Change the Culture and Behavior</th>
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<tbody>
<tr>
<td>Executive Management Team</td>
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<td>Plant Management Team</td>
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<tr>
<td>Increase Awareness of energy usage and cost</td>
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<tr>
<th>Process Understanding and Insight</th>
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<tr>
<td>Facility and process questionnaire</td>
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<tr>
<td>Facility Profile</td>
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<tr>
<td>Determine utility baseline (regression analysis)</td>
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<tr>
<td>Idea brainstorming - process teams</td>
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<tr>
<td>Systems, process and procedures audits (burner tuning, chiller water, compressed air, steam, etc.)</td>
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<td>Opportunity Impact Analysis</td>
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<td>Action List</td>
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<td>Benchmarking</td>
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<tr>
<th>Identify Measurement Characteristics</th>
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<tr>
<td>Develop key energy measurement metrics</td>
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<tr>
<td>Determine key energy variables</td>
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<tr>
<td>Measurement and monitoring needs analysis</td>
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<tr>
<td>Develop cost for Performance Measurement and Monitoring System</td>
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<td>PMMS Approval</td>
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<tr>
<td>PMMS Installation</td>
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<tr>
<td>M&amp;V system definition - Short Term</td>
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<tr>
<td>M&amp;V system definition - Long Term</td>
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<tr>
<td>Design Energy Management Reporting System</td>
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<tr>
<th>Manage Process Variation</th>
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<tr>
<td>Implement short term M&amp;V system</td>
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<td>Monitor process improvement changes</td>
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<th>Improve the Process</th>
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<tr>
<td>Implement Opportunity Impact Analysis</td>
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<tr>
<td>Manage Action List</td>
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### Project Week

| 3 | 2 | 1 | 6 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|-----|-----|-----|-----|-----|-----|-----|-----|
|   |   |   |   |   |   |   |   |   |   |   |   |   |     |     |     |     |     |     |     |     |
Opportunity Identification, Approval and Acceptance Process

Opportunity Identified
- Input data into Opportunity Website
  - Status: Draft

Data Includes:
* Description
* Assigned to (Customer personnel)
* Safety impact
* Quality impact
* M&V plan
* Estimated Completion date
* Estimated consumption reduction(s)
* Savings basis (ie calcs, data, etc.)
* Estimated Cost to implement

Opportunity submitted to Plant Energy Leader for approval (i.e. 90 day plan)
- Status: submitted

Plant Energy Leader approves
- Status: approved
  - Complete and sign Opportunity Approval Form

Plant Energy Leader rejects and Prenova agrees
- Status: cancelled

Plant Energy Leader rejects and Prenova disagrees
- Status: pending

Do work to implement opportunity

Savings start date captured

Opportunity submitted to Plant Energy Leader for completion-acceptance

Plant Energy Leader approves for completion
- Status: complete
  - actual completion date captured

Plant Energy Leader cancels opportunity
- Status: cancelled

Work Complete
- Actual implementation costs captured

Savings Start date captured
- Actual savings captured

M&V plan complete

Procedure(s) and Training completed (if necessary)

Attach procedure to website

Complete and sign Opportunity Completion and Acceptance Form
Sustainability Performance Monitoring and Management System

- Implemented at 6 plants
- Implementation in progress at remaining 5 plants
- Enhanced visibility to energy performance by plant and process area
  - Web reporting
  - Alarming
- Desired Results
  - Drive sustainability of energy savings
  - Platform for continuous improvement
- Demo: PMMS and PreVUE
Results Achieved

• Energy Savings
  ✓ 7% average reduction in annual energy spend
  ✓ 71,000,000 kWh
  ✓ 476,500 MMBtu

• Costs
  ✓ Average cost per plant was $120,000 after rebates
  ✓ Rebate funding was $775,000

• Financial Return
  ✓ Less than 4 months average payback
Energy Process Optimization
Additional Benefits

- Energy Efficiency Program Managers integrated into plant teams
- Synergy between supply and demand efforts
- Focus on energy use and reduction
- Awareness of energy usage/cost by process area
- Process and procedures to drive sustainable savings
- Best practices and common opportunities replicated
- “Engaged” other organizational teams in the effort
- Performance Measurement and Monitoring System
- Facilitates EPA Energy Star Partner of the year
Contact Information

Owens Corning
• Fred Dannhauser, Leader, Global Energy
• 419-248-6555
• fred.dannhauser@owenscorning.com

Prenova
• Tom Pagliuco, Director Industrial Field Services
• 732-254-9158
• tpagliuco@prenova.com