Energy Kaizen: Strategic Energy Productivity Improvement
What is an Energy Kaizen Event?

A methodology that delivers:

- A way to identify, classify and prioritize the financial impact of energy conservation
- Improved environmental emissions performance, customer satisfaction, and operating costs
- A competitive advantage that will enable sales and profitability to grow
- A culture where involvement and mutual respect encourage continuous improvement
Energy Waste: Examples

Compressed Air Leak (Process Defect)

Steam Leak (Process Defect)

Excess Fuel Usage (Motion, Over Production, Transportation)
Energy Waste: Examples

Poorly functioning HVAC

Inefficient Lighting

Water Leak

Waste Heat Release

Energy Kaizen
Energy Waste: Examples

- Compressed Air Intake Indoors
- Inefficient Motors
- Bare Piping
- Poor Air/Fuel Ratio
# The Cost of Wasting Energy

## Air Leaks in the SMC-Huntington Bar & Wire Department (HAI)

<table>
<thead>
<tr>
<th>Location - Issue</th>
<th>Total $ lost (annualized)</th>
<th>Total CFM lost</th>
<th>Impact</th>
<th>Action Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exit side stand 7 -1/8&quot; continuous</td>
<td>$2,100.00</td>
<td>23</td>
<td>High</td>
<td>Repair Leak</td>
</tr>
<tr>
<td>Entry side of stand 8 - 2 at 1/8&quot; each continuous</td>
<td>$4,200.00</td>
<td>46</td>
<td>High</td>
<td>Repair Leak</td>
</tr>
<tr>
<td>Parts washer - maint area - 1/8&quot; continuous</td>
<td>$2,100.00</td>
<td>23</td>
<td>High</td>
<td>Repair Leak</td>
</tr>
<tr>
<td>Valve on top of selas - 1/8&quot; continuous</td>
<td>$2,100.00</td>
<td>23</td>
<td>High</td>
<td>Repair Leak</td>
</tr>
<tr>
<td>Stand 1 Pinch roll 1/4&quot; continuous</td>
<td>$8,400.00</td>
<td>92</td>
<td>High</td>
<td>Repair Leak</td>
</tr>
<tr>
<td>Valve stand east of cooling bed shear - 1/8&quot; continuous</td>
<td>$2,100.00</td>
<td>23</td>
<td>High</td>
<td>Repair Leak</td>
</tr>
<tr>
<td>Scholle Saw backstop - 1/2&quot; 16 hrs per week</td>
<td>$3,200.00</td>
<td>35</td>
<td>High</td>
<td>Repair Leak</td>
</tr>
<tr>
<td>Column 17 valve stand under transfer table - 1/8&quot; continuous</td>
<td>$2,100.00</td>
<td>23</td>
<td>High</td>
<td>Repair Leak</td>
</tr>
<tr>
<td>Col N33 - 1/8&quot; continuous</td>
<td>$2,100.00</td>
<td>23</td>
<td>High</td>
<td>Repair Leak</td>
</tr>
<tr>
<td>Failed valve Set up shop - Col T14 - 3/4&quot; continuous</td>
<td>$32,200.00</td>
<td>353</td>
<td>High</td>
<td>1) Repair Leak 2) Shut off air source when not running wire line.</td>
</tr>
<tr>
<td>Eddy Current stand 16 air - 1/2&quot; 42 hrs per week</td>
<td>$16,800.00</td>
<td>184</td>
<td>High</td>
<td>1) Blower system with air knife 2) Solenoid valve tied to Metal in Mill signal</td>
</tr>
<tr>
<td>Repeater blow off 1/2&quot; air hose - 60 hrs per week x 2</td>
<td>$24,000.00</td>
<td>263</td>
<td>High</td>
<td>1) Blower system with air knife</td>
</tr>
<tr>
<td>Scholle Saw dust collector - 1/8&quot; low pressure continuous</td>
<td>$900.00</td>
<td>10</td>
<td>Med</td>
<td>Repair Leak</td>
</tr>
<tr>
<td>#4 flying shear - 1/16&quot; continuous</td>
<td>$500.00</td>
<td>5</td>
<td>Low</td>
<td>Repair Leak</td>
</tr>
<tr>
<td>Automatic Blow down -1&quot; 5 sec every 300 sec x 3</td>
<td>$6,700.00</td>
<td>73</td>
<td></td>
<td>Double Check Frequency</td>
</tr>
<tr>
<td>Totals</td>
<td>$109,500.00</td>
<td>1,200</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Totals** $9,125.00  0.000173611
Lean Tools For Energy

- Treasure Hunt: Identify Opportunities
- Communication Boards: Sustain/Steady Improvements – NEI
Treasure Hunt: Standard Operating Procedure

**DAY 1**
- Kick Off Meeting
  - Safety Training/Orientation
  - Introduction to Energy Kaizen
  - Energy Training
    - Audit selected shops for off-shift energy use.
      - Identify all process and building equipment that is operating: need to run? turned it off?
    - Measure/meter consumption of equipment.
    - Reconvene for Reflection Meeting
  - Discuss what was found.
  - Presents opportunities for other groups to review.

**DAY 2**
- Kick Off Meeting prior to start of production
  - Review plan.
  - Describe desired activities.
    - Continue audit after start up.
  - Observe process equipment operation.
  - Use team knowledge of process to identify opportunities.
  - Collect data:
    - Check for down flows, air flows, water flow rates, set points.
  - Compare host plant equipment against kaizen thought.
  - Equipment to operate in the mode desired?
    - What modifications might have to be made?
  - Start detail sheet development.
    - Describe the current situation.
    - Quantify current consumption and cost.
    - Describe the proposed situation.
    - Estimate installation / modification costs.
  - Daily Reflection meeting
    - Champion tells the group what was found.
    - Identifies opportunities other groups may have missed.
Treasure Hunt: Standard Operating Procedure

DAY 3
– Kick Off Meeting one hour prior to start of production
  • Review plan.
  • Describe desired activities.
– Continue to Audit selected shops.
– Review detail sheets and collect data.
– Continue detail sheet development.
  • Describe the current situation.
  • Quantify consumption and cost
  • Describe the proposed situation.
  • Estimate installation/modification costs.
– Prepare for management presentation.
  • Totalize Savings.
  • Prioritize for implementation.
  – A < 1 year
  – B < 2 years
  – C > 2 years
  • Select three “best” kaizens.
– Management Presentation.
  • Introduce team.
  • Present total energy savings and cost reduction.
  • Three “best” items from each team.
– Closing statements.

– Final Steps
  • Prepare Summary Report.
  • Prioritize identified opportunities.
  • Follow up with PCC Operations Group on implementation.
Data Collection

- Treasure Hunt Ground Rules
  - Ratio FY09 forecast to FY10 forecast: use ratio as a guide
  - Brainstorm ‘likely suspects’: NG, process gases, CA, electricity
    - Asset list: touch every piece of equipment
  - Need average numbers/hour
  - Determine sizes of all leaks; write tags
  - Collect all forms of energy waste (lights left on, motors running, pumps, blowers, compressors, etc.) – document
Lean Tools For Energy

- Treasure Hunt: Identify Opportunities
- Communication Boards: Sustain/Steady Improvements – NEI
**UTILITY FACTS**

**NSS spends approximately $1,000,000 per year on utilities! We must reduce energy costs by 25%**

**Compressed Air**
- **COMPRESSED AIR IS NOT FREE.** It is extremely expensive and inefficient.
- The overall efficiency of a typical compressed air system is 10 - 15%.
- 7 - 8 horsepower of electrical power input is required to compress enough air to operate a 1 hp air motor at 100 PSI.
- A single 1/4" leak at 100 PSI can cost over $12,000 per year.
- A single blowoff can consume up to 20 HP of electrical input into the compressor.
- A 10 PSI reduction in air pressure results in 9% less air usage.

**Lighting**
- Ronda shop lighting costs approximately **$48,000 per year**.
- A single 400 Watt bulb, like most shop ceiling bulbs, costs approximately **$400 per year**
- The cost savings for turning off an office light begins after 18 seconds. Most modern lights have an even faster payback.

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The **NSS Energy Team** will begin meeting weekly in early November to discuss projects and ideas. This will be a great opportunity to make a large, positive impact as NSS, while expanding your knowledge of business principles and technology. Please contact Jerry Gase or Bill Dietzen if you are interested in participating.
TIPS - Utility Cost Reduction

EVERY EMPLOYEE MUST CONTRIBUTE TO ENERGY CONSERVATION

Electricity
- Turn off all air blowoffs and air knives when your machine is not running (even if it's only a few minutes)
- Turn off machine motors when not in use (Ex: Rollers, scrap and work conveyors)
- Disconnect air tools from air line when not in use.
- Immediately report air leaks to your supervisor, no matter how small.
- Turn off shop lights when an area will be unoccupied for at least an hour (Ex: Maintenance, CNC department, sorting)
- Turn off office lights if room is not in use.
- Avoid jogging multiple headers at once to reduce peak usage penalty (Will require operator awareness and teamwork)
- Turn off work lights when not in use (Ex: Work lights in header die areas)
- Use power saver features on office equipment (printers, monitors, etc) and turn off computers and printers at night.
- Do not remove, alter, or discard energy efficient devices without supervisor permission (Ex: Nozzles on blowoffs)
- Replace inefficient space heaters with energy efficient models
- Turn off General Drive air compressor immediately at end of shift.

Gas
- Never turn office thermostats above 68 degrees.
- Lower temperature on office thermostats to 60 degrees when leaving for the night (Last person out).
- Turn on shop heaters only when absolutely necessary.
- Close all outside doors when heaters are in use.

Water
- Use oil skimmers on parts washers to prevent water contamination
- Report any leaky or defective plumbing to your supervisor.

Please report maintenance issues causing wasted electricity, gas, or water.
Please use the NSS suggestion program to offer additional ideas.