Hospitality Energy Efficiency: Radisson Hotel & Water Park of America

Jill Eide

MnTAP Advisor: Sarah Haas
Company Overview

- Hotel: Lodging for leisure and business travel
  - 403 rooms
  - 77% annual occupancy
  - 2.1 people/room
  - 305,800 people/year

- Water Park: Amusement for families and kids
Motivations for Change

• Large annual utility bills
  – Energy efficiency directly impacts the profit margin

• Corporate social responsibility
  – Reduce environmental and health impacts on the local community
Reasons for MnTAP Assistance

Identify new opportunities for energy reduction

- Many energy conservation practices exist
  - Energy management system (EMS)
  - Variable frequency drives (VFDs) on water park pump/motor combos
  - Compact florescent lighting (CFL) in guest hallways and rooms
  - Low flow shower and sink fixtures in guestrooms
Approach

1. Analyzed utility bills to determine high energy processes
2. Interviewed staff regarding processes
   - Determined maintenance and efficiency practices
   - Identified gaps & “nuisances”
3. Researched and identified energy efficient opportunities
Approach

Annual Utility Cost

- Gas (therms): 13%
- Electric (kWh): 32%
- Water & Sewer (1000 gals): 55%

Legend:
- Light blue: Gas (therms)
- Pink: Electric (kWh)
- Yellow: Water & Sewer (1000 gals)
Public Lighting

• Background: Common areas use incandescent, halogen and CFL bulbs
• Problem: High electrical bills & constant maintenance with light bulb replacement
# Public Lighting

<table>
<thead>
<tr>
<th>Implementation Cost</th>
<th>Annual Saving</th>
<th>Payback (months)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>$10,300</td>
<td>$18,000</td>
<td>183,600</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dollars kWh</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dollars kWh</td>
<td>7 months*</td>
<td>Implementing 8/11</td>
</tr>
<tr>
<td></td>
<td>*Includes Xcel rebate</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Solution: Upgrade current lighting
- LEDs have longer life, no mercury, and greater efficiency
- CFLs with lower watt & less mercury
Energy Management System

- **Background:** EMS in place to control humidity, CO₂, Chlorine, temperature, and pressure in the water park
- **Problem:**
  1. Energy Management System
     - altered settings
     - faulty sensors & control boards
  2. Building Damage
     - peeling paint
     - inability to adequately cool spaces
# Energy Management System

<table>
<thead>
<tr>
<th>Implementation Costs</th>
<th>Annual Energy Savings</th>
<th>Annual Cost Savings</th>
<th>Payback Period (months)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dth</td>
<td>kWh</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$4,400</td>
<td>16,500</td>
<td>328,000</td>
<td>$105,000</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>

- Solution: Re-commission equipment using third party engineers
Laundry Dry-Time

• Background: Processes before dryer influence dry-time
  – Boiler functionality
  – EcoLab test pilot
• Problem: Over-drying linens wastes natural gas
Laundry Dry-Time

<table>
<thead>
<tr>
<th>Implementation Cost</th>
<th>Annual Saving</th>
<th>Payback (months)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0</td>
<td>$13,500</td>
<td>2,800</td>
<td>Immediate</td>
</tr>
</tbody>
</table>

- Solution: Reduce overall dry time based on current laundry room conditions
Boiler Tune-Ups (8)

• Background: Manufacturers recommend annual tuning

• Problem: Systems had not been serviced in approximately 3 years
# Boiler Tune-Up

## One Time Boiler Tune Ups

<table>
<thead>
<tr>
<th>Implementation Cost</th>
<th>Annual Saving</th>
<th>Payback</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>$3,170</td>
<td>$30,000*</td>
<td>6,300*</td>
<td>2 months*</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>Fall 2011</td>
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</table>

*includes Centerpoint Energy rebate

## Annual Boiler Tune Ups

<table>
<thead>
<tr>
<th>Implementation Cost</th>
<th>Savings/minute reduced</th>
<th>Payback</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject to annual change</td>
<td>$3,000-$7,000</td>
<td>700-1,500</td>
<td>~1 year</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>annual</td>
</tr>
</tbody>
</table>

• Solution: Hire third party to perform tune-ups

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**Minnesota Technical Assistance Program**
## Presentation Summary

<table>
<thead>
<tr>
<th>Project</th>
<th>Implementation Costs</th>
<th>Annual Energy Savings</th>
<th>Cost Savings</th>
<th>Payback</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Dth</td>
<td>kWh</td>
<td></td>
</tr>
<tr>
<td>Lighting</td>
<td>$10,300</td>
<td>-</td>
<td>183,600</td>
<td>$18,000</td>
</tr>
<tr>
<td>EMS</td>
<td>$4,440</td>
<td>16,500</td>
<td>328,000</td>
<td>$105,000</td>
</tr>
<tr>
<td>Dry Time</td>
<td>$0</td>
<td>2,800</td>
<td>-</td>
<td>$13,500</td>
</tr>
<tr>
<td>Boilers</td>
<td>$3,170</td>
<td>6,300</td>
<td>-</td>
<td>30,000*</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>$17,910</strong></td>
<td><strong>25,600</strong></td>
<td><strong>511,600</strong></td>
<td><strong>$166,500</strong></td>
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</tbody>
</table>

- 29,500 ton reduction of CO$_2$e emissions
- 13% reduction in annual utility costs
## Additional Recommendations

<table>
<thead>
<tr>
<th>Project</th>
<th>Implementation Costs</th>
<th>Annual Energy Savings</th>
<th>Cost Savings</th>
<th>Payback</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Dth kWh</td>
<td></td>
<td></td>
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<tr>
<td>Ozone</td>
<td>$190,680</td>
<td>455 -</td>
<td>$60,900</td>
<td>~3 yr.</td>
<td>Recom.</td>
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<tr>
<td>Acid Wash</td>
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<td>- 50,000</td>
<td>$4,000</td>
<td>&lt;3 mo.</td>
<td>Recom.</td>
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<tr>
<td>Room Lighting</td>
<td>Unknown</td>
<td>- 149,500</td>
<td>$12,000</td>
<td>unknown</td>
<td>Recom.</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>$209,570+</strong></td>
<td>26,055 711,100</td>
<td><strong>$244,000</strong></td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

- 29,650 ton reduction of \(\text{CO}_2\text{e}\) emissions
- 18% reduction in annual utility costs
Bonus: Framing Sustainability

- Employees
  - Cooling tower water quality
  - EMS basic controls
  - Recycling

- Guests
  - Marketing magnets

<table>
<thead>
<tr>
<th>Implementation Cost</th>
<th>Saving</th>
<th>Payback (months)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dollars</td>
<td>lbs paper</td>
<td></td>
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</tr>
<tr>
<td>$130</td>
<td>$570</td>
<td>10,000</td>
<td>7 months*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Implemented</td>
</tr>
</tbody>
</table>
Personal Benefits

• Time management
  – Scheduling
  – Multitasking
• Networking in a professional atmosphere
• Accomplishment
  – Find root problems
Questions

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