Energy Efficiency
Simple, Safe Investment

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Energy Efficiency in Attractions and Accommodations

• **Energy Costs**
  - On average, America’s 47,000 hotels spend $2,196 per available room each year on energy
  - Represents about 6% of all operating costs

• **Energy Efficiency Benefits**
  - Direct energy cost savings
    - 20% reduction in energy consumption means...
    - Same financial effect as increasing the ADR
      » $1.24 in limited-service hotels
      » $2.70 in full-service hotels
  - Capital equipment upgrades
    - More reliable = Less maintenance = Less cost and often not considered
  - Enhances guest comfort
  - Demonstrates a commitment to **climate stewardship**
    - Competitive advantage
Energy Efficiency in Attractions and Accommodations

- **Energy Costs**
  - Where is it going?
  - What choices?
    - Continue to spend?
      » Do nothing is not an option
    - Invest & reduce?
      » No & low-cost measures
      » Capital investments
  - Future Energy Costs?
  - Cost of Delay?
Energy Use

- Energy consumption in EACH Category – two components
  - Energy used wisely
  - Energy use wasted

<table>
<thead>
<tr>
<th>Use</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space Heating</td>
<td>31%</td>
</tr>
<tr>
<td>Water Heating</td>
<td>17%</td>
</tr>
<tr>
<td>Space Cooling</td>
<td>15%</td>
</tr>
<tr>
<td>Lighting</td>
<td>12%</td>
</tr>
<tr>
<td>Other</td>
<td>9%</td>
</tr>
<tr>
<td>Cooking</td>
<td>5%</td>
</tr>
<tr>
<td>Office Eq</td>
<td>4%</td>
</tr>
<tr>
<td>Ventilation</td>
<td>4%</td>
</tr>
<tr>
<td>Refrigeration</td>
<td>3%</td>
</tr>
</tbody>
</table>
Most Common Energy Wasters

2. Old Lighting Systems
3. Kitchen Hood Systems
4. Simultaneous Heating & Cooling
5. Poor HVAC Ventilation Control
6. Constant Volume Air & Air Mixing Systems
7. Constant Volume Pumping & Pump Throttling
8. Poor Maintenance
9. Poor Chiller & Boiler Plant Control
10. Oversized and Inefficient Equipment
Energy Conservation Measures

- Shut off/Setback
- Repair/Replace
- Slow down
- Coordinate & Commission

- Time of Day
- Variable Frequency Drives
- Systems & Equipment
- Optimize System Operation
Financial Analysis Tools

- Simple Payback – SPB
  - Cost/annual savings=years
- Internal Rate of Return
- Net Present Value
- “Continue to Waste” or “Invest & Save”
  - Annualized measure costs compared to annual savings
- TEPA - Thermal Energy Purchase Agreement
  - System owned/operated/maintained by 3\textsuperscript{rd} party
  - Buy the BTUs
- Off Balance Sheet – Off Credit
  - Efficiency Measures owned/operated/maintained by 3\textsuperscript{rd} party
Financial Considerations

• Investment **Risks**
  – Risk of results falling short of **expectations**
  – Risk of results falling short of **other investments**

• If focus only on Investment & Payback
  – Energy management – **stop & go process**
    • Back to square one if measure(s) rejected
  – Continue to **waste dollars**
    • Instead of **saving dollars**
How Much Does the Measure Cost?

— Why make the measure justify itself so quickly?
  • Long life measure will often be rejected
— How much does the measure **cost per year**?
  • Compare **Annual Cost** to **Annual Benefits**

Annualized Cost (PMT) = \[ \frac{i(1+i)^n}{[(1+i)^n]-1} \]

- \( i \) = cost of capital and discount rate for future cash flows
- \( n \) = economic life of project
Example – Annualized Cost of Measure

- Cost of Measure = $100,000
- SPB = Cost/Savings = Years

1yr SPB means savings = $100,000/yr
3yr SPB = $33,000
5yr SPB = $20,000
Retrofit Example

- Cost of Measure = $100,000
- Cost of Capital (=discount rate) = 10%

<table>
<thead>
<tr>
<th>Energy Before</th>
<th>Energy After</th>
<th>Savings</th>
<th>% Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy $</td>
<td>$</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>SPB 8.0</td>
<td>50,000</td>
<td>38,500</td>
<td>$12,500</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Asset Life</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized Cost</td>
<td>($11,745.96)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost Basis if SPB Method</td>
<td>$100,000</td>
<td>$50,000</td>
<td>$33,333</td>
<td>$25,000</td>
<td>$20,000</td>
<td></td>
</tr>
<tr>
<td>Cost Basis if Annualized</td>
<td>($11,746)</td>
<td>($11,746)</td>
<td>($11,746)</td>
<td>($11,746)</td>
<td>($11,746)</td>
<td></td>
</tr>
<tr>
<td>Annual Savings w/Inflation</td>
<td>($100,000)</td>
<td>$12,500</td>
<td>$13,000</td>
<td>$13,520</td>
<td>$14,061</td>
<td>$14,623</td>
</tr>
</tbody>
</table>

| Net Savings | $ 754 | $ 1,254 | $ 1,774 | $ 2,315 | $ 2,877 |
| Cumulative Savings | $ 754 | $ 2,008 | $ 3,782 | $ 6,097 | $ 8,974 |
| NPV          | $51,885.22 |
| IRR          | 16%        |
| 20-yrTotal Cumulative Net Savings | $ 137,307 |

BRADY
Investment Risks & Returns

- **16.00% Stocks**
- **12.00% Corporate Bonds**
- **8.00% 10-yr Treasury**

Efficiency is **Low Risk & High Return!!**

- **High Risk/High Return**
S&P 500 – 2000 - 2010

• Negative return for decade
• Are there better investments – safer too?
• Consistent with risk/return?
# Typical Array of Choices

<table>
<thead>
<tr>
<th>Upgrade</th>
<th>Cost</th>
<th>SPB-Yrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chiller Upgrade</td>
<td>$1,250,000</td>
<td>15</td>
</tr>
<tr>
<td>Boiler Upgrade</td>
<td>$550,000</td>
<td>8</td>
</tr>
<tr>
<td>Insulation</td>
<td>$225,000</td>
<td>10</td>
</tr>
<tr>
<td>Doors</td>
<td>$400,000</td>
<td>20</td>
</tr>
<tr>
<td>Windows</td>
<td>$1,200,000</td>
<td>20</td>
</tr>
<tr>
<td>Other HVAC</td>
<td>$350,000</td>
<td>25</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$3,975,000</strong></td>
<td><strong>14.8</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Upgrade</th>
<th>Cost</th>
<th>SPB-Yrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controls Upgrade</td>
<td>$350,000</td>
<td>2</td>
</tr>
<tr>
<td>Thermal Storage</td>
<td>$1,000,000</td>
<td>8</td>
</tr>
<tr>
<td>Lighting Upgrade</td>
<td>$2,000,000</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$7,325,000</strong></td>
<td><strong>6.9</strong></td>
</tr>
</tbody>
</table>

Good *Strategy* - Consider **Bundling Fast & Slow** Paybacks
Financial Considerations - Summary

• Efficiency Investments?
  – Invest or *keep paying*

• Consider using *Annualized* Cost
  – Pay a 20-yr asset in 3-yrs?

• *Bundle* your projects
  – Fast & slow paybacks

• Consider investment *Risk & Return*
  – Efficiency is a SAFE Investment!!

• *Invest* or *Waste* mentality
Introduction to Eco-Tourism

Orbitz is committed to protecting Planet Earth, by helping raise environmental awareness and by making it easier to be an eco-friendly traveler.

- Find Hotels that have earned the EPA's ENERGY STAR® for using nearly 40 percent less energy than average buildings and emitting 35 percent less carbon dioxide into the atmosphere.
- ...
Eco-Friendly Hotels

Start considering an eco-friendly hotel when you travel. Many lodging properties use wind and solar power as energy sources or purchase only environmentally-friendly products, such as “green” detergents for linens and soaps. Hotels around the world are doing their part to help you minimize your impact on the environment on your next trip. Based on Orbitz research, we think these hotels deserve some recognition.

Check out our growing list of “green” hotels:

<table>
<thead>
<tr>
<th>Find hotels by state</th>
<th>North Carolina</th>
<th>Eco-Friendly Hotels Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Springhill Suites by Marriott Charlotte University Research Park - Charlotte, NC</td>
<td>Courtyard by Marriott Fayetteville - Fayetteville, NC</td>
<td></td>
</tr>
<tr>
<td>Springhill Suites by Marriott Raleigh/Durham Airport/Research Triangle Park - Durham, NC</td>
<td>Courtyard by Marriott Charlotte SouthPark - Charlotte, NC</td>
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</tr>
<tr>
<td>Courtyard by Marriott Durham Research Triangle Park - Durham, NC</td>
<td>Courtyard by Marriott Charlotte Arrowood - Charlotte, NC</td>
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</tr>
<tr>
<td>Courtyard by Marriott Raleigh North - Raleigh, NC</td>
<td>Courtyard by Marriott Raleigh Cary - Cary, NC</td>
<td></td>
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<tr>
<td>Courtyard by Marriott Raleigh Crabtree Valley - Raleigh, NC</td>
<td>Residence Inn by Marriott Raleigh Cary - Cary, NC</td>
<td></td>
</tr>
<tr>
<td>Courtyard by Marriott Raleigh-Durham Airport - Raleigh, NC</td>
<td>Courtyard by Marriott Charlotte University Research Park - Charlotte, NC</td>
<td></td>
</tr>
<tr>
<td>Courtyard by Marriott Greensboro - Greensboro, NC</td>
<td>Proximity Hotel</td>
<td></td>
</tr>
</tbody>
</table>

Eco-Friendly Hotel Criteria:

- Use a natural source of energy (i.e. wind, water, solar, bio-fuel)
- Use environmentally-friendly and safe products (i.e. detergents for linens, soaps, shampoos, etc.)
- Contribute $5 from each hotel reservation to an environmental organization
- Use energy conserving devices (i.e. eco-friendly light fixtures/bulbs triggered by motion detectors, water-saving devices, water filtration systems and air filtration/purifiers)
- Earned the ENERGY STAR®

Orbitz is proud to recognize hotels that have earned the ENERGY STAR, indicating that they are among the top 25% of facilities in the country for energy performance. Click here for more information about the ENERGY STAR program: www.energystar.gov

Hotels interested in earning how to track energy performance and the related carbon footprint...
Energy Management Guide


Simple, organized, useful

• Initiate an Energy Management Program
• Determine Efficiency Targets
• Conduct Energy Assessments
• Identify Energy Savings Opportunities
• Calculating Costs and Paybacks
• Implement Measures
• Monitor Performance
What Is Energy Performance Contracting?

Here’s how it works:

You enter into an agreement with a private energy service company (ESCO). The ESCO will identify and evaluate energy-saving opportunities and then recommend a package of improvements to be paid for through savings. The ESCO will guarantee that savings meet or exceed annual payments to cover all project costs—usually over a contract term of seven to 10 years. If savings don’t materialize, the ESCO pays the difference, not you. To ensure savings, the ESCO offers staff training and long-term maintenance services.

Many types of building improvements can be funded through your existing budgets—new lighting technologies, boilers and chillers, energy management controls and swimming pool covers, to name a few.

A qualified ESCO can help you put the pieces together:

- Develop engineering designs and specifications;
- Manage the project from design to installation to monitoring;
- Arrange for financing;
- Train your staff and provide ongoing maintenance services; and
- Guarantee that savings will cover all project costs.

http://www.energyservicescoalition.org/resources/whatis.htm