A Roadmap to Sustainability

CrossRoads Consulting

Virginia Tech National Capital Region
OVERVIEW

- The Business Case for Sustainability
- Setting a Framework
- Goals, Metrics & Measuring
- Reporting & Communications
- GeoTourism
THE BUSINESS CASE FOR SUSTAINABILITY

**People**

- Change Management
- Community Trust
- Government Relations
THE BUSINESS CASE FOR SUSTAINABILITY

Profit

• Consumer Alignment
• Reduced Costs, Better Margins
• Reduced Risk & Liability
• Pleasant, Healthier Workplace
THE BUSINESS CASE FOR SUSTAINABILITY

Planet

• Mitigate Negative Impacts
• Reduce Carbon Footprint
• Catalyst for Regional Change
THE BUSINESS CASE FOR SUSTAINABILITY

Place

- Cultural Preservation
- Historical Preservation
- Engagement & Enhancement
Sustainability is Synergy

1. Environmental improvements can achieve multiple benefits;

Environmental threats can yield multiple detriments

Sustainability is a Journey

2. Embed sustainability into the philosophy and business model.

The goal is to move towards the destination
GOALS, METRICS & MEASURING

• Create a baseline to track performance
  – People
  – Planet
  – Profit
  – Place

• Setting goals and improving performance
  – 1 year benchmarks
  – 3 year benchmarks
  – 5 year benchmarks
Reporting & Communications

- Identify and quantify opportunities for innovation, learning, efficiency and cost savings
- Demonstrate leadership, commitment, values, and ethics
- Develop new ways communicate, connect with clientele, and engage stakeholders in meaningful ways
GEOTOURISM

• **Strive for standards of geotourism**
  
  – The most meaningful for Linden Centre’s business model and existing practices
  
  – Engagement & Enhancement

• **Green Globe Certification**
  
  – Has a long track record, including in China
  
  – Clear set of standards, globally recognized
  
  – Low price tag, high benefits
  
  – Offers sustainability training for staff and marketing
• Overview of PLACE
• Energy & Resource Efficiency
• Waste Water Management
• Client Engagement & Education
STEPS TOWARD SUSTAINABILITY
UNIQUE BIODIVERSITY & CULTURE

Cormorant Fishing

"Chun-Yu" (Spring fish)

Purple Swamphen

Fire-tailed sun bird
ENVIRONMENTAL PROBLEMS

Algae Blooms on Erhai Lake (above); Raw sewage flowing in the Yangtze (upper right); Industrial wastewater (lower right)
CLIMATE CHANGE & EXTREME WEATHER

**Early 2010, SW China**
The worst drought in a century

**Since April 2010, China**
The worst flooding in 10 years
LINDEN CENTRE

WATER & WASTEWATER MANAGEMENT

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National Capital Region
EFFICIENCY & RETROFITS

Dual-flush or low flow toilets
Waterless Urinals
Faucet Aerators
Linens and towel re-use programs

Low flow shower heads
Fix leaky fixtures
Ozone Laundry System
RAINWATER HARVESTING

What it is: catching the rain water in storage tanks that can be accessed in the future to provide a free source of water.

Rooftops can be connected to storage containers to hold the rain water until it’s needed.

How you can use the water:
CONSERVATION THROUGH RE-USE
SEPTIC TANKS

**Septic Tank**

**ADVANTAGES**
- Long accepted practice, many options for effluent

**DISADVANTAGES**
- Maintenance by staff

**MAINTENANCE**
- Remove sludge typ. 3 – 5 years
- Varies based on effluent destination

**Drain Field**

**Living Machine**
LIVING MACHINE
PUMP WASTEWATER TO TREATMENT FACILITY

<table>
<thead>
<tr>
<th><strong>ADVANTAGES</strong></th>
<th>No need for staff to manage a treatment process</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DISADVANTAGES</strong></td>
<td>Need to pipe off-site, multiple discharge points, possible sewer fees</td>
</tr>
<tr>
<td><strong>MAINTENANCE</strong></td>
<td>Pump maintenance</td>
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</tbody>
</table>
OPTIONS FOR FUTURE PROJECTS

- Anaerobic Digester
- Peat Filter
- Compost Filter Bags
- Composting Toilets
## SUMMARY OF OPTIONS & COSTS

<table>
<thead>
<tr>
<th>PRACTICALLY FREE</th>
<th>$</th>
<th>$$</th>
<th>$$$</th>
<th>$$$$</th>
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<tbody>
<tr>
<td>Guest Linen Re-use Program</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Staff Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Fix Leaky Fixtures</td>
<td>Faucet Aerators</td>
<td>Greywater Filtering System for Inside Re-use</td>
<td>Wet Well and Pump</td>
<td>Alternative Septic Field Measures (Digesters or Living Machines)</td>
</tr>
<tr>
<td></td>
<td>Low-flow Shower Heads</td>
<td>Compost Filter Bags</td>
<td>Alternative or Waterless Toilets &amp; Urinals</td>
<td>Composting System</td>
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<tr>
<td></td>
<td>Tank &amp; Bubbler for Laundry Rise Water</td>
<td>Ozone Laundry System</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Septic Tank Beneficial Bacteria</td>
<td></td>
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<tr>
<td></td>
<td>Aqus Sink Greywater Re-use System</td>
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What is the Forecast for the Yunnan Province?
Rising temperatures + precipitation + greater inter-annual precipitation variation

Effects on Energy?
Rising temperatures + increasing droughts + hydropower price volatility

Suggestions:
Energy efficiency, conservation and alternative/renewable energy sources
ENERGY AND RESOURCE EFFICIENCY
ENERGY AND RESOURCE EFFICIENCY

- Operational opportunities
- Locally-applicable opportunities
- Conceptually-available opportunities
SUSTAINABLE LIGHTING OPTIONS

• Existing “wins”?
  – Natural light
  – LED bulbs

• Opportunities?
  – Solar tubes
  – Room card-key switches
  – Sensors
  – Solar outdoor lights
TRANSPORTATION SUSTAINABILITY OPTIONS

• Existing “wins”
  – Limited single occupant vehicle use
  – Availability of buses to neighboring towns
  – Non-motorized transport usage
  – Interest in doing more

• Opportunities
  – Alternative fuels
  – Coordinated mass transit

Source: Tennessee Dept. of Transportation
Water Efficiency And Energy Consumption

So What Are the Options?

• Day to Day Operational Practices
• High efficiency clothes washers
• High efficiency dishwashers
• High efficiency faucets: aerator or laminar flow
• Low flow shower heads
The average household in the United States uses 14% of total energy consumed to heat water (USEPA, 2012b).

WATER HEATING PRACTICES

- Conserve Water
- Adjust Temperature Settings
- Maintain and Adapt Appliances
<table>
<thead>
<tr>
<th>Water Heater Type</th>
<th>Efficiency (EF)</th>
<th>Installed Cost¹</th>
<th>Yearly Energy Cost²</th>
<th>Life (years)³</th>
<th>Total Cost (Over 13 Years)¹²³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional gas storage</td>
<td>0.6</td>
<td>$850</td>
<td>$350</td>
<td>13</td>
<td>$5,394</td>
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<tr>
<td>High-efficiency gas storage</td>
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<td>$1,025</td>
<td>$323</td>
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<td>$5,220</td>
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<td>Condensing gas storage</td>
<td>0.86</td>
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<td>$244</td>
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<tr>
<td>Conventional oil-fired storage</td>
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<td>$1,400</td>
<td>$654</td>
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<td>$11,299</td>
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<tr>
<td>Minimum Efficiency electric storage</td>
<td>0.9</td>
<td>$750</td>
<td>$463</td>
<td>13</td>
<td>$6,769</td>
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<tr>
<td>High-eff. electric storage</td>
<td>0.95</td>
<td>$820</td>
<td>$439</td>
<td>13</td>
<td>$6,528</td>
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<td>Demand gas (no pilot) ⁵</td>
<td>0.82</td>
<td>$1,600</td>
<td>$256</td>
<td>13</td>
<td>$4,925</td>
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<td>Electric heat pump water heater</td>
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<td>$1,660</td>
<td>$190</td>
<td>13</td>
<td>$4,125</td>
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<tr>
<td>Solar with electric back-up</td>
<td>1.2</td>
<td>$4,800</td>
<td>$175</td>
<td>13</td>
<td>$7,072</td>
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</tbody>
</table>
• Energy efficient refrigerators can use 20% less energy
• Be aware of regular maintenance and appropriate replacements
• Available energy consumption calculators
• Use the most efficient temperature settings
• Consider top freezer models which are more 10-25% more efficient than side by side refrigerator/freezers
• Facilities with commercial kitchens use twice the energy of other commercial facilities

• Energy efficient equipment and practices can reduce overall energy consumption by 10% to 30%
Average High/Low Temperature Graph for Dali, China

Month

- Average High Temp(F)
- Average High Temp(C)
- Average Low Temp(F)
- Average Low
Radiant Heat Flooring

- Note the floor loop piping is concentrated at the perimeter, where the load is greatest.

- The heat sink can be in vertical wells, horizontal trenches, or at the bottom of a lake or pond.

Photos: Tom Howorth
Digital Dashboard

- Platform for staff and guests to engage in energy awareness
- Accessible user interface, such as iPad, enables real-time feedback on energy
- Connect resource usage with the local environment to inform decision-making and encourage operational change
Energy Efficiency Options

• Using existing infrastructure more efficiently
• Making practical operational changes
• Looking at realistic technology options that can be adopted over the next three years (or another implementation period)
• Case studies: what has worked for similar sized hotels?
ALIGNMENT AND OPPORTUNITIES

• Provincial Government
  • Erhai Lake Basin Protection and Control Plan (2003-2020)
  • Initiative to Protect Colorful Yunnan (2009-2020)

• Geotourism Approach
  • Community Development through Tourism
  • Geography and Culture as Context

• Market Relevance
  • ~85% Western Clientele (Europe, North America)
  • 70-80% Occupancy Rate
  • 20-30% Margin for Increased Occupancy
  • Increased Demand for Geotourism Experiences
  • Opportunities for Increased Room Rates
  • Opportunities for Partnerships, New Business Development
• Sustainability assessment of current activities

• Sustainability program development

• Active guest engagement tools

• Passive guest engagement tools
VARIOUS TYPES OF LEARNING

- Active
- Passive
- Collaborative
GOALS OF SUSTAINABILITY PROGRAMMING

• Educate guests on sustainability systems and challenges of Linden Centre and local community
• Engage guests through activities with objectives based on critical challenges of the local culture and region
• Empower guests to share their expertise, bring their knowledge home, and choose a more sustainable lifestyle
Sustainability Assessment of Activities

• Why is it related to sustainability in the context of geotourism?
• What are some guiding questions to help provide sustainability interpretation?
• What are slight modifications that can help to incorporate sustainability elements?
• How can we frame this activity to communicate and market its sustainability relevance?
Sustainability Program Development

• Sustainability “short stays” of 3/5/7 days
  o Build on current activities with new framing
  o Suggestions for additional sustainability-focused activities

• Opportunities for new types of markets
  o Retreat for sustainability champions
Additional Active Guest Engagement Tools

• Pre-trip Packet
  o Prepare guests for stay
  o Helps manage expectations

• Sustainability 101 presentation content

• Packet of materials for guests during stay
Passive Guest Engagement Tools

• Signage around facility and in guest rooms
  • Water consumption awareness
  • Locally made shampoo
• Built-in options for guests
  • Reduced linen services
  • Local foods for meals
  • Reusable toiletry containers
• Information on website
• Establish a 3-year vision and tangible goal posts for the sustainability plan at the Linden Centre.

• Reflect on and prioritize sustainability proposals which best reflect the existing context, resources and activities of the Linden Center and its long-term goals.

• Brainstorm on new ideas for making sustainability improvements and staff and guest engagement in sustainability initiatives.