ECO-ECONOMICS

Attaining Sustainability without Compromise

http://www.harbec.com/

HARBEC™ INC

TECHNICAL INNOVATION WITH ENVIRONMENTAL RESPONSIBILITY

Who We Are…

At ***HARBEC*** we regard Eco-economic Sustainability as absolutely critical to the future of our business, and we believe that our success in the pursuit of it, will improve our competitive advantage by insuring our efficiency.

ENERGY STAR PARTNER

HARBEC INC
TECHNICAL INNOVATION WITH ENVIRONMENTAL RESPONSIBILITY

A Carbon Neutral manufacturing company

Striving to be **Water Neutral by 2015**

CO_2 By 2013

H_2O By 2015

EPA GREEN POWER PARTNERSHIP

ISO 50001/SEP Platinum Nov. 2013

DOE - **Better Plants – Challenge** Jan. 2014

HARBEC's conviction to Eco-economic Sustainable Manufacturing

ECO-ECONOMICS

- HARBEC has developed an internal Eco-Economic model for evaluating the costs and benefits of all technologies, equipment, and projects that relate to business objectives of pursuing sustainable manufacturing and achieving its goals of carbon and water neutrality.

- HARBEC's Eco-Economic model is also a deliberate tool that ensures the business always achieves financial value from its investments, so that goals for environmental, energy, social, and sustainable impact do not interfere with the ability of the business to achieve desired financial performance.

ECO-ECONOMICS

- By incorporating Eco-Economic decision criteria into energy generation, management, and efficiency measures, HARBEC has been able to use “energy dollars” or those dollars which would have been spent on electricity (kWh) and gas (therms) with the utility toward high-value energy efficiency improvements.

- The result of this unique approach has been significant. HARBEC has been able to save hundreds of thousands of dollars in energy costs by offsetting what they would have paid for energy if they had not made Eco-Economic analytical choices on energy improvements.

Eco-Economic Opportunities

Installation of CHP System

CHP Investment paid off in 2008!

Barrel Insulation Project

Installation of 850 kW wind turbine

2000 / 2001 / 2002 / 2003 / 2004 / 2005 / 2006 / 2007 / 2008 / 2009 / 2010 / 2011 / 2012 / 2013 / 2014 / 2015

Lighting Upgrade

Installation of 250 kW wind turbine

Wind investment paid off in 2010!

LED Lighting Project Upgrade

Achieve Carbon Neutrality!

Taking Action on 15-Years of Eco-Economic Opportunities

Eco-Economic Opportunities

Why bother on Sustainable Manufacturing?

- Energy in our type of manufacturing = 4 to 6% cost of doing business
- Energy dollars = Value to the Bottom Line
  - $175K in annual energy savings is equivalent of $2-3M in new revenue
- **Would a normal manufacturing company pursue an opportunity to increase sales by 30% ??**

Assumptions:

Energy = 5% cost of doing business for manufacturing

Example Company is $10MM sales
~ $500K annual energy cost

35% energy cost reduction = $175k/year to bottom line
.
If (5% to 10% is average profit) = $700k

$175k is 30% of $700k
Would require (30%) ~$2MM to $3MM additional sales for equal impact on overall annual profitability

Achieving Eco-Economic Results

Thermal Energy Opportunity Examples at Harbec

Combined Heat and Power (CHP)

- 25 CNG fueled 30kW Microturbine Generators
- 750 kW max. potential provides:
  - 500 kW for electric load, 250 kW for back-up

Thermal Opportunity:

- With thermal energy from the exhaust we heat and air condition 9,000 sq.ft. of molding space (w/25 injection mold machines) and 17K sq.ft. manufacturing space.

- 7 year ROI paid for with energy dollars!

- Upgrade on CHP system in progress, will result in greater efficiencies, thermal utilization, energy and cost benefits

Maximizing Thermal Opportunities:

- Reduced energy cost through efficiency (by using the other 65% to 75%)

- Sustainable Industrial Park Potential (excess thermal and power)

Achieving Eco-Economic Results

Renewable Energy Examples at Harbec

Renewable on-site generation, 250kW Wind

- Installed 250 kW in 2000
- Electric savings provides >$45,000/year revenue stream
- 8-10 year ROI on $400k project originally

Renewable on-site generation, 850kW Wind

- Installation of 850 kW wind generator in 2010
- Annual production potential is 1,500,000 kWh +/- 10% per year, or about 50% of total Harbec annual energy requirements
- 6-7 year ROI on $2.1M project

Renewable energy :

- Displaces retail value electricity, which is $.15 per kWH
- Allows Harbec to predict ~50% of their energy costs 20 to 25 years into the future (no escalating fuel cost)
- Harbec's total energy from on-site renewable energy generation is ~60% of total energy requirement
- ROI on renewable energy is shortened further as electric costs rise

Achieving Eco-Economic Results

Energy Efficiency Examples at Harbec

Building Design - LEED

- Daylighting
- In-floor radiant heating
- Double insulated walls and roof

Industrial Efficiency & Equipment Modifications

- Replaced hydraulic equipment with all-electric injection molding machines (50% less energy intensive)
- Insulated molding machine barrels resulting in 324,000 kWh electricity savings, or $44K annually

Lighting

- Complete lighting upgrade in 2007
  - $65K total cost
  - $16K NYSERDA grant
  - $8K Fed Tax Credit
  - Contractor secured finance package
  - 48% lighting energy reduction
  - 1.5 year ROI
- 2014 – LED direct replacement project of 880 bulbs
  - $24K total cost
  - 50% NYSERDA/IEP grant
  - Lease option = no upfront costs
  - $22K annual savings
  - 45% lighting energy reduction
  - 50K hour bulb life

Energy Efficiency Opportunities:

- ROI's in the 1.5-2 year range
- Total annual energy savings >$100K
- Lower maintenance costs
- Improved productivity
- Control operating costs

Data Drives Eco-Economics:
ISO 50001/SEP Certification

Working toward **carbon neutrality**, HARBEC, Inc.'s small-scale, specialty plastics manufacturing facility in upstate New York implemented an **energy management system** that earned both **ISO 50001** and **Platinum Superior Energy Performance certification**.

OUTCOMES & NEXT STEPS

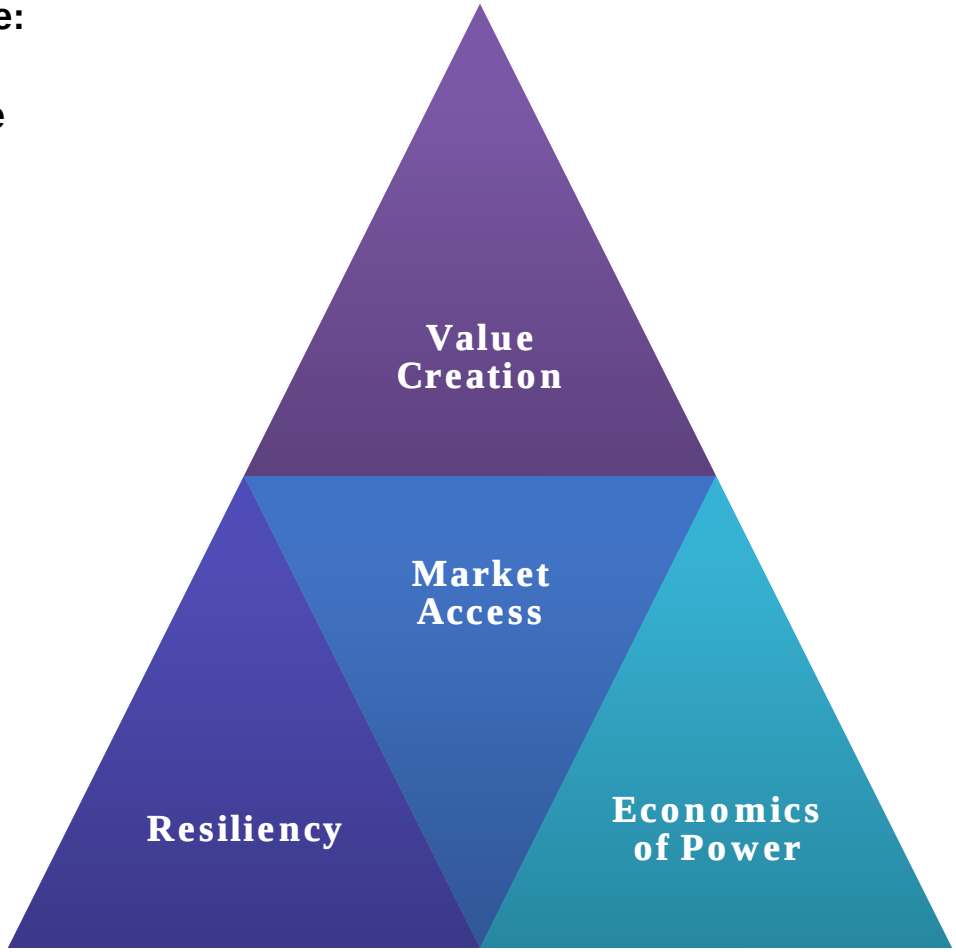
- HARBEC's plant improved its energy performance 16.5% (from the baseline period to the reporting period) and attained SEP status as a Platinum Certified Partner.
  - The operational energy efficiency measures attributable to SEP saved 6 billion Btu (6,300 GJ) and **$52,000** in costs annually.

The annual cost savings is equivalent to HARBEC having to generate greater than **$1M in new revenue.**

The Sustainable Bottom Line

Eco-Economic decisions make business sense:

- **Conservation is the 1st Rule of Sustainable Manufacturing**
  - Make the most of the eco-economical opportunities at your fingertips
- **Control operating costs**
  - Lower maintenance costs
  - Lower electric & gas usage and costs
- **Improve competitive pricing**
- **Insure power reliability (uptime/no blackouts)**
- **Provide fixed energy costs decades into future**
- **Improved operating efficiency through thermal utilization**
- **Product and Service Differentiation and Competitiveness**



Drivers & Benefits of Sustainable Manufacturing