The Competitive Advantage
of Energy Efficiency

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Agenda

• Need for Improvement
• Competitive Drivers
• Strategies and Opportunities
• Case Studies
• Local Initiative (Ongoing and Needed)

Valued Resources:

American Council for an Energy-Efficient Economy

Alliance to Save Energy

World Business Council for Sustainable Development

Thanks to Gregory Thurnher, Whiton Paine, and the Booth Bricker Foundation
Need for Improvement

• **Eco-efficiency**: The effectiveness with which raw materials are converted into deliverables (World Business Council for Sustainable Development)
  – Lean Production
  – Closed Loop Manufacturing
  – Industrial Ecology

• **Objective**: Maximize economic activity relative to resource utilization and pollution
Louisiana’s Challenge

• Upgrade an industrial economy that substantially lacks eco-efficiency
  – Improve/extend resource availability
  – Reduce needless pollution
  – Create jobs without concomitant environmental damage
Benefits of Improved Eco-Efficiency

- Reduced resource depletion and pollution per unit of economic activity (More jobs per unit emission)
- Improved supply reliability
- Reduced prices*
- Predisposition toward renewable energy sources
- Improved domestic security

*ACEEE, using National Petroleum Institute models, determined that a 5% cut in demand would reduce natural gas prices 25% by 2010, saving US consumers and businesses $100 Million.
Competitive Drivers

- Energy/Resource Price Uncertainty
  - Complicates planning and financing
  - Threatens/reduces profitability

--Bureau of Labor Statistics
Competitive Drivers

• Profit Security (reduced resource spending relative to revenues)
• Hedge against price volatility (insurance)
• Low-interest investment opportunity

*Source: Reprinted with permission from ACEEE, Summer Study, 1998.*
Global Competitive Driver
(Kyoto Wake-up Call)

• Globalized marketplace is tooling up for increased efficiency and carbon trading

• Many US Companies are adopting Kyoto-driven management plans (Bloomberg 11/15/04)
  – Dupont
  – Xerox
  – GM

• Cooperative Initiatives are Mobilizing
  – EPA/NARUC program with AR, NM, DC, CT, HI, MN
  – Northeast Regional Coalition
Strategies and Opportunities

- Energy Service Contracts
- Process Efficiency Upgrades
- Combined Heat and Power (Cogeneration)
- Eco-industrial Planning
3M: Facility-based energy management teams
- Behaviors, self assessments, then capital expenses
- 27% reduction in energy intensity since 2000

Dupont: Six sigma projects ► efficiency and GHGs
- Average savings of $250,000 across 75 projects
- 12 non-capital projects yield $4.9 million/year savings
- 68% reduction in GHG emissions since 1990

Kimberly Clark: Overcoming “not invented here”
- Corporate energy management staff ► energy productivity reviews
- 11% reduction in 1995-2000; similar progress expected in current period
Combined Heat and Power (Cogeneration)

- Enhances Industrial Efficiency
- Improves Air Quality
- Benefits Grid
- Combustion Today; Fuel Cells Tomorrow
Deterrents to/Incentives for Cogen

- No Standards for Interconnectivity
- Discriminatory Back-up or Exit Fees
- Air Regulations don’t Credit Cogen’s Benefits
- Depreciation Schedules are Unfairly Extended

- FERC and States ► Interconnectivity Standards and Purchasing Guidelines
- AQ Regulatory Recognition of Cogen’s Net Benefit
- Investment Tax Credits and Accelerated Depreciation

Involve Regional and State Leadership in Identifying, Promoting, and Coordinating Opportunities
Special Opportunity for Enhanced Regional Efficiency

• Problem: flared natural gas at wellheads
• Solution: microturbines and generators
Microturbine Stats

• Basic Stats
  – Size Range: 25 – 500 kW
  – Fuel: Natural gas, hydrogen, propane, diesel
  – Efficiency: 20 – 30% (Recuperated)
  – Environmental: Low impact (< 9 – 50 ppm) NOx
  – Suitable for Cogen (50 – 80°C water)
  – Commercially available in small volume production

• Economic/Service Requirements
  – Capital Cost: $700-$1100/kW
  – O&M Cost: $0.005-0.016/kW
  – Maintenance Interval 5000-8000 hrs
Microturbine Pros and Cons

- Few moving parts
- Compact and Lightweight
- Low emissions
- Can utilize waste fuels
- Low maintenance requirement

- High operating RPM’s (90,000-120,000)
- Reduced power output and efficiency with higher ambient temperatures
- Low fuel-to-electricity efficiencies
To promote increased future use...

• Provide ready access to transmission services
• Increase demand/production volume
  – Cogen should stimulate demand…reducing price
  – Desirable for LA to apply promptly toward flare-gas
• Expect improved design and efficiency
Enhanced Regional/Developmental Planning for Industrial Efficiency

**Industrial Ecology:** The Optimization of Resource Efficiency by Strategic Planning and Siting
- Energy Sharing
- Waste-resource Exchanges
- Facility Colocation (Green Twinning)
- Eco-industrial Parks (Industrial Symbiosis)

Kalundborg, Denmark...An Industrial Ecosystem
Eco-Industrial Planning: Attracting New Industry and Jobs, Minimizing Pollution and Resource-use

Evaluate Current and Potential Industries

Optimize waste-resource linkages and energy sharing

Formulate and promote regional development plan

Specific industries now existing in the region of interest, e.g.
- Western Steel Co.
- River Farms, Ltd.
- Best Concrete Products, Inc.
- Ace Dry Cleaning
- Generic global industries, e.g.
  - Paper mill
  - Steel mill
  - Solvents recycling
  - Aquaculture
An Industrial Ecosystem For Louisiana

Glass

Materials Processing Center

Plasma arc furnace

Chlor alkali Plant

Electricity

Fuel Cell plant

Electricity

Heat/steam

Electricity

Worm castings

Compost facility

Green houses

Organic Produce

Markets

Inorganic residues

Organic residues

Inorganic residues

Climate alkali Plant

Electricity

Fuel Cell plant

Electricity
Other Local Initiatives

- New Orleans (NOEEP) and State Efficiency Programs
- Recognition of “Demand Side Management” as a Rate Base Asset
- Promotion of Least Cost Planning
- Net metering legislation passed…rule *en forma*
- DNR HERO Program for Homeowners
- “Energy Corps” Small Business Alliances in NOLA and BTR
Take-home Messages

• Individual businesses may improve efficiency
• Integrated improvements are better than piecemeal measures
• Regional cooperation (under government leadership) will magnify progress and benefits
• Many other industrial regions are off-and-running; it’s time for Louisiana to join the race