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:

ALLIANCE TO SAVE ENERGY
Creating an Energy-Efficient World

ACE3 American Council for an Energy-Efficient Economy

World Business Council for Sustainable Development

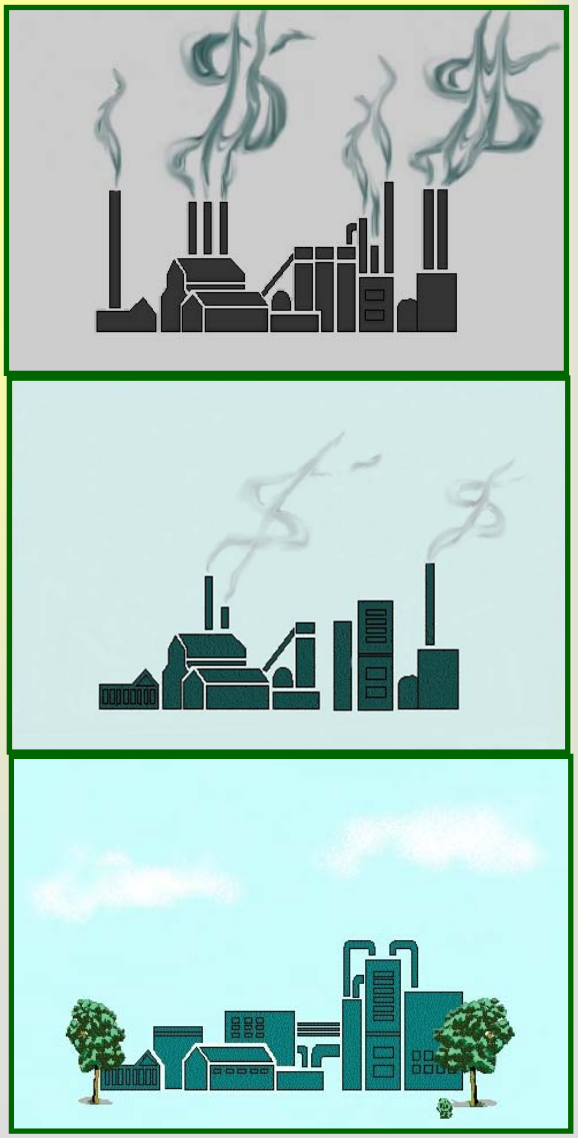
Thanks to Gregory Thurnher, Whiton Paine, and the Booth Bricker Foundation

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

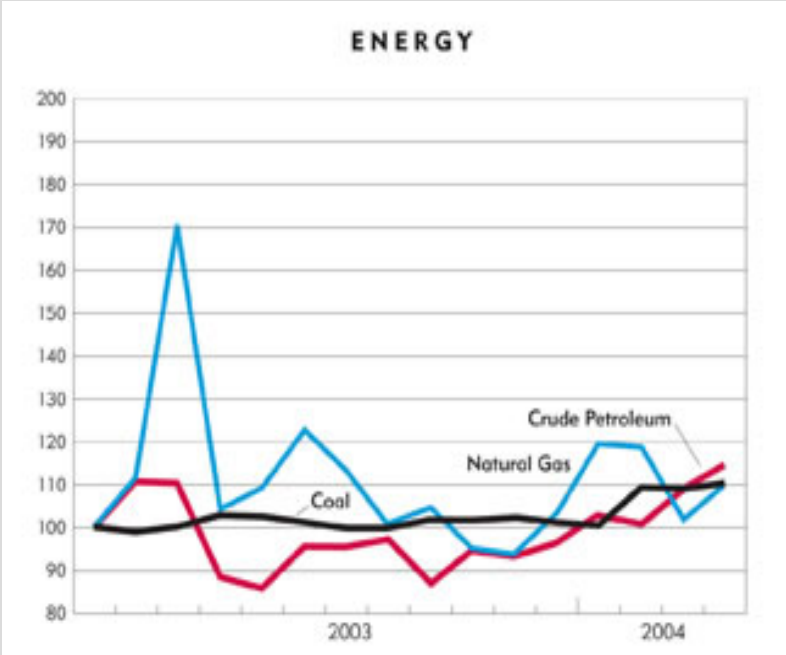
- Reduced resource depletion and pollution per unit of economic activity (More jobs per unit emission)
- Improved supply reliability
- Reduced prices*

- 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

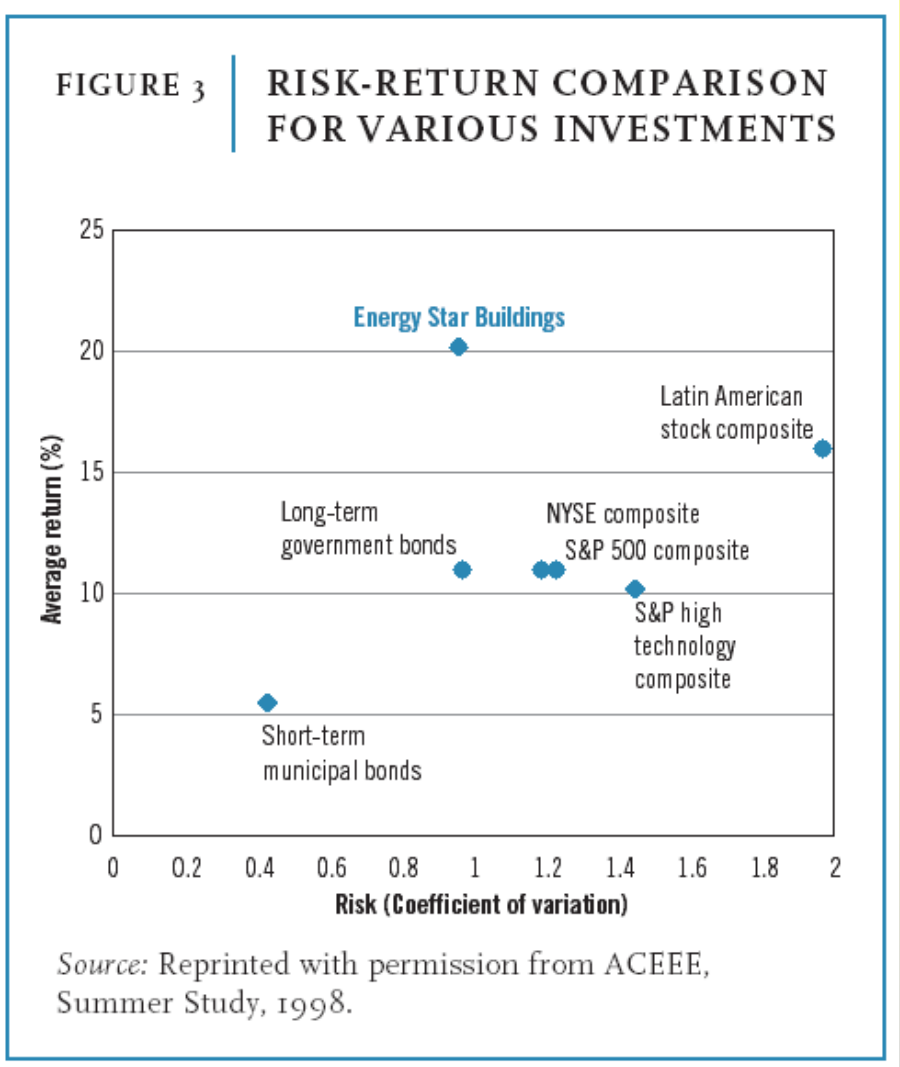
- Energy/Resource Price Uncertainty
  - Complicates planning and financing
  - Threatens/reduces profitability



--Bureau of Labor Statistics

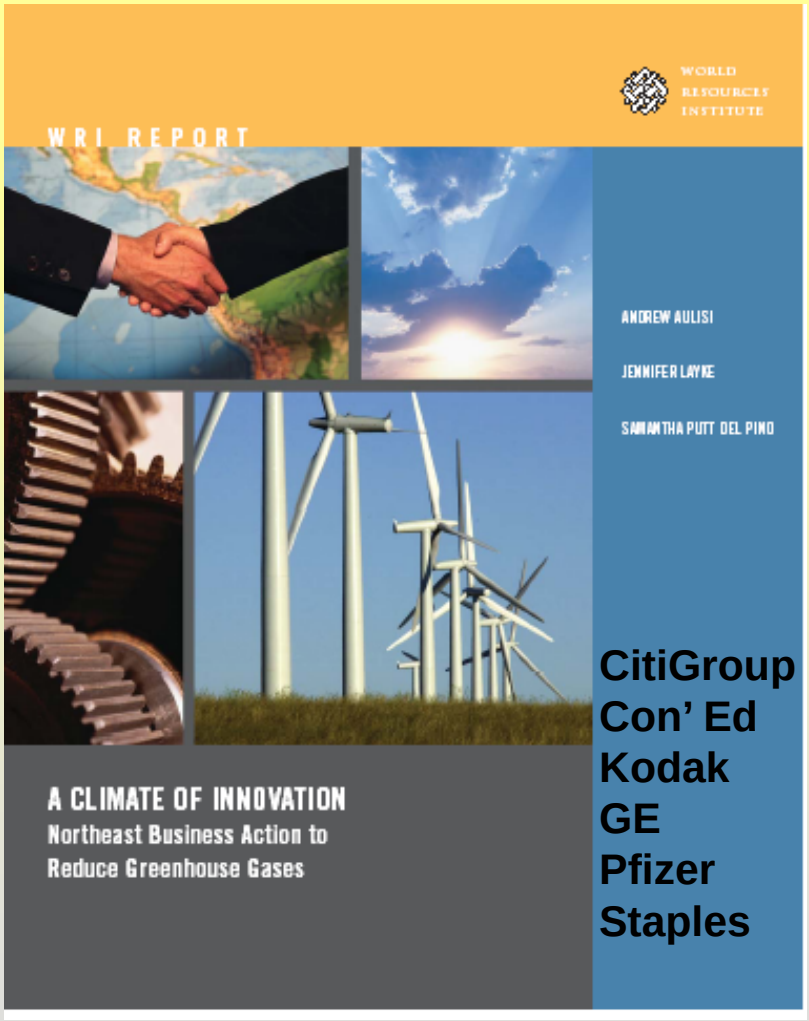
Competitive Drivers

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



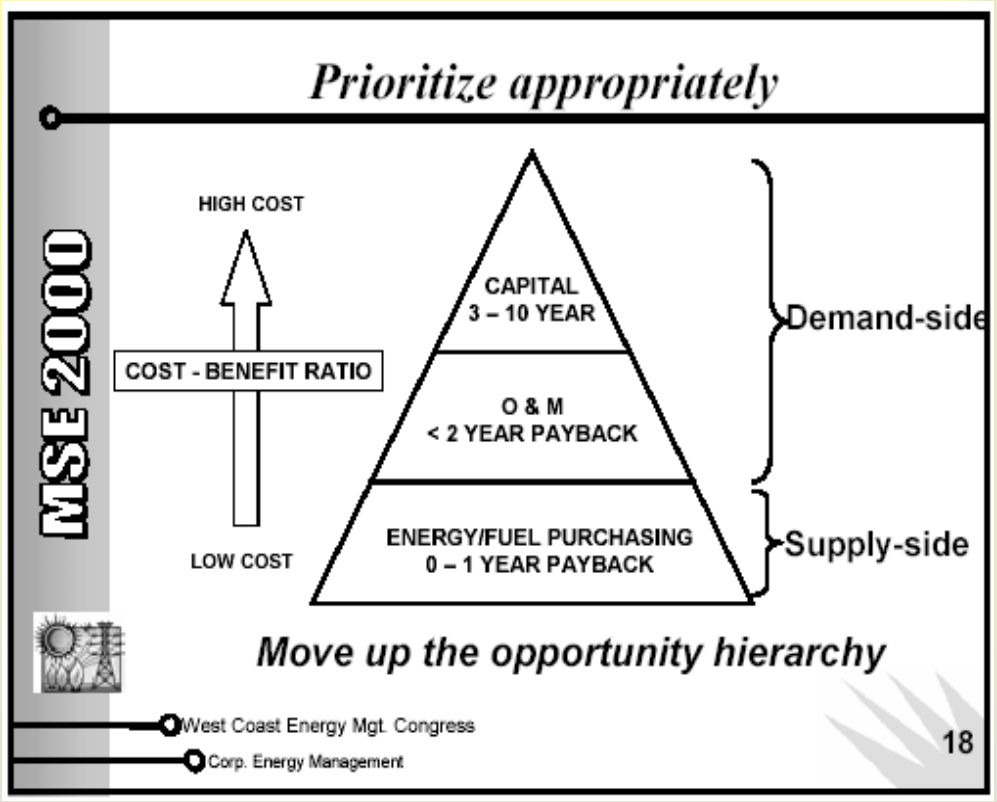
Global Competitive Driver
(Kyoto Wake-up Call)

- 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 Management Systems (ANSI MSE 2000)
- Energy Service Contracts
- Process Efficiency Upgrades
- Combined Heat and Power (Cogeneration)
- Eco-industrial Planning



American National Standards Institute Management Standard for Energy

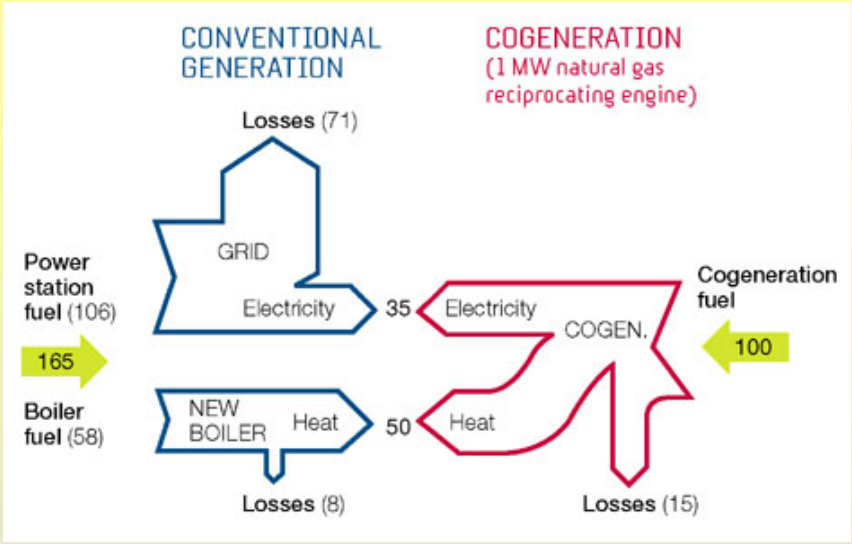
Corporate Efficiency Success Stories

http://www.ase.org/section/topic/industry/corporate/cemcases

- 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

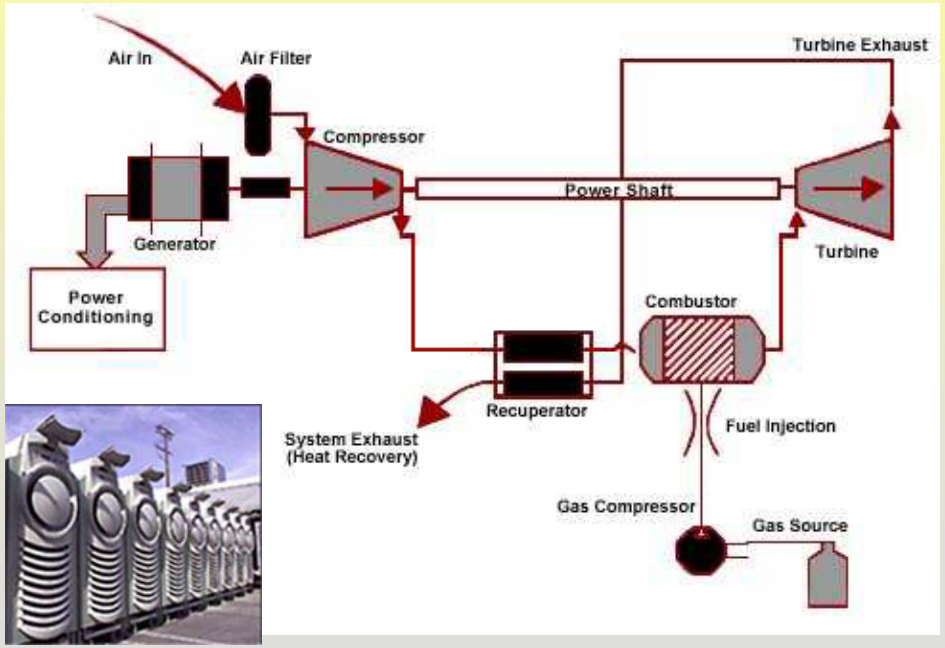
- No Standards for Interconnectivity
- Discriminatory Back-up or Exit Fees
- Air Regulations don't Credit Cogen's Benefits
- Depreciation Schedules are Unfairly Extended

- 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
  - Efficiency20 – 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 Light-weight
- 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

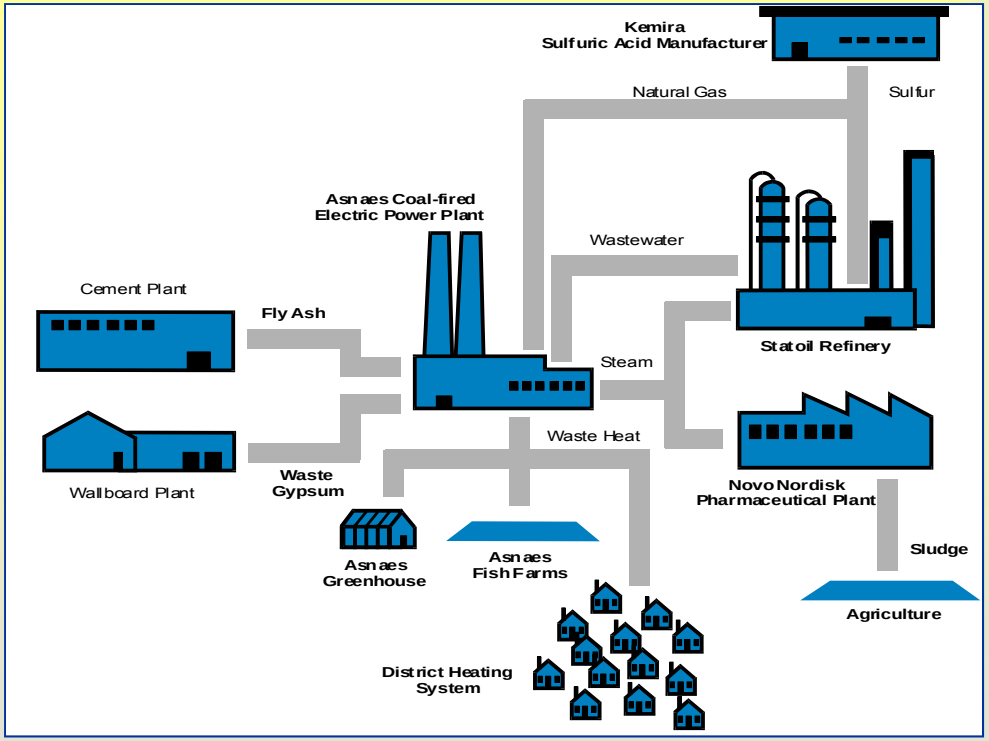
To promote increased future use…

- 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)

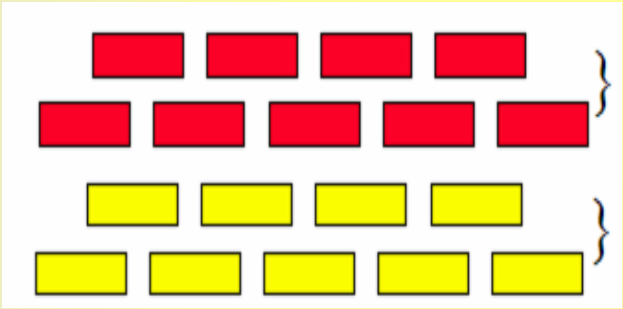


Kalundberg, Denmark…An Industrial Ecosystem

Eco-Industrial Planning:

Attracting New Industry and Jobs, Minimizing Pollution and Resource-use

Evaluate Current and Potential Industries



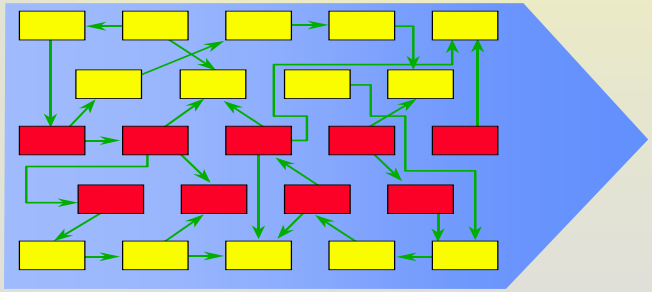
Specific industries now existing in the region of interest, e.g.

- Western Steel Co.
- River Farms, Ltd.
- Best Concrete Products, Inc
- Ace Dry Cleaning

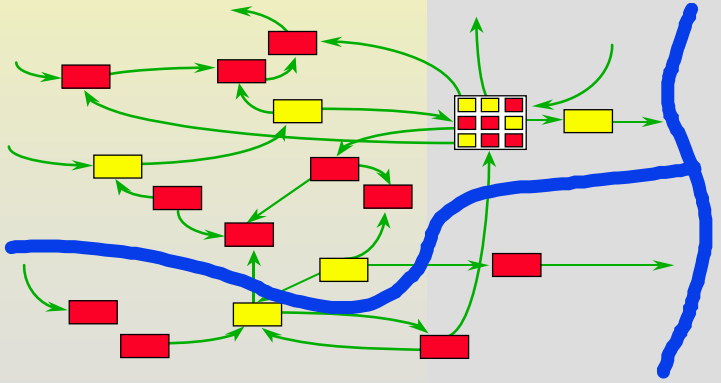
Generic global industries, e.g.

- Paper mill
- Steel mill
- Solvents recycling
- Aquaculture

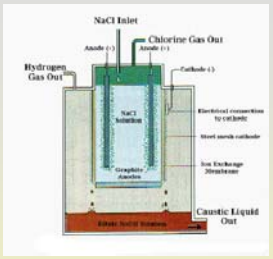
Optimize waste-resource linkages and energy sharing



Formulate and promote regional development plan

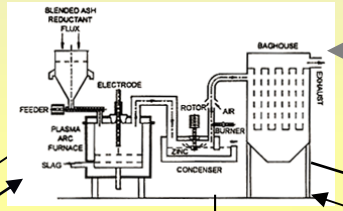


An Industrial Ecosystem For Louisiana



Chlor alkali Plant

Plasma arc furnace



Electricity

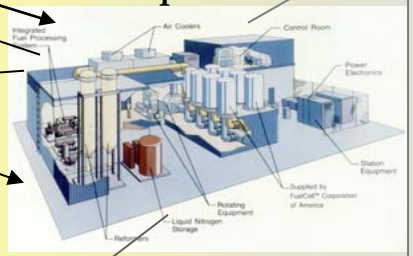
Inorganic residues

Glass

H_2

Fuel Cell plant

H_2O



Electricity

CO

CO_2

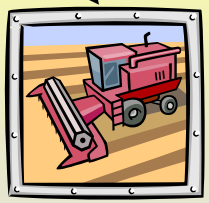
H_2

Materials Processing Center

Green houses

Heat/steam

Organic residues



Compost facility

Worm castings

Organic Produce

Markets

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**