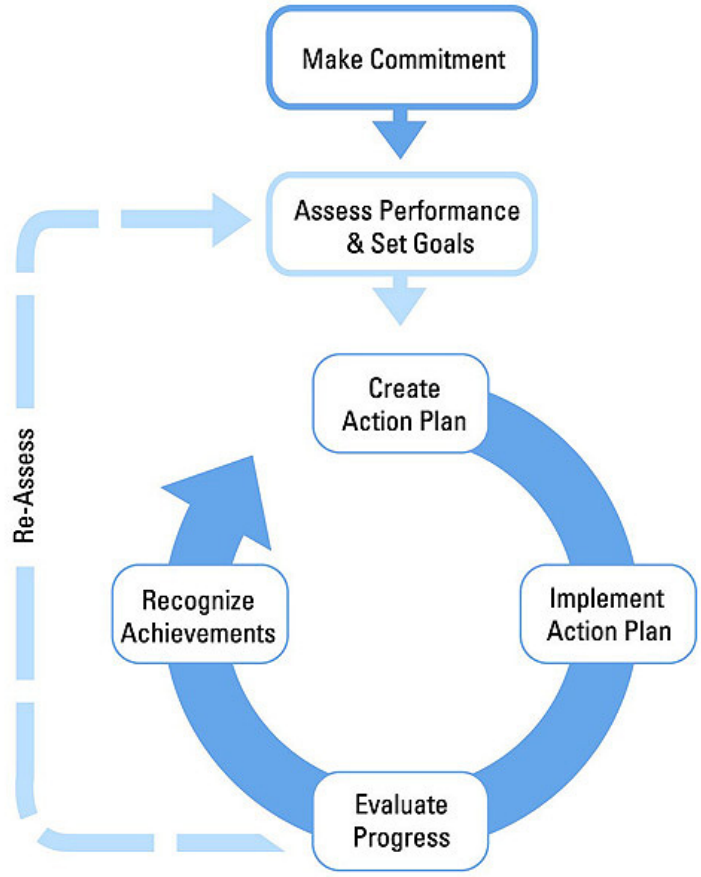
Saving Energy This Winter

ENERGY STAR Web Conference
December 7, 2005

Call-in Number: 1-800-914-3396
Access Code - 9307720

About The Web Conferences

- **Monthly**
- **Topics are structured on a strategic approach to energy management**
- **Help you continually improve energy performance**
- **Opportunity to share ideas with others**
- **Slides are a starting point for discussion**
- **Open & interactive**



Web Conference Tips

- Mute phone when listening! Improves sound quality for everyone.

  Use * 6 – to mute and * 7 to un-mute
- If slides are not advancing, hit reload button or close presentation window and press the launch button again.

Web Conference Tips

- Chat Feature

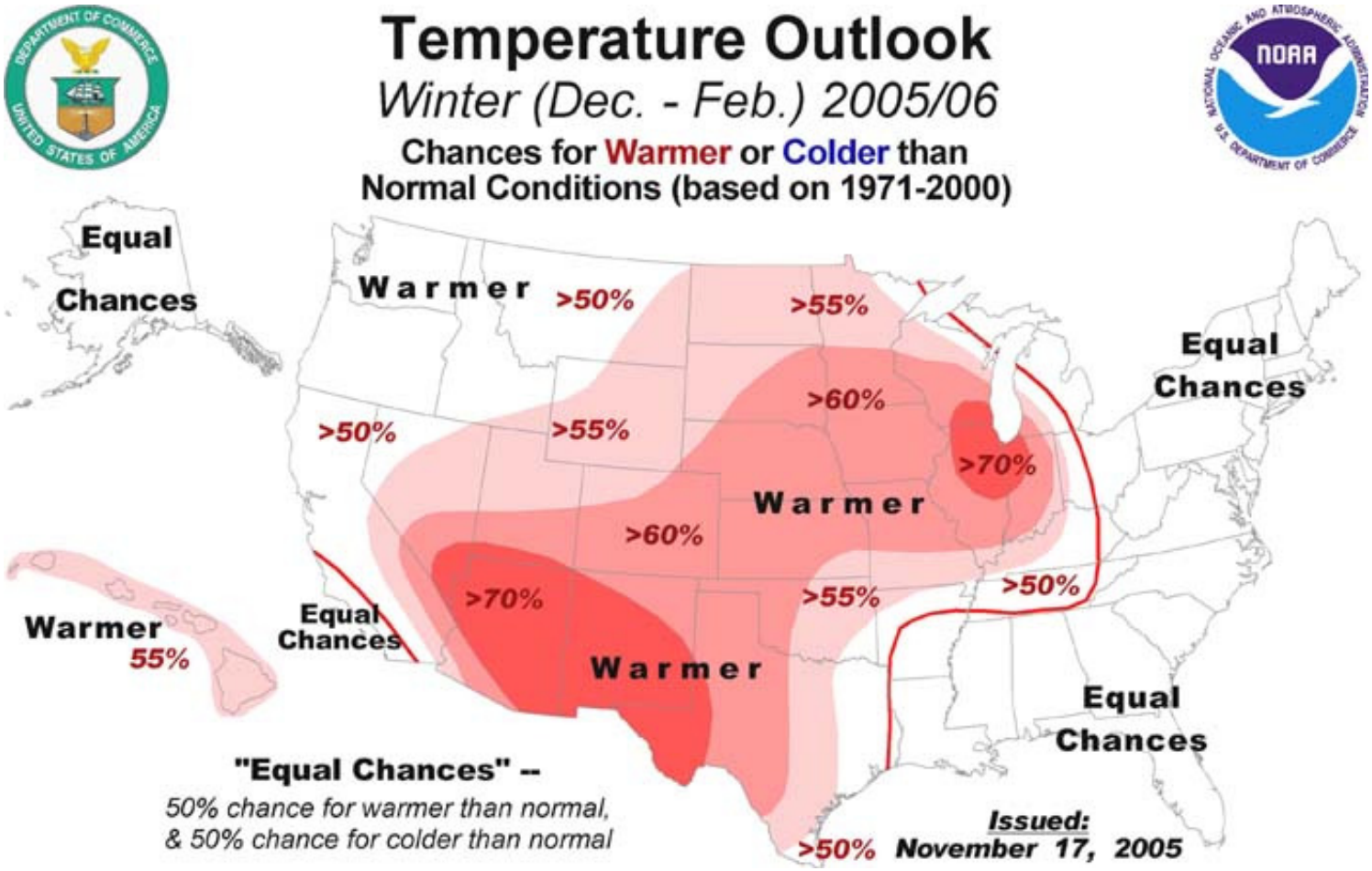
- Presentation slides will be sent by email to all participants following the web conference.

- Hold & Music – If your phone system has music-on-hold, please don't put the web conference on hold!

Background

- High Heating Bills are expected this year
  - Today's USA Today Headline – "Heating bill bump to hit 5-year high"
- Hurricane season added volatility in gas and oil markets
- The days of cheap natural gas appear over

The good news?



Today's Web Conference

Speakers:

- Bob Rose, US EPA ENERGY STAR
- Michael Scorrano, ConEd Solutions

Summary of Tips For Businesses

1. Establish energy use and set a savings goal
2. Inspect equipment and perform monthly maintenance
3. Turn back, or turn off heating equipment when not needed
4. Get the occupants involved
5. Improve lighting systems

   (Waste heat from lighting is an most expensive, least efficient source of heat.)

High energy prices are a new opportunity to instill energy management.

For consumers -www.energystar.gov/index.cfm?c=heat_cool.pr_winter

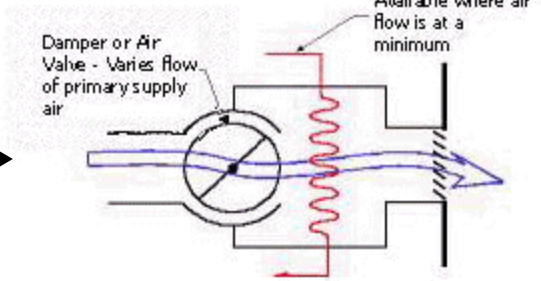
For businesses - http://www.energystar.gov/index.cfm?c=business.bus_winter

VAV Terminal Box w/ Reheat

Supply Fan

Supply Air Typically 55F

Terminal Box



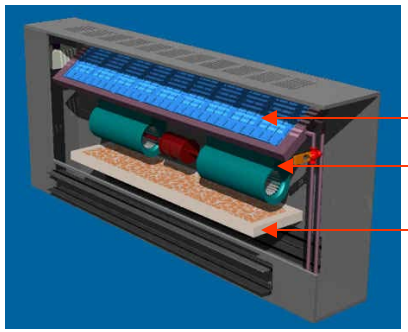
1) Dampers should reach minimum airflow, prior to energizing reheat
   - Ensure minimum airflow is sufficient for IAQ
2) Reset supply air temperature (i.e. increase), prior to energizing reheat
   - Do not be satisfied with the reset schedule because “its always been like that”

Don’t have time to check every thermostat and terminal box?
Tip: Isolate major reheat use by turning off reheat coils for 20-60 minutes (cold spots will arise). Resulting cold spots are those most dependent upon reheat, thus look for equipment problems, supply temperature opportunities, and reasons heating loads may be high.

Images Left to Right: Temtrol, State of Massachusetts

Steam/Hot Water Unit Ventilator

Unit Ventilator



1) Outside air dampers (if present) should be minimum necessary
   - Ensure minimum airflow is sufficient for IAQ
2) Check for filter and coil blockage, broken fans, constrained piping
   - Efficient operation increases comfort, and can pay off further on next slide

Don't have time to check every unit ventilator?
Tip: Isolate the most sensitive areas by reducing the steam/hot water temperature for 20-60 minutes. The coldest "cold spots" are the problem areas, thus look for equipment problems and reasons heating loads may be high.

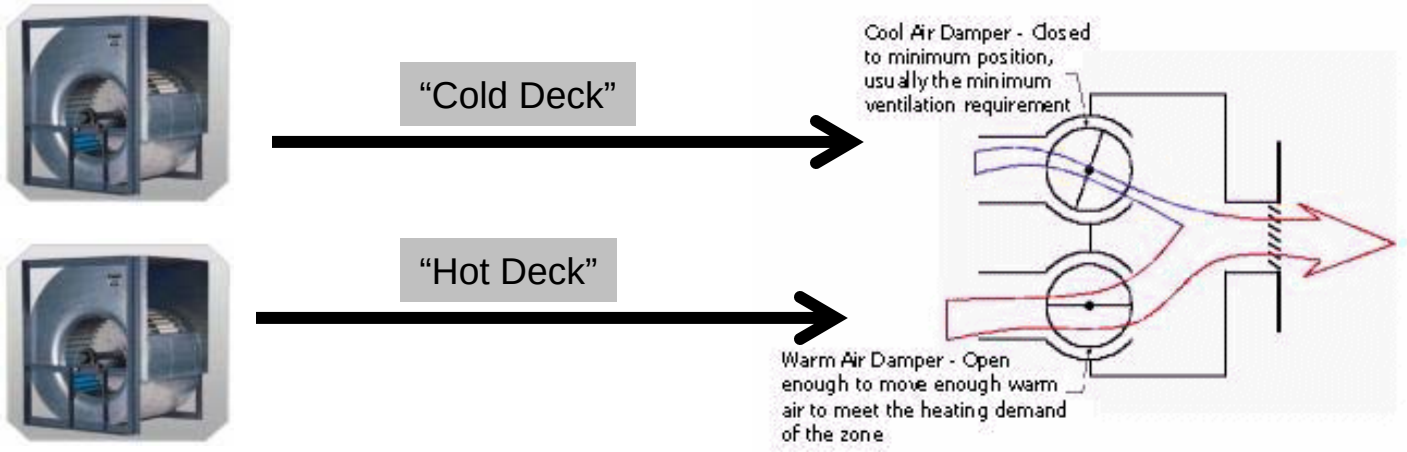
Image: Pasco

Winter Tips And Annual Benefits

Tip: The previous “Tips” isolate the worst trouble spots likely to have equipment problems or unusually high heating loads. If the first pass indeed uncovers trouble spots, repeat the process looking for a second round of trouble spots.

The Potential: There may be just a few unit ventilators that dictate the need for 150F steam/hot water. Once fixed if steam/hot water temperatures can be reduced, line loses and boiler plant efficiency could improve up to 5 percent depending.

Dual-Duct VAV Mixing Box



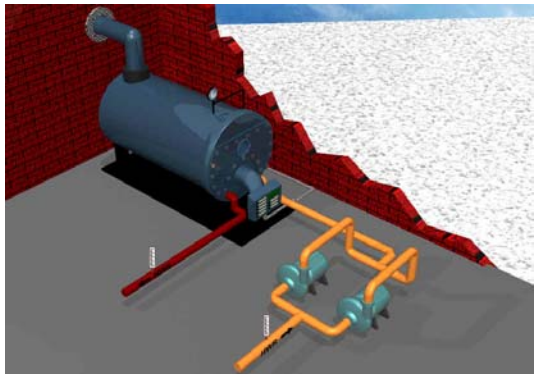
Numerous variations exist including single duct with cooling & heating coil inside the mixing box, varied temperatures instead of air dampers and so on.

All times of the year, an active "cold deck" and "hot deck" equals energy waste.

<u>If you have a variation of this, question every aspect of its operation</u>. If the system still operates as it was originally designed, you are wasting lots of energy.

Images Left to Right: Temtrol, State of Massachusetts

Boilers



- Excess combustion air will become inefficient at some point, insufficient combustion air can drastically reduce efficiency
- Find the furthest heating unit or that one process load that dictates boiler steam pressure, and work to reduce the need thus reduce boiler pressure (same for hot water).
- Minimize “blowdown” (process of purging sludge, and heat!, from the bottom of the boiler), and understand the sources of contamination
- The boiler that operates the greatest number of hours should have a variable load burner (more efficient than on/off operation)
- Steam traps are notorious losses of energy (does anyone have a “tip” to isolate worst offenders without checking all?)

Image: Pasco

Drafty Windows and Doors

Drafty Windows and Doors

- Occupants will be less comfortable
- Occupants will bring in electric resistive foot warmers (the least efficient, most expensive way to heat)
- Thermostats must be set higher than otherwise to maintain an equivalent comfort level
- Related cold spot may dictate overall temperature and efficiency of boiler plant

Cold spots are a signal that something is wrong, and energy can be saved.

Turn It Back or Off When Not Needed

Three reasons heating systems are often not turned back or off

• Potted plants will be harmed? No. As they sit dormant at night potted plants don't mind temperatures down to 32F.

• Will it be too cold in the morning? No. Modern controls make it possible for heating equipment to ramp-up automatically. Small buildings with home-like wall thermostats can be controlled using battery operated ENERGY STAR qualified thermostats.

• Can a heating system be too complex to turn on and off automatically? Yes and no. Many small businesses and schools have complex heating system but are too small to have dedicated maintenance engineers. In such a case a professional contractor is needed to install controls that allow for automatically turning back or turning off such equipment.

Efficient Lighting Is Your Friend

Efficient lighting of course reduces lighting energy, and helps reduce summer time air conditioning energy.

During the winter inefficient lighting will add heat to the building, but in the least efficient manner.

Inefficient lighting displaces more economical sources of energy such as heat pumps and furnaces.

So Remember…

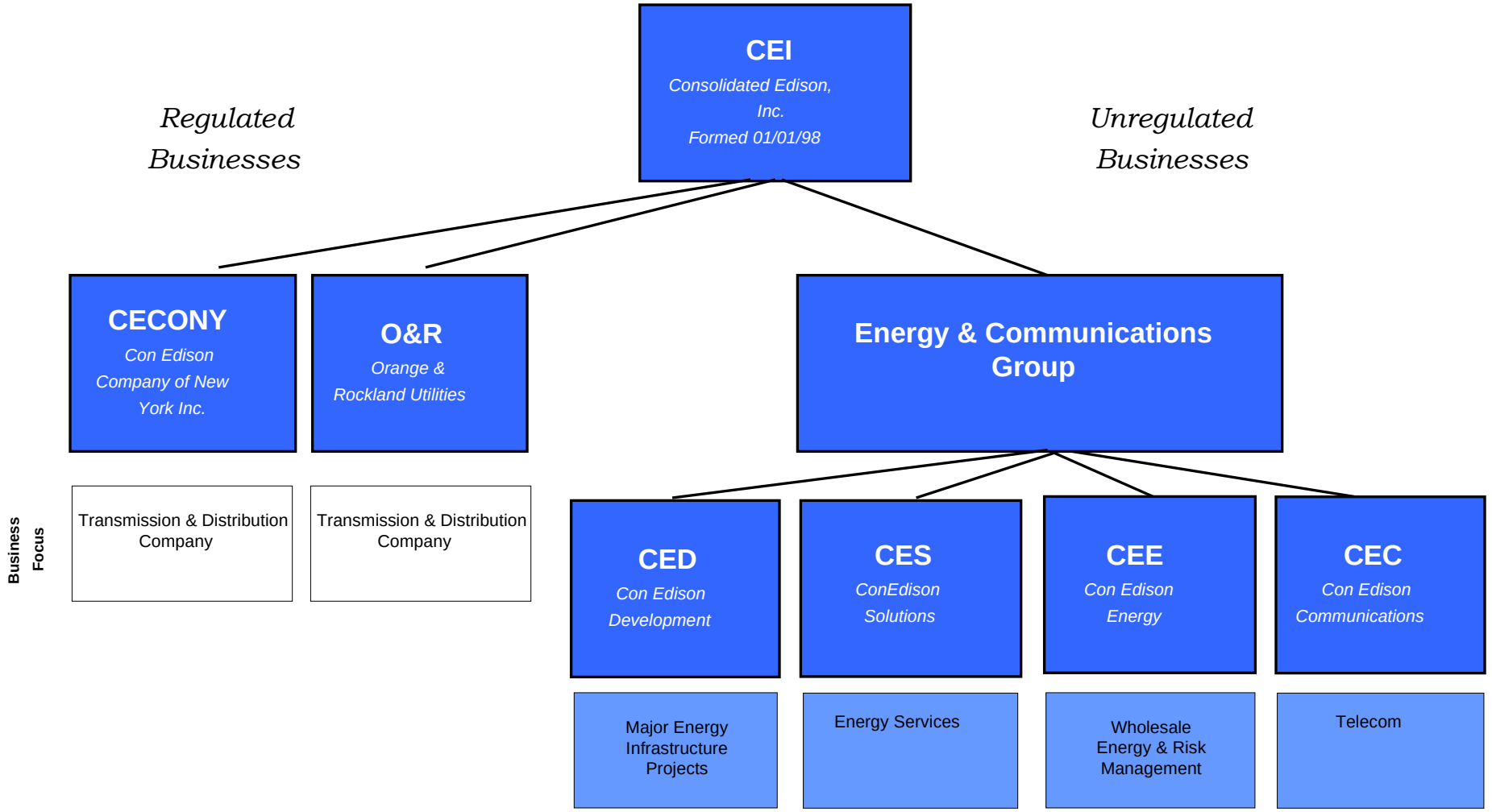
- ✓ Use the tips provided to isolate worst offenders of reheat, potential equipment problems, and unusually high heating loads
- ✓ Cold spots are a signal that something is wrong, which likely can help save energy if addressed
- ✓ For boiler systems first address trouble spots, and then leverage the opportunity for greater energy savings by reducing boiler plant pressure and/or temperature
- ✓ Concentrate on the one process, or the one set of drafty windows, that may in fact dictate the entire boiler plant
- ✓ Address the underlying reasons you may not be turning back heating systems when the facility is not in operation
- ✓ Energy efficient lighting is always a great way to save energy.

Saving Energy This Winter

Michael Scorrano
December 7, 2005

ConEdison Solutions
An Energy Services Company

Corporate Overview



ConEdison *Solutions*

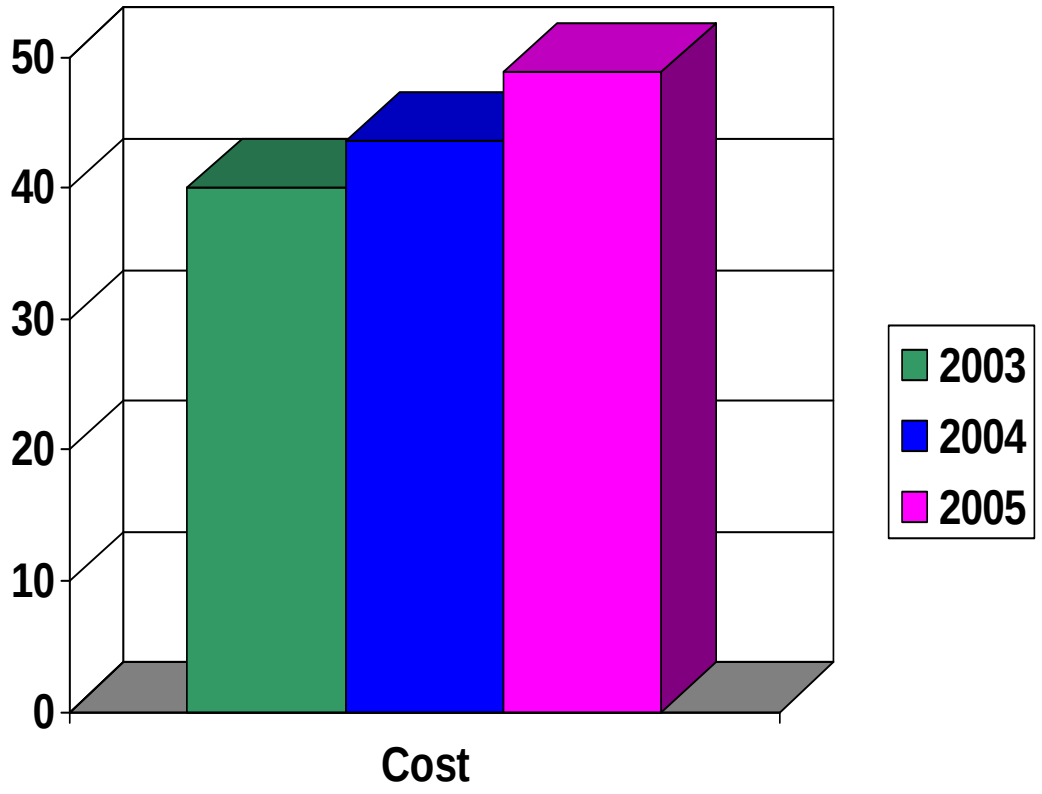
- Retail energy services company, launched in 1998
- Commodity Procurement: Electricity procurement & supply for commercial, industrial, government and mass market customers
  - Fixed and indexed priced contracts
  - Serving customers in NY, NJ, MA, MD, Wash DC
- Energy Services: Consulting and installation services for the upgrade, retrofit, and replacement of building systems and infrastructure to reduce energy and operating costs and improve facility operations
  - Energy efficiency services
  - Energy performance contracting
  - Energy security services
  - Consulting services
- Offices in White Plains, NY; Burlington, MA; Cherry Hill, NJ; Arlington, VA

Current Situation: Rising Energy Costs

Budget Example
(Large Network Hospital)

$40.0M 2003
$43.6M 2004
$48.9M 2005 (1)

(1) Budgeted



Overall Assessment

- Reduction of energy costs to combat current volatility is part of an overall energy management plan
- Not just ….
  - BTU’s
  - kWh
  - Purchase of electricity
  - Reduction of demand
  - Reactionary

Specific Overall Initiatives

- Overall Initiatives
  - Procurement
    - Selecting appropriate suppliers
    - Hedging Program
  - Demand Side Management
    - Utilize existing assets or ability to shift loads
    - Develop new procedures to curtail energy usage
  - Conservation
    - Identify, rank and implement energy saving measures
  - Energy Grants
    - Proactively seek incentives to explore energy reduction
  - Capital Investment
    - Investment in energy equipment that will provide returns greater than core business

Immediate Measures

- Things that can be done immediately
  - Alternative supply (reduced volatility)
  - Fuel switching
  - Set point adjustments
  - Ventilation (reduced outside air, ventilation controls)
  - Boiler efficiency testing and adjustment
  - Operations and maintenance practices (filters, steam traps, clean coils)
  - Participate in a Load Curtailment Programs
  - Education/Training

Specific Measures

- Quick Paybacks (< 2 to 3 years)
    - Lighting upgrades and controls
    - Heating and cooling temperature and controls
    - Ventilation (reduced outside air, ventilation controls)
    - Water conservation
    - Free cooling opportunities
    - Boiler efficiency testing and adjustment
    - Operations and maintenance practices (filters, steam traps, clean coils)
    - Participate in a Load Curtailment Programs (winter or summer)
    - Education/Training
    - Procurement

Specific Measures

- Longer Paybacks (> 2 to 3 years)
  - Heating and cooling upgrades (chiller and boiler replacements)
  - Low grade heat usage
  - Distribution system (VAV conversions)
  - Motor Replacements
  - Variable frequency drives on pumps and fans
  - Energy Information and advanced metering systems
  - Alternative supply – onsite generation (DR, CHP, PV)

Example: New York Presbyterian Hospital

- Background
  - Comprised of 4 Hospitals & 10M Square feet:
  - Affiliated with 2 Ivy League Medical Universities
  - $2.2 Billion in Annual Revenue
  - Ranked 7th Nationwide by US News & World Report
  - EPA Energy Star Partner of the Year
- Energy saving approach and measures
  - Close partnership with Energy Program Manager
  - Energy audits including financial analysis to determine areas of improvements
  - Upgrades have included lighting, central plant, advanced metering
  - Green Building (LEED and GGHC) – beyond energy initiatives

Other Examples

- Commercial Real Estate
  - Energy Efficiency studies
  - Aggressive Procurement
  - Lighting and DSM measures
  - Supply side measures (cost savings or revenue growth)
- Government facilities
  - Policy Initiatives to reduce energy
  - Energy efficiency studies
  - Lighting and DSM measures
  - Supply side measures (cost savings and system reliability)

Key Goals to Overall Energy Management

- Minimize Costs
- Improve equipment efficiency & performance
- Enhance Facility Reliability
- Maximize Existing Assets
- Leverage competitive markets to Hedge Volatility, Manage Risk
- Improve supply reliability & quality through alternate energy sources
- Improve employee performance

Implementation Strategy – Process Driven

Acquire information.

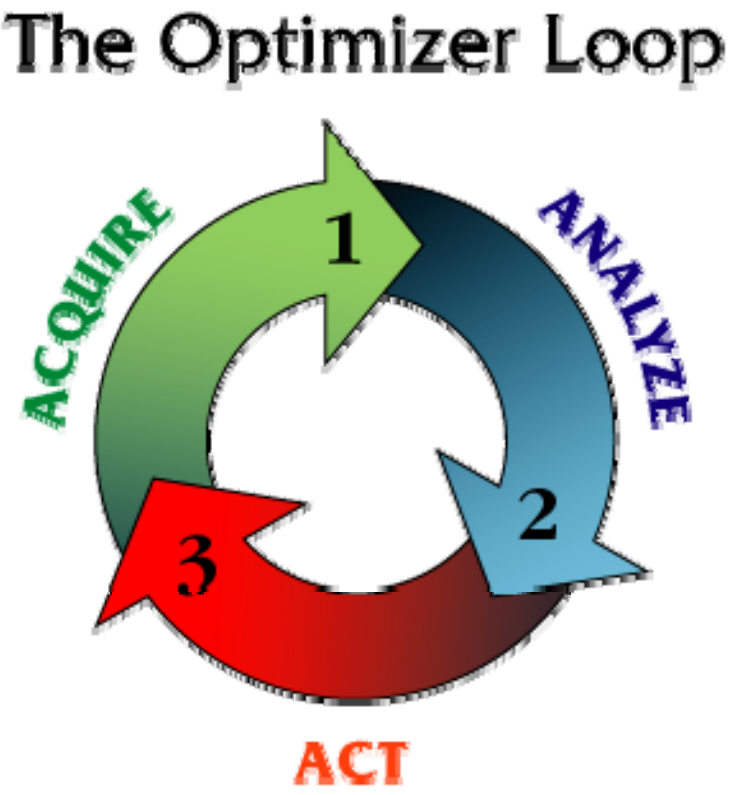
- •Usage, Available Incentive Programs

Analyze information to determine optimum strategy.

- •Strategies and benchmark
- •Identify short and long term plans
- •Break overall strategy into smaller tasks

Act to implement your strategies to meet key goals:

- •Work with key partners to implement
- •Communicate results - Speak in terms of financial metrics, not engineering terms



Work with Partners

- Don’t do it alone
  - EPA (Energy Star)
    - Information and benchmarking
  - Federal, State, and Local Agencies
    - Federal – grants and various investment tax credits
    - State - NYSERDA or other equivalent state agency
    - Local – Reductions of energy cost
  - Utility Sponsored Programs
    - Local and state wide
  - ESCO & consultants

Questions:

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Questions & Comments

Upcoming Web Conferences

January 18 – ENERGY STAR Update

February 15 - Green buildings and energy efficiency.

www.energystar.gov/networking

Thank you for participating!