

Greening the Supply Chain

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Confidential and Proprietary



Brief Background

- Founder and Principal Owner – PWI Energy, Phila., PA
- Acquired by Johnson Controls – July 2008
- Performed 30 – 40 Energy Surveys per Year
- 22 Countries in Last 5 Years
- Negotiated ~\$150M in Utility Contracts per Year
- Developed Web-Based Software to Warehouse: Utility Bills, Carbon Footprint and Energy Projects – Over \$10B in bills from over 95 countries (85+ currencies), over 5,000 projects
- Used by: Dell, Lockheed Martin, Wyeth, Pfizer, Xerox, etc.
- Developed Global Corporate Energy Management Programs for Fortune 500 Companies

Most Common Energy Opportunities

- Outside Air
- Operations
- Compressed Air
- Lighting
- Data Centers
- Fume Hoods

Outside Air

- Most expensive air to treat
- Must be heated or cooled and/or dehumidified almost constantly
- Usually too much is being brought in, especially in DX units – closed dampers usually have 10% leakage
- Economizers should be controlled by enthalpy (combination of temperature and humidity) not just temperature
- Active control using CO₂ sensors
- Shut off completely during unoccupied hours

Operations

- Night set-backs on temperature and air-flow
- Time start/end hours of operation adjusted to ambient conditions
- Raise/lower temperatures
- Reduce electrical peak – move energy intensive operations to off-peak hours, dim lighting
- Set up an Energy Council with buy-in from all affected parties
- Take suggestions and reward any that are implemented
- Posters, occupancy sensors, newsletters,
- Remove unnecessary/redundant equipment – printers, refrigerators, desk heaters and fans, extra lights
- Prevent simultaneous heating and cooling, especially when dehumidification is required
- Heating/cooling recovery when possible

Compressed Air

- Air is not free
- Use ultrasonic equipment to find leaks
- Shut off lines when not in use
- Size all components to match load

Lighting

- Have a lighting contractor perform a survey – usually free consultation
- LED's and T-5 can be huge energy savers and even larger \$ savers in terms of replacement and man hours – 10–20,000 hour lifetimes
- Occupancy and daylight sensors
- Motion sensors in parking lots

Data Centers

- Usually more outside air than required – low population density
- Occupancy sensors in stacks for lighting
- Higher temperatures
- Free cooling when cost effective
- Higher utilization of servers – requires policy change from C-Suites

Fume Hoods

- Sensors to close automatically
- Variable air volume to labs based on pressure
- Reminders to people who leave them open
- Rewards to departments who close them
- Still debates on safe air flows

Results

- 8 – 12% Reduction in energy usage even in fairly well managed facilities
- Can't be one-time event – must be part of an on-going Energy Program
- Keeping everyone involved and informed promotes continued reductions
- A Negawatt is much cheaper to achieve than building a Megawatt

Thank You

- Questions?