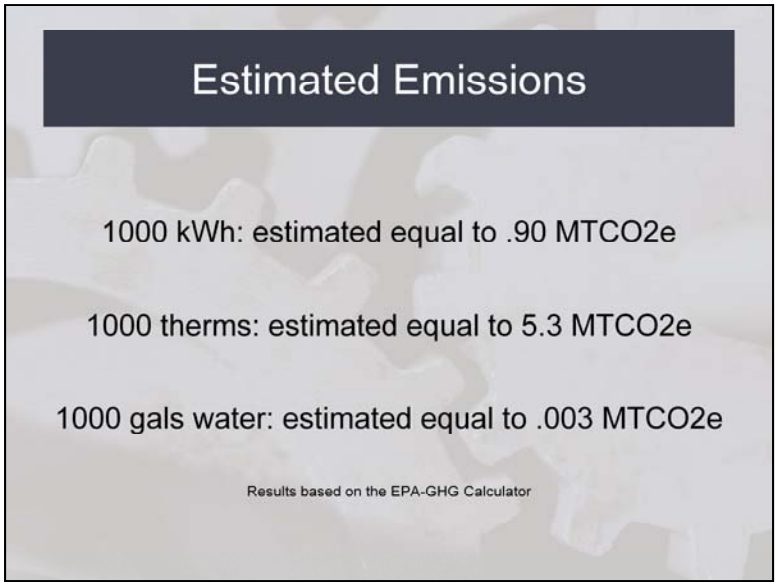
Do you really know the impacts behind your activities?



Handy Guideline using EPA GHG Calculator

1000 kWh: estimated equal to .90 MTCO2e

1000 therms: estimated equal to 5.3 MTCO2e

1000 gals water: estimated equal to .003 MTCO2e

Common areas to investigate

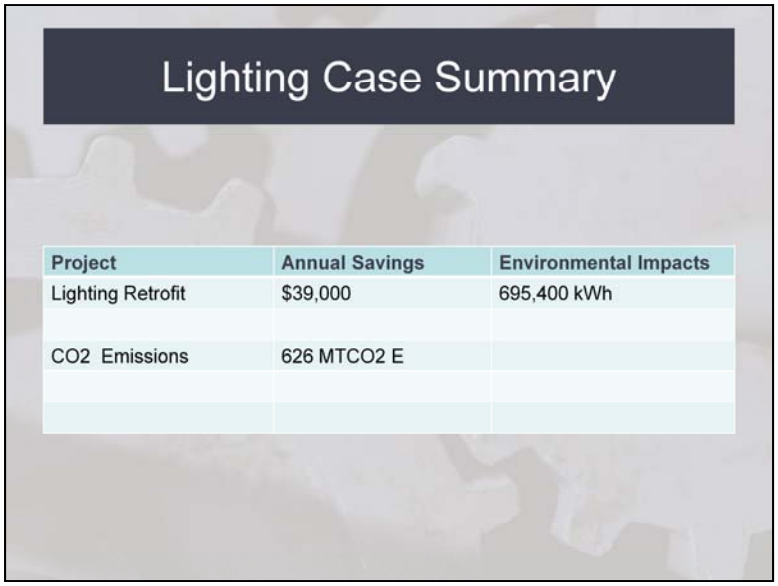
Indoor and outdoor use

Type of control system

Do you have adequate lighting

Do you have the right type of lighting

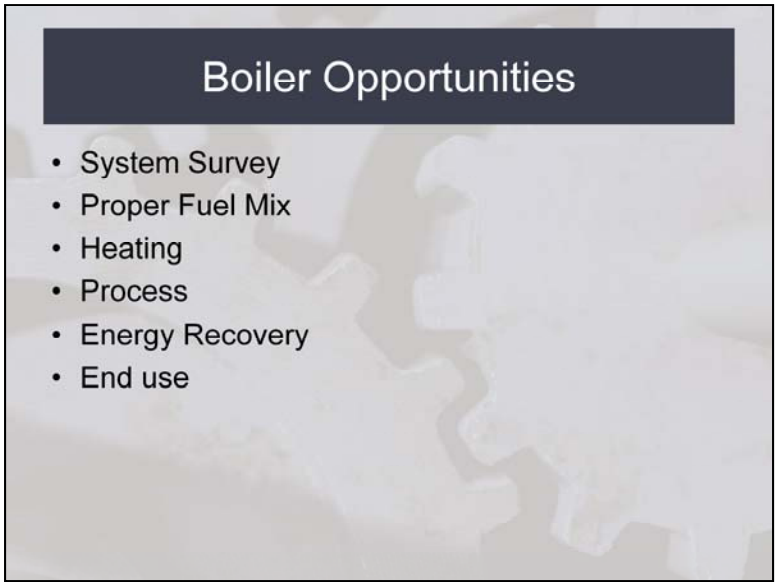
Technology Upgrade



Lighting Retrofit

- The goals of this lighting project are: (1) to increase light levels throughout the facilities, (2) to decrease energy consumption and (3) to utilize utility provider incentives and state-of-the art retrofit fixtures.

- Two out dated lighting technologies were targeted in this project. T12 fluorescent fixtures were replaced with higher efficiency T8 fixtures, powered by electronic ballasts. Incandescent bulbs, which appear in a variety of wattages throughout the two buildings, were replaced with cfls.



System Survey

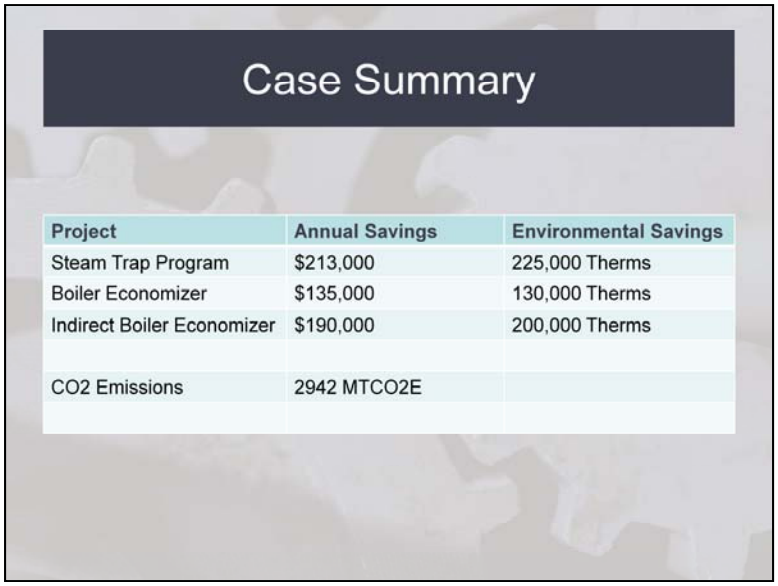
Proper Fuel Mix

Heating

Process

Energy Recovery

End use



- **Steam Trap Program***:* There are nearly 1000 steam traps in this facility. Sample surveys conducted by the employees in the past have shown a 30 percent

  failure rate, but the surveys were never finished.
- **Boiler Waste Heat Economizers:** The plant had three boilers Two boilers are online at any given time meeting the average steam demand. These boilers produce an average stack temperature of 400°F, and current feed water is pumped into the boiler at a temperature of 210°F. Using the waste heat creates an opportunity to save 130,000 therms per year with an annual cost savings of $135,000.
- **An indirect contact condensing economizer** is very similar to a feed water economizer. The main difference is that the water being heated in the economizer would be used in process. This is a more feasible alternative to a direct fire water heater because it eliminates the fear of water contamination. If a condensing economizer were installed, it could raise the efficiency of the boiler up to ten percent and save them 200,000 therms per year with an annual cost savings of $190,000.

Motor Size and CFM Rating

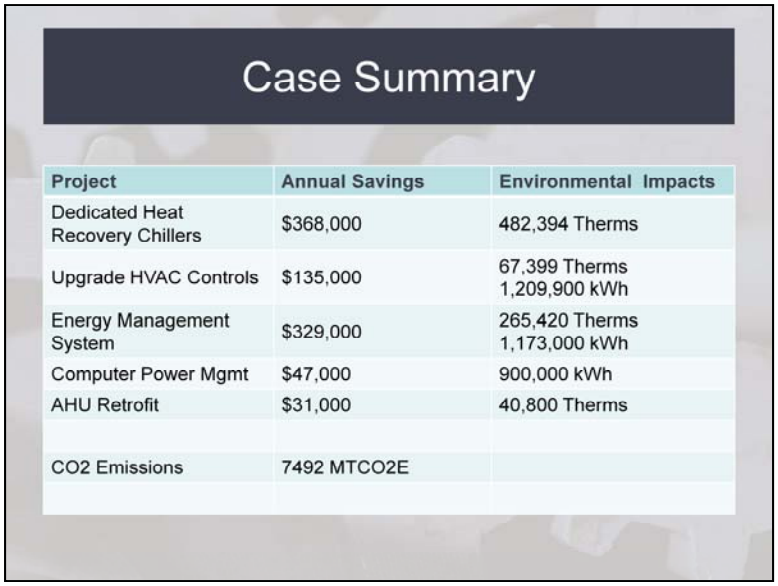
Air Balance Survey

Regulating Conditioned Air Distribution

Stratification

Building Condition

Door Seals and Windows



Dedicated Heat Recovery Chillers: The center's heating, cooling and ventilation (HVAC) system simultaneously heats and cools. Chilled water is produced to first cool the supply air, and then steam is used to heat water, which in turn is used to reheat the supply air. Heat recovery chillers would reclaim the heat dumped into the chilled water lines and use it to reheat the air in the HVAC system, thus producing savings in two areas.

HVAC Controls: Devoted AHUs and electrical loads are operated non-stop at full capacity. However, the actual need for this energy varies greatly throughout the day and drops off entirely during nights and weekends. Using a controls system that can accurately dial up or dial down the energy would result in considerable savings.

Temperature Control and Energy Management Systems: Chilled water and steam appear to be running non-stop and only vary with outside air conditions rather than occupancy. Weekday usage does not vary from weekend usage. Installing systematic temperature controls and an Energy Management System for all floors and areas would enable them to regulate heating and cooling based on work schedules, thus reducing energy wasted during nights and weekends.

Computer Power Management Adjustments: Few of the 2500 computers are set up to make use of built-in power saving modes. By changing the computers' operating parameters to allow them to enter hibernation while workers are not in the building, roughly 100 watts of demand per computer could be saved during off-work hours.

Lighting Sensors in Unoccupied Spaces: Mechanical rooms, elevator control rooms, stairways and circuit breaker rooms are unoccupied most of the time, yet lighting is typically left on in these areas constantly. If occupancy sensors were installed, the lights would draw power only when necessary.

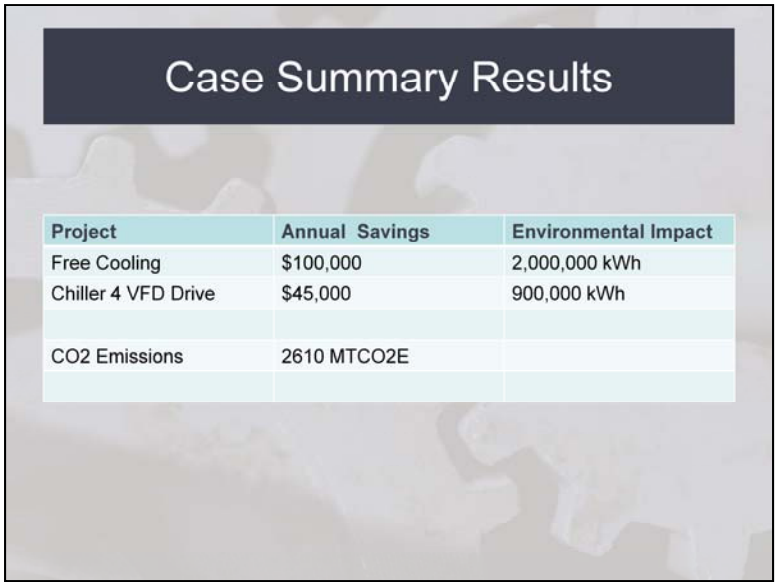
Demand Survey End Use

Is it Sized Correctly?

Does the Control System require a Technology Update?

Survey Energy Losses

Would VFD Motors Reduction Demand?



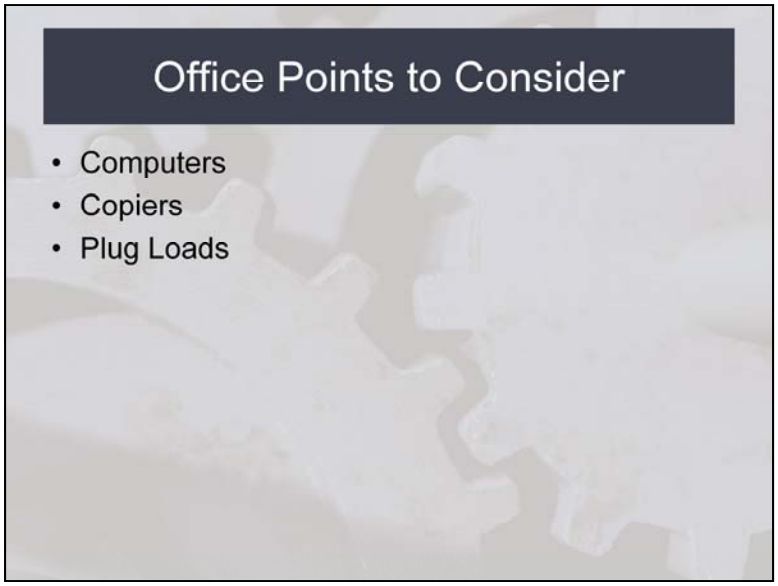
Chilled Water System Optimization:

- **Is free cooling practical for your facility? This covers a chiller installation of various age units.**

In the course of investigating free cooling, alternative optimization strategies may be identified. The use of variable frequency drives (VFD) .

Small changes in drive efficiency could result in significant energy reduction, given the large number of annual chiller run hours.

- **Some of the chillers used a soft-start mechanism before elevating the compressor drive shaft to a full, fixed speed. Reducing chilled water output capacity is based upon internal chiller valve manipulation. Upgrading the current compressor drives to variable frequency drives would allow the compressor to control the chilled water output, thus preventing wasted energy at times of reduced chiller demand. .**



Computer age and method of use

Copy machine age

Plug Loads, fans, heaters, chargers, refrigerators, vending machines

Questions

Chuck Geguzis
Facilities Engineer
Pollution Prevention Services
Iowa Department of Natural Resources
(319) 331-1527 (phone)
chuck.geguzis@dnr.iowa.gov
www.iowap2services.com