

# Energy Audits

## Bring Energy and CO2 Reductions

***Jim Schifo, P.E., Vice President  
KERAMIDA, Inc***

***17<sup>th</sup> Annual Pollution Prevention Conference  
Indianapolis Indiana – September 17, 2014***



# Outline

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## » Drivers

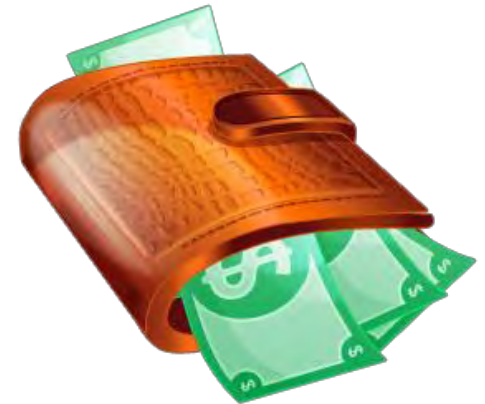
- Why be concerned about energy?
- Regulatory Issues
- Voluntary Programs

## » Facility Audit Choices

- Objective
- Process
- Reporting Results

# Drivers

- Regulatory – Greenhouse Gases
- Environmental Management Systems
- Energy Management Systems/ISO 50001
- Sustainability and Greenhouse Gases
- **Dollars \$\$\$\$\$\$ -- Not necessarily the same as issues listed above.**



# Regulatory – Environmental (Direct Emissions)

## » Greenhouse Gasses (GHG) as Pollutants. (CO<sub>2</sub>e – Carbon Dioxide Equivalent)

- GHG were required to be tracked and reported to EPA starting with the 2010 Calendar Year at 25,000 tonnes/yr CO<sub>2</sub>e based on actual emissions. 2010 use reported in 2011.
- Landfills reported GHG emissions in 2012.
- Quantifying GHG will in itself bring attention to emission levels.
- Metric? Really?

# Regulatory – Environmental (Direct Emissions)

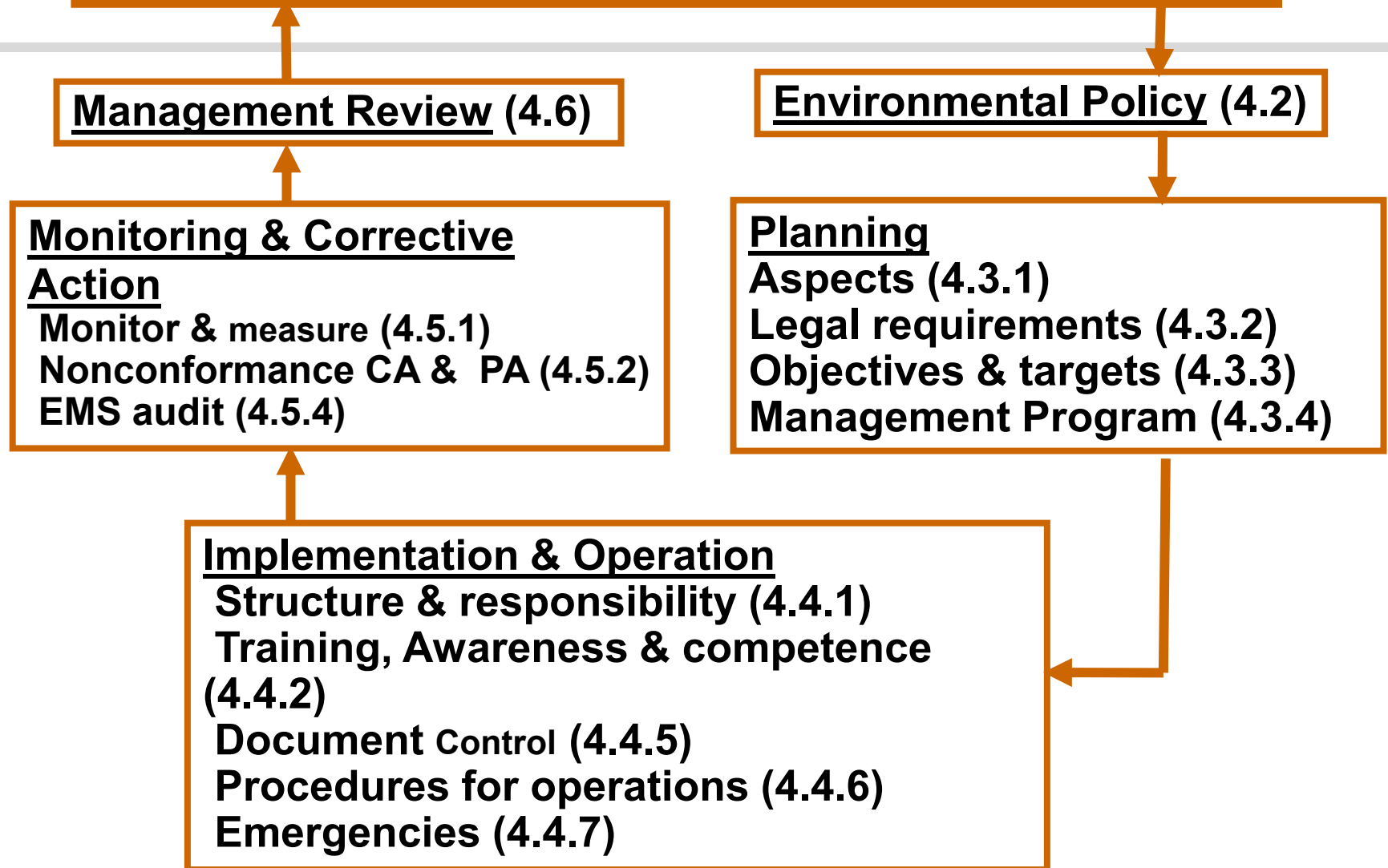
## » Greenhouse Gasses (GHG) as Pollutants. (CO<sub>2</sub>e – Carbon Dioxide Equivalent)

- ~~○ GHG are pollutants subject to Title V and New Source Review (NSR)/Prevention of Significant Deterioration (PSD) at 100,000 tons/yr CO<sub>2</sub>e. Potential Emissions as of January 2011.~~
- ~~○ Title V applications or enforceable limits to reduce PTE GHG must have been in place by July 1, 2012 to avoid major source permitting.~~
- Absent guidance on the status of GHG in permitting, GHG can still be considered through existing programs in evaluating options for control options.
- Recently enacted Boiler and Process Heater rules require energy audits as a part of the required rule implementation.

# Environmental Management System (EMS)

- Most facilities have a system/procedures in place to meet their environmental responsibilities. Social as well as regulatory.
- An Environmental Management System (EMS) is a formal/documented system to insure a system is in place to address these responsibilities.
- ISO 14001:2004 is an international standard to address and certify the EMS requirements.
- EMS is required of suppliers to certain industries such as automotive manufacturers.

# EMS CONTINUAL IMPROVEMENT



# Environmental Management System (EMS)

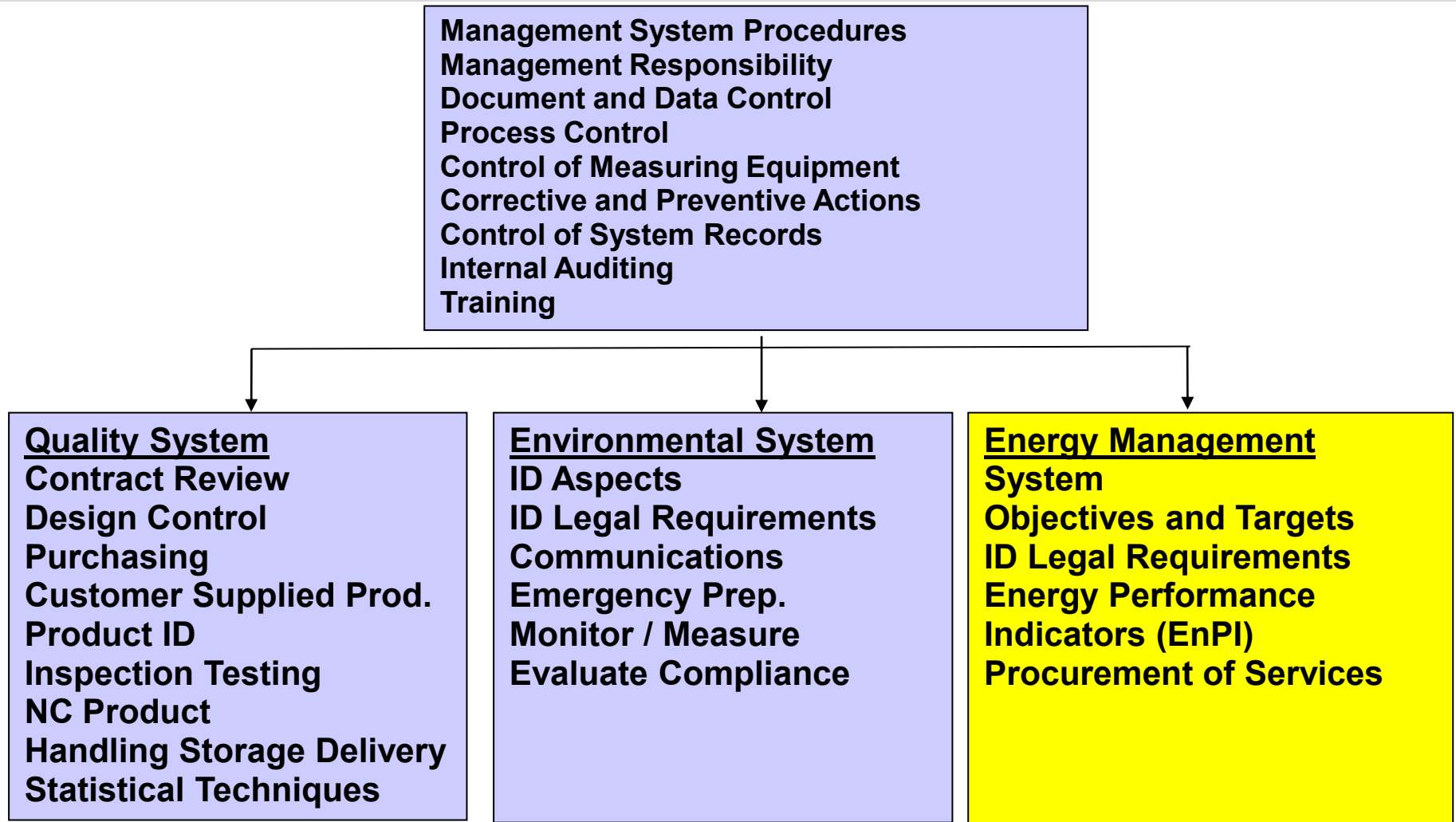
- » EMS systems address a wide variety of environmental issues.
- » Environmental issues include energy use, consuming natural resources and air emissions of all forms, including GHGs.
- » Other areas addressed also have energy impacts such as reducing waste, raw materials, and energy in many forms.
- » Costs are considered one of the methods of setting priorities for potential projects.



# Energy Management System (EnMS)

- » Most facilities have informal methods of addressing energy use.
- » An Energy Management System (EnMS) is a formal/documented system to insure a system is in place to address these responsibilities.
- » ISO 50001:2011 is an international standard to address and certify the EnMS requirements.

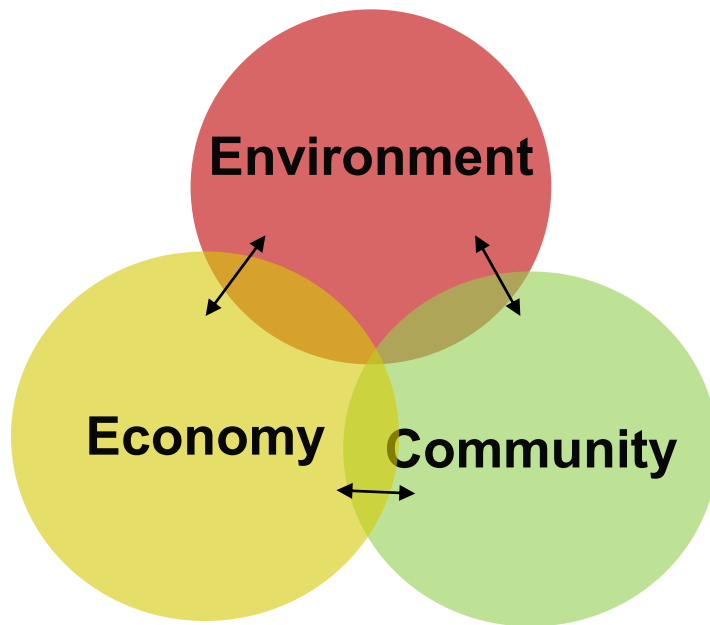
# Integrated Management Systems



# EnMS System Content

- EnMS addresses areas of energy consumption, including purchases, baseline determination (audit and analysis), uses, goals, etc. Not as prescriptive as ISO 9001:2008 but more so than 14001:2004.
- Elements of the EnMS are very similar to some types of energy audits but are ongoing processes.
- A formal registration process is required by the ISO standards.

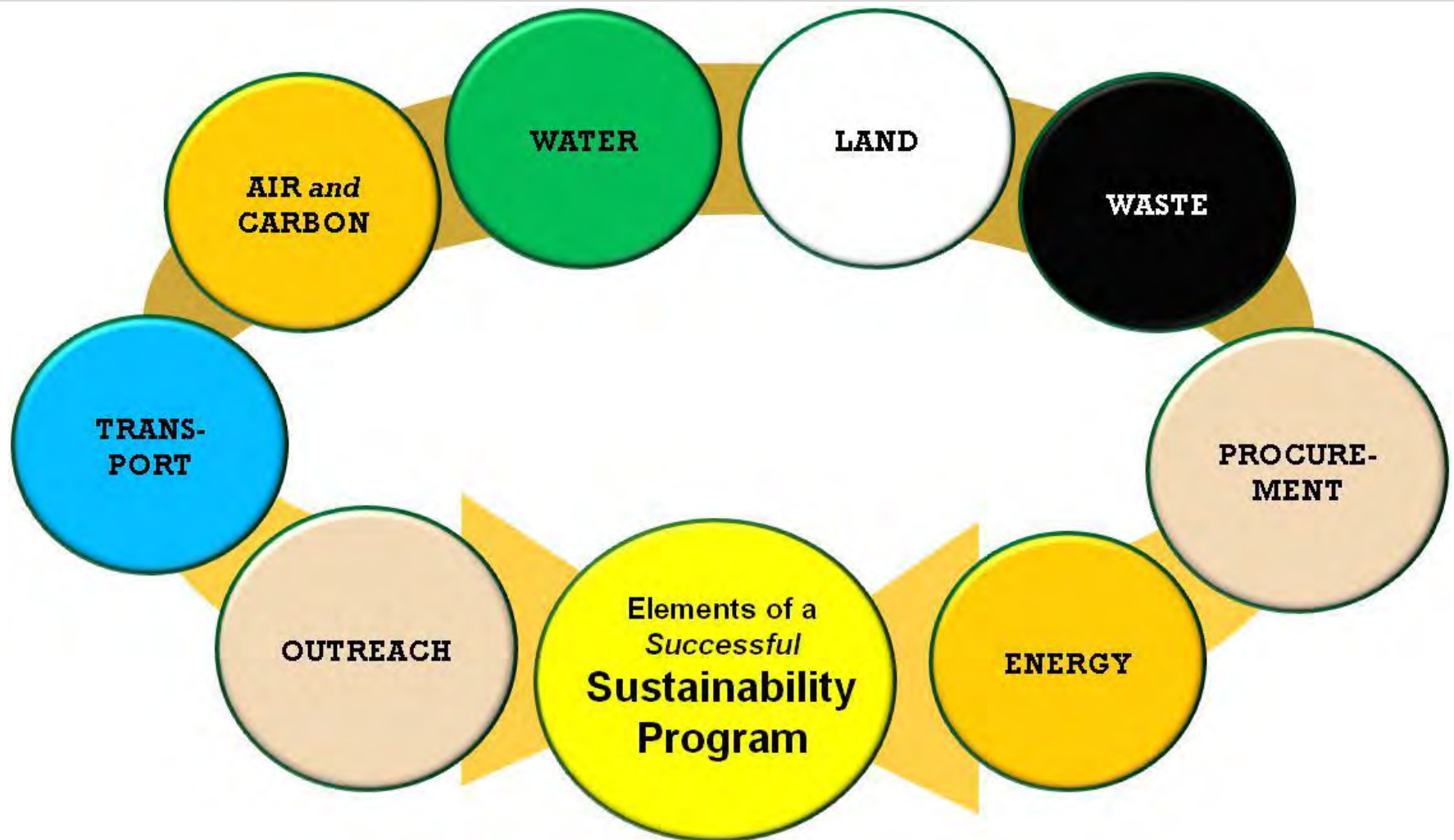
# What? Sustainability/Sustainable Development



**“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”<sup>1</sup>**

**-Brundtland Commission**

# Sustainability Program Scope



# Energy Audits

## Determine Facility Needs

- Energy Audits or Management Programs need to address the needs of the facility. What are you needs?
- Is it implemented to meet international standards? EPA inventories? Cost savings programs? Greenhouse Gas reductions?
- The goals of the programs need to be determined to decide how to approach the process. Energy audits might be the end results of your efforts or a part of a larger energy management program.

# Determine Facility Needs

- The type of program will also determine the impact on the organization.
- Will the plant personnel be implementing and maintaining the program? (EMS/EnMS/Sustainability, Regulatory) Or implementing the results of a third party energy audit. Or incorporating these results into an EnMS program.
- Will third party audits/involvement be used to facility an in-plant energy management system.

# Determine Facility Needs

- Consultants can be used to assist in implementing voluntary or regulatory programs by training plant personnel in the procedures/protocols necessary to run the programs internally.
- Consultants can also be used to conduct specific energy audits of facilities as a part of a management system or as a stand alone audit process.
- The energy audit process can be a “walk through” or a more detailed process including capital costs and savings. (ASHRAE Level 1, 2, and 3)



# Pick Your Program

- Determine your facility needs
- Expand on existing programs – EMS, EnMS, Corporate or Local Programs
- Hire third part assistance to either facilitate the process or perform a detailed energy audit with goals and suggested changes.
- Use existing programs provided by local universities
- Many existing resources are available to assist you.
  - Department of Energy – Benchmarking/Assessment Software
  - US EPA
  - IDEM

# Facility Audit – Typical Findings

## » Envelope

- Improvements in Glazing
- Air Curtains
- Addition of Insulation
- Repairing Leaks

## » HVAC

- Adding Economizers
- Improving Controls
- Setting Temperature Resets
- Adding Variable Speed Drives
- Retro-Commissioning
- Replacing Aged Equipment
- Deferred Maintenance

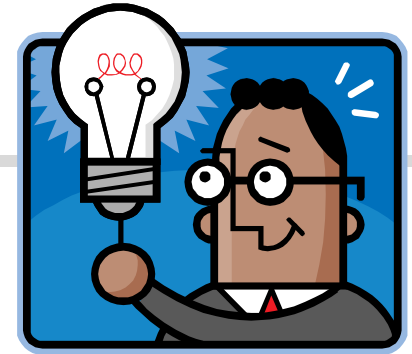
## » Lighting

- Delamping/Daylighting
- Adding/Improving Controls
- Changing Bulbs/Fixtures

## » Domestic Hot Water

- Insulating Pipes
- Repairing Leaking Fixtures
- Replacing Equipment

# Facility Audit – Typical Findings



## » Compressed Air

- Reducing Setpoint
- Eliminating Uses
- Repairing Leaks
- Replacing Equipment
- Scheduling Equipment

## » Refrigeration

- Adjusting Setpoint
- Adding Refrigerant Controls
- Improving Heat Rejection

## » Industrial Processes

- Rescheduling Processes
- Eliminating Unnecessary Processes
- Implementing Standby Modes
- Replace energy intensive processes
- Reformulate products

## » Laundry/Food Preparation

- Reducing Setpoints
- Improving Controls



# Questions/Comments

**Jim Schifo, PE**  
*KERAMIDA, INC*  
*jfs@keramida.com*  
*(317) 685-6600*