



KPPC - Kentucky Pollution Prevention Center

# **Evolving Pollution Prevention: From Grass Roots to Suits**

**15th Annual Pollution Prevention  
Conference and Trade Show**

**Making P2 Work for You**

**September 20, 2012**

**Cam Metcalf**

*Executive Director*

# Today's Presenter from KPPC



**Cam Metcalf**  
*Executive Director,  
KPPC*

# What is KPPC?

- KPPC is a non-profit organization established by the General Assembly in 1994 through a state legislative mandate
- Provides technical assistance & outreach programs to Kentucky businesses and industries
- Based at the **U of L J.B. Speed School of Engineering**
- Mission:

KPPC is Kentucky's primary resource to help businesses, industries and other organizations develop environmentally sustainable, cost-saving solutions for improved efficiency.

# Key Elements for a Sustainable World: Energy, Water & Climate Change





# The Big Squeeze is on!

**There is a global business environment!**



## Public Concerns

### Environmental

Water, Climate, Resources  
Life Cycle Management

### Social – “Interested Parties”

Responsibility & Roles  
Transparency  
Accountability

### Core Values

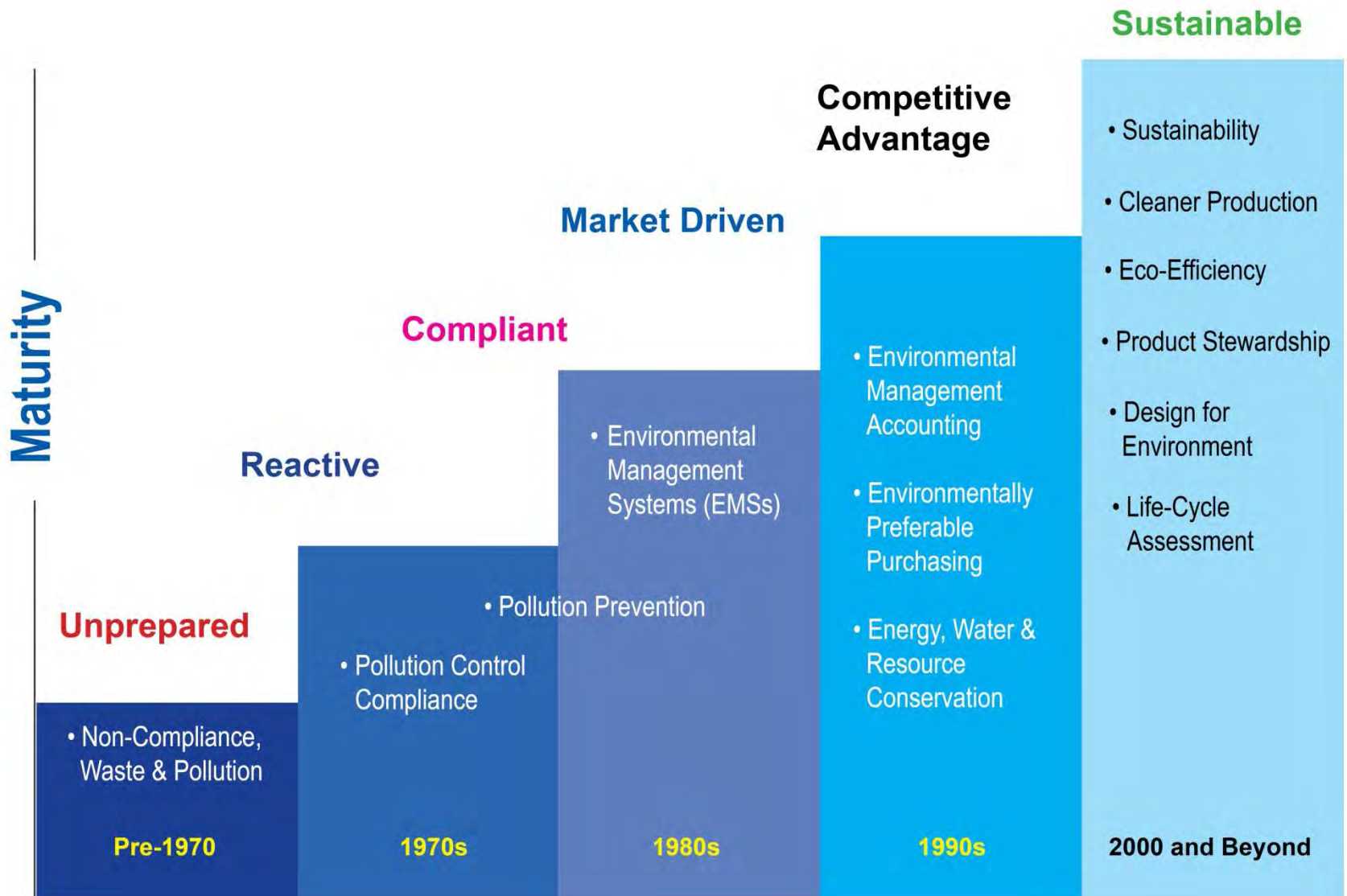
Corporate Values  
Leader’s Values  
Societal Values

# Our “Universal Backyard”



- ☐ **NIMBY**
- ☐ **NOTE**
- ☐ **BANANA**
- ☐ **CAVE**
- ☐ **NOPE**

# Evolution of Business



# Evolving Definitions & Programs

## Waste Minimization (WM)

- The reduction, to the extent feasible, in the amount of *hazardous waste generated* prior to any treatment, storage, or disposal of the waste. Because waste minimization efforts eliminate waste before it is generated, *disposal costs may be reduced*, and ...

## WM Program-in-Place

- 40 CFR 262.27(a): “I am a large quantity generator. *I have a program in place* to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable...

## Innovative & effective approaches to WM, including:

- Lean Manufacturing
- Energy Recovery
- Environmental Management Systems (EMS)
- Green Chemistry



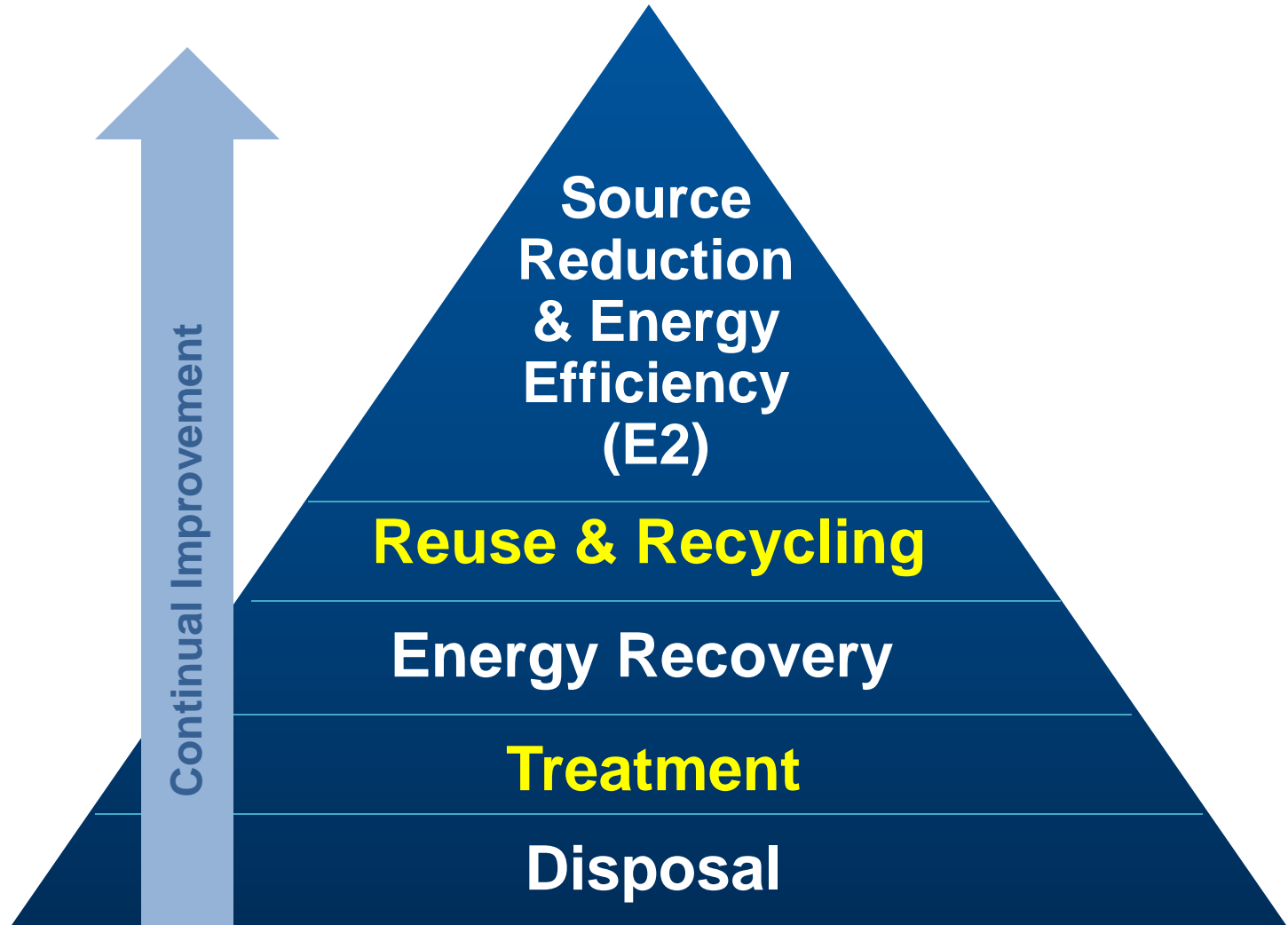
# Pollution Prevention Definition

Pollution Prevention means “Source Reduction” and other practices that reduce or eliminate the creation of pollutants through:

- increased efficiency in the use of raw materials, energy, water or other resources, or
- protection of natural resources by conservation.

***Resource Management***

# Proactive Planning: Move Up the Hierarchy



# Pollution Prevention (P2) is Multi-Media

✓ **W**ater

✓ **A**ir

✓ **S**olids

✓ **T**ime

✓ **E**nergy Efficiency (E2)

## Environmental Management System (EMS)

- “An EMS is a *continual cycle of planning, implementing, reviewing and improving the processes* and actions that an organization undertakes to meet its business and environmental goals.”



# Identify How You Affect the Environment



What activities can interact with the environment?  
(ASPECTS)

What change to the environment occurs from activities?  
(IMPACTS)

# Environmental Excellence!

Is everyone working from the latest “how we do things” procedures?

***SAY WHAT YOU DO,  
DO WHAT YOU SAY!***

***IF IT MOVES, TRAIN IT!***

***IF IT DON'T MOVE, CALIBRATE IT!***

***BUT NO MATTER WHAT YOU DO,  
DOCUMENT IT!!!***

# Superior Energy Performance Strategy

- Foster a corporate culture of **continual improvement** in energy efficiency
- Use **ISO 50001** standard as foundational tool for energy management
- Establish a **tiered program** that provides an entry point for companies at all levels of experience with energy management
- Create a **verified record** of energy performance improvement.
- Potentially **create value** for corporate energy savings and carbon reductions in utility, state, regional, national, and international trading markets





# Getting Superior Energy Performance Certified

## Certification Requirements:

An ANSI-ANAB accredited Verification Body will conduct a third-party audit to verify that the following requirements are met:

1. Conformance to ISO 50001 Energy Management Standard
2. Energy Performance Improvement



ISO 50001 is a foundational tool that any organization can use to manage energy.

**ISO 50001**  
Components in place:

- Baseline
- Policy
- Plan
- Team/Leader



## Superior Energy Performance

Single facility ISO 50001 conformance with verified energy performance improvement

**ISO 50001**



5



**Feb 2010:** Republic Conduit partnered with KPPC to introduce environmental and energy savings initiatives within the company. KPPC performed initial assessment for opportunities for improvements to the existing Louisville plant.

**June 2011:** KPPC completed sustainability assessment which provided recommendations for opportunities for improvement to reduce energy usage and carbon footprint.

**July 2011:** Republic Conduit CAPEX projects for 2011/2012 using recommendations provided by KPPC Sustainability Assessment

**Sept 2011:** KPPC awards Republic Conduit with KPPC Environmental Sustainability Award.

**Jan 2012:** Republic Conduit selected to participate with KPPC in ISO 50001/SEP NE Demonstration Project lead by GA Tech, supported by USDOE. (Phase I)

**Jan 2012 –present:** KPPC working as mentor for achieving ISO 50001 certification in the Republic Conduit Louisville plant.

# ISO 50001 Implementation Supported by KPPC

- Staff members selected to attend ISO 50001/SEP NE Demonstration Project training lead by GA Tech, supported by USDOE. (Phase I)
- Deliverables and Timelines established to implement ISO50001 reviewed with KPPC twice monthly, along with coaching calls and review with GA Tech for project status and support.
- Energy Policy implemented for Republic Conduit Louisville to drive culture change to support reduction of energy usage and carbon footprint.
- Analysis of energy usage to determine significant energy use. Develop Energy Performance Indicators (EnPI) to be tracked for performance.
- Energy Team established with members from all areas of the plant to meet monthly to communicate ideas for energy reduction and review tracker improvement projects to support reduction of EnPI.

# Why an EMS and EnMS?

- Strengthens management focus on environmental & energy performance, injects organizational discipline across functional silos
- Creates opportunity for cultural shift; encourages commitment across company, BEYOND compliance & the 'low hanging fruit'
- Introduces & sustains a systematic approach to efficiency & wise use of resources
- Requires management commitment of resources appropriate to the goals of P2/EMS/EnMS and can be linked to QMS that ties back to profit margin
- Based on measurement and verification

# EMS/EnMS & Sustainability Overview

- Sustainability is a core value that drives the long-range strategy for continual improvement of resource management & the ability to exist.
- EMS/EnMS are operational tools to achieve 5-7 year objectives in support of 25 year goals.
- The analogy of a construction project:
  - ✓ “Sustainability” is the structure you want to build
  - ✓ Sustainability strategy is the blueprint
  - ✓ EMS/EnMS represents the construction codes & standards
  - ✓ P2/E2 are the choices to use the highest quality materials
  - ✓ Compliance is the foundation



# Systems Approach: Value Added

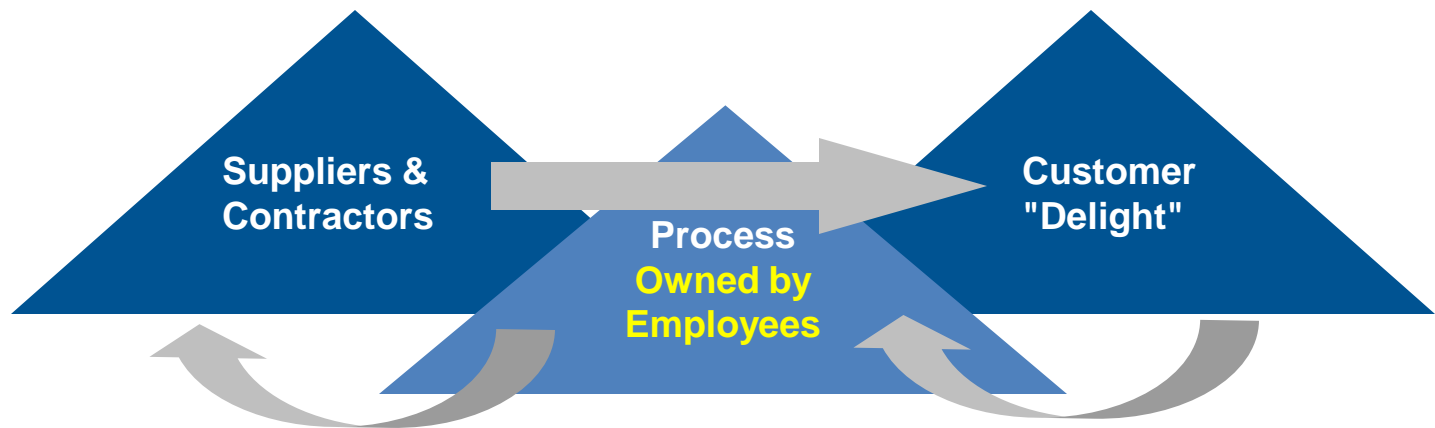
An operational tool for an organization's business plan!

## Prevent Waste & Reduce Energy Use:

- Involvement
- Commitment

## Add Value:

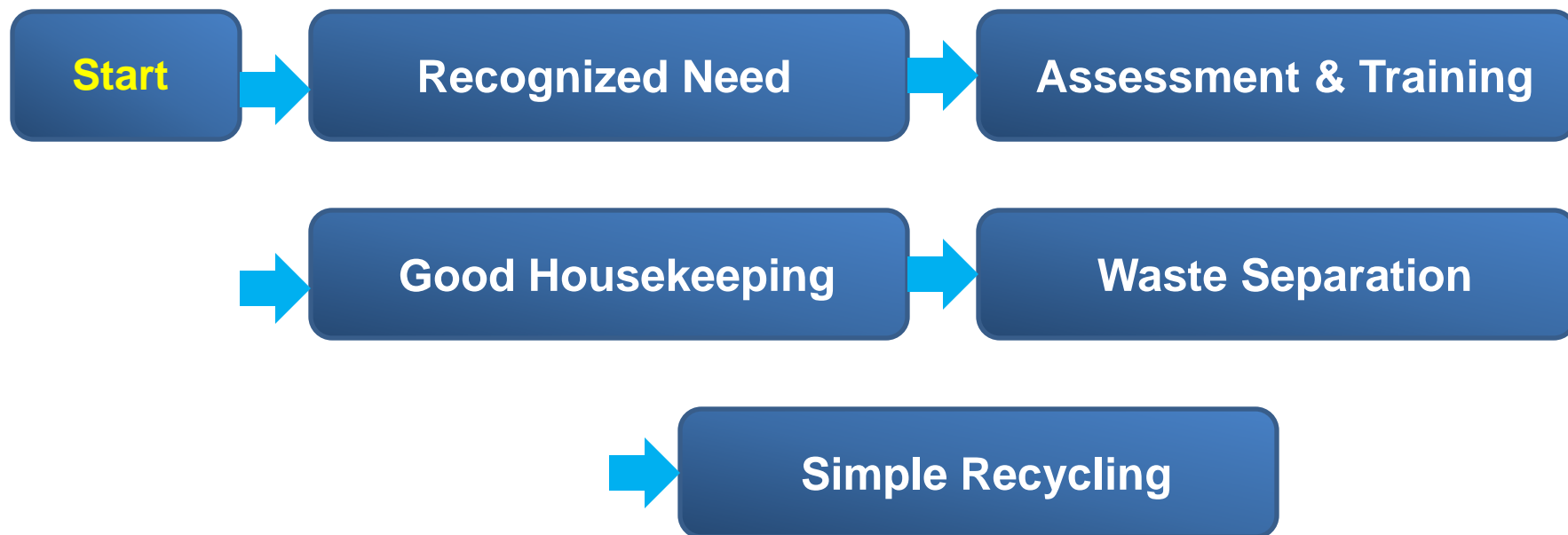
- Fulfillment
- Expectations
- Exceed Expectations



**Customer Satisfaction will lead to Customer Loyalty – Priceless!**

# Source Reduction

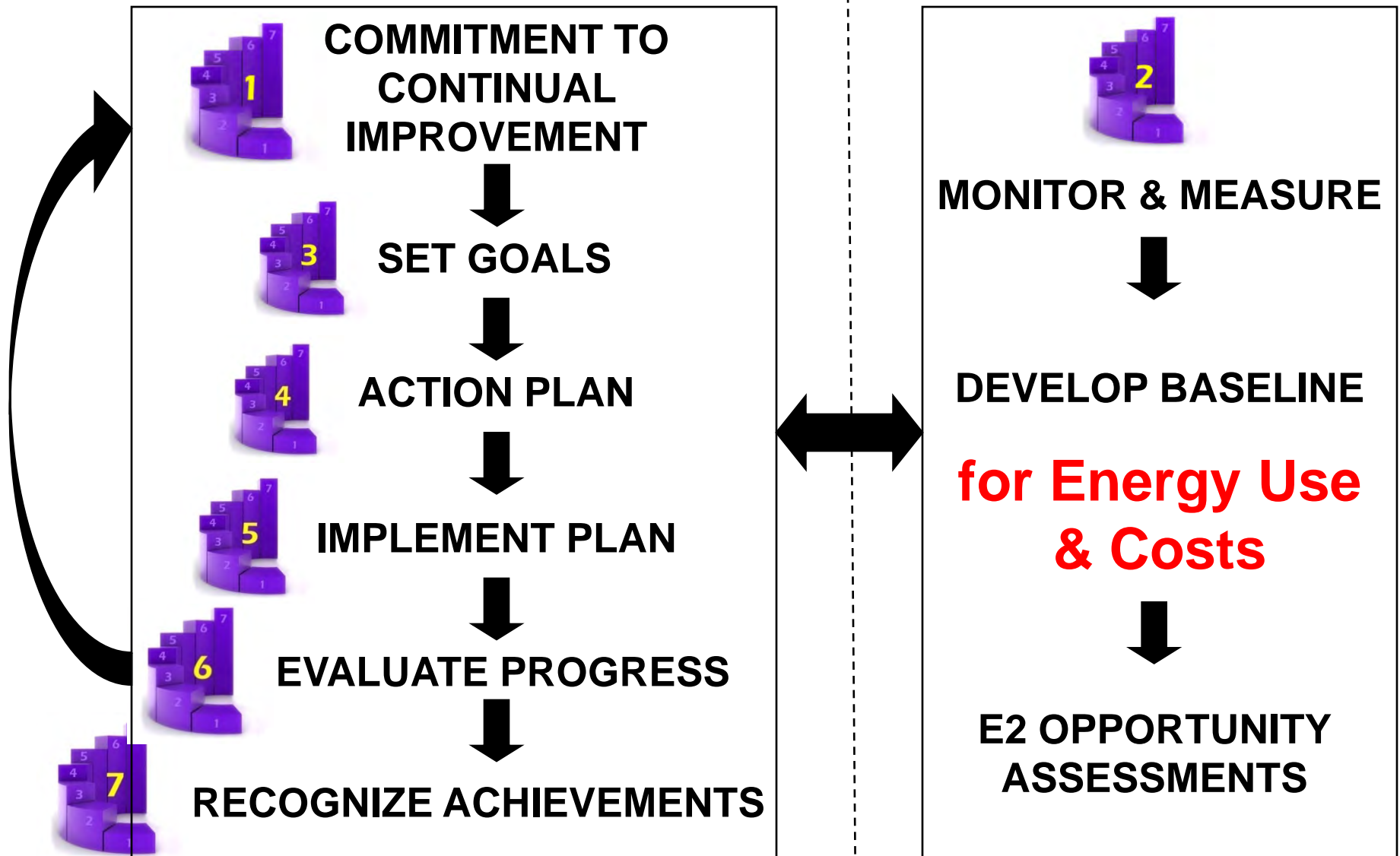
## Phase One - Operations



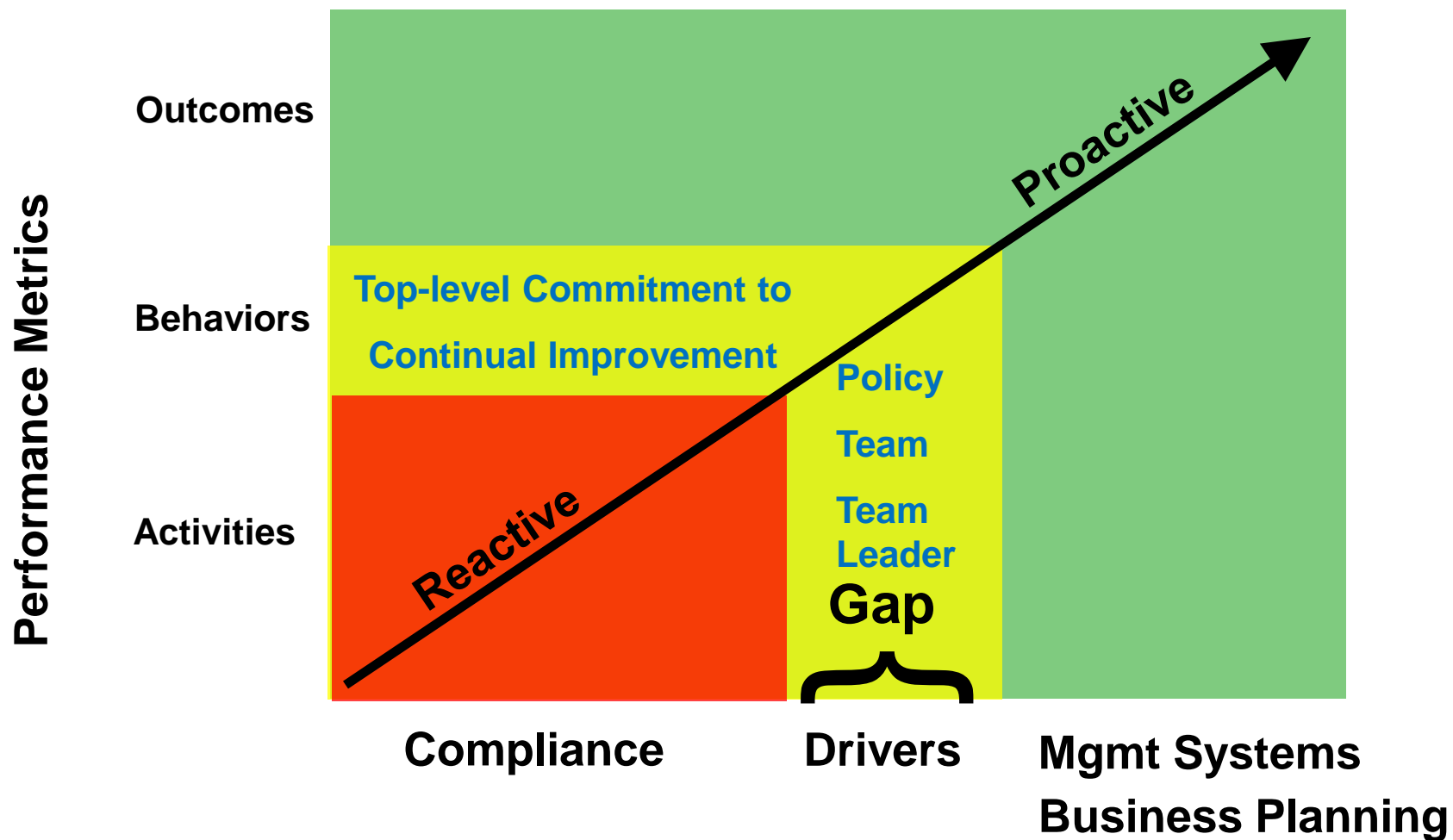
0-6 months, **Big Return** on Investment

# 7-Step Process for **E2** Management Program

**MANAGEMENT** **TECHNICAL**



# Organizational Capability



# Two Sides of Organizational Change

## **The Hard Side of Change** (Management)

- Processes
- Measurement
- Tools
- Structures & Procedures

## **The Soft Side of Change**

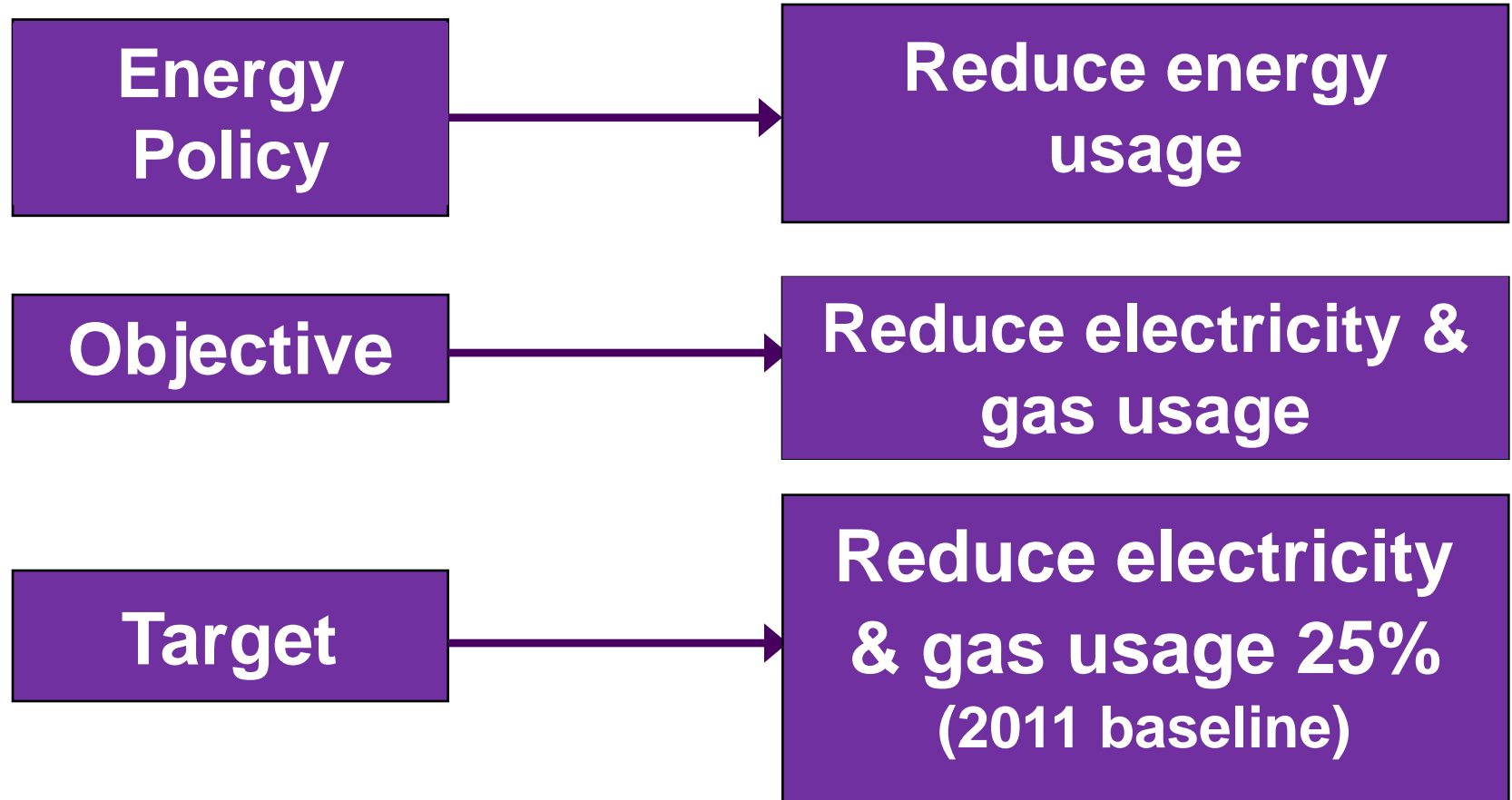
(Leadership)

- Buy-In
- Commitment
- Attitude
- Creativity
- Overcoming Resistance to Change
- Self-Leadership



# Commitment to Continual Improvement

## The Policy Drives Objectives & Targets



**Environmental performance – measurable results based on the policies, objectives & targets!**



# Sustainability Training Focus

Training to enable economic growth for manufacturers to succeed in a sustainable business environment

Training to enhance 'green' skills & capabilities for workers to address Pollution Prevention (P2), Energy Efficiency (E2) & Sustainability challenges

Creating workers *certified* in a variety of 'green' skills

# Technical Assessment of Facilities

An **Environmental Sustainability Assessment** that provides tools and identifies opportunities to reduce energy demand and costs, and improve performance through waste reduction and water conservation strategies (P2/E2) + lean review

A **Greenhouse Gas (GHG) Evaluation** that assists manufacturers in calculating GHG emissions and evaluating reduction strategies

**Post-Assessment Recommendations** that guide each facility towards improved overall efficiency, reduced waste, more efficient use of resources including energy and water, *workforce development* and cost savings

# Rate Tariff Analysis

Client Type	Location	Annual Savings (\$/Yr)	Percent Savings of Annual Electric Spend (%)
Industrial	Louisville	\$26,725	12.8%
Commercial	Lexington	\$38,384	34%
Industrial	Elizabethtown	\$26,607	7.1%
Industrial	Louisville	\$13,691	4.3%
Industrial	Lebanon	\$24,000	8.0%
Commercial	Shepherdsville	\$16,800	4.1%
<b>TOTAL</b>		<b>\$146,207</b>	<b>6.9%</b>



# Behavior Change

- Shutdown program for lighting within Storage Yard, Distribution Center and Shipping/Receiving Canopies
  - Energy Savings: 383,074 kWh/Yr
  - Project Cost: \$0
  - Financial Savings: \$22,740/Yr
  - Payback: Immediate
  - CO<sub>2</sub> Metric Tons Savings: 1,201/Yr



# Source Reduction

## Phase Two – Equipment

Process Controls



Equipment Modifications



In-process Reuse &  
Recycling

6 months - 2 years, **Some Return** on Investment



# Operational Controls

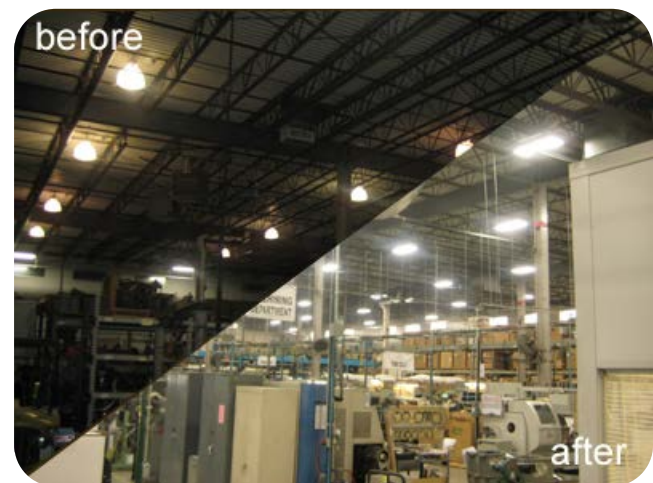
Help meet regulatory requirements & reduce potential significant environmental impacts.





# Lighting Opportunities

- Replaced 600 Metal Halide (400 W) with 622 Hi-bay T-8 Fluorescent Lighting Fixtures (224 W)
  - Energy Savings: 1,042,702 kWh/Yr
  - Project Cost: \$70,000 (w/ EPACT Incentive)
  - Financial Savings: \$71,000/Yr
  - Payback: 1 Year
  - CO<sub>2</sub> Metric Tons Savings: 3,269/Yr



# Compressed Air Opportunities

- Fixed 121 compressed air leaks representing 40% of system capacity (1,000 HP)
  - Energy Savings: 1,395,794 kWh/Yr
  - Project Cost: \$0
  - Financial Savings: \$81,412/Yr
  - Payback: Immediate
  - CO<sub>2</sub> Metric Tons Savings: 4,376/Yr



# Motor Control

- Auto shutdown for vertical presses (60 HP to 125 HP) and conveyors on process lines that operate in “idle mode” for 30 minutes
  - Energy Savings: 212,877 kWh/Yr
  - Project Cost: \$0
  - Financial Savings: \$15,000/Yr
  - Payback: Immediate
  - CO<sub>2</sub> Metric Tons Savings: 667/Yr



# Process Heating/Recovery

- Non-condensing economizer on boiler stack exhaust to preheat inlet water. Reduce boiler load from 2 to 1 boiler (500 BoHP)
  - Energy Savings: 4,131 MMBtu/Yr
  - Project Cost: \$29,388
  - Financial Savings: \$27,853/Yr
  - Payback: 1 Year
  - CO<sub>2</sub> Metric Tons Savings: 231/Yr



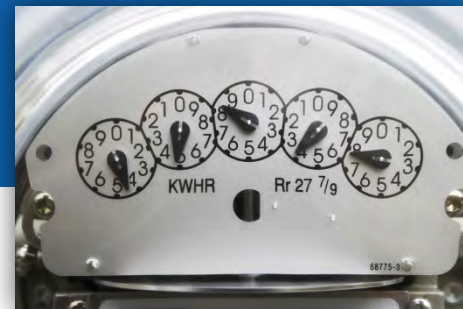
# Process Heating/Recovery

- Installed 45 barrel blankets on injection molding machines (50 to 700 Ton)
  - Energy Savings: 1,081,268 kWh/Yr
  - Project Cost: \$76,650
  - Financial Savings: \$47,949/Yr
  - Payback: 1.6 Years
  - CO<sub>2</sub> Metric Tons Savings: 3,390/Yr

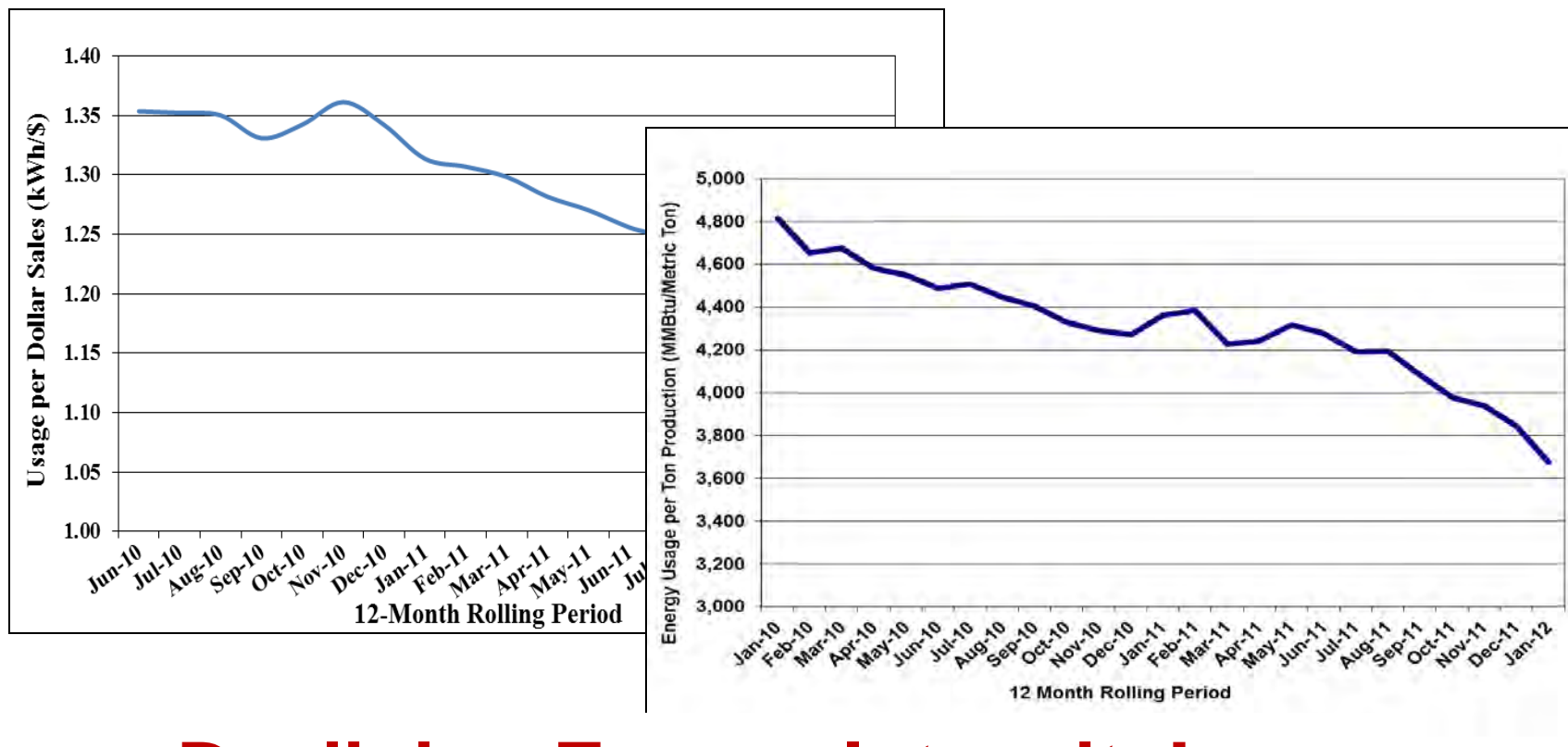




# Measure Results



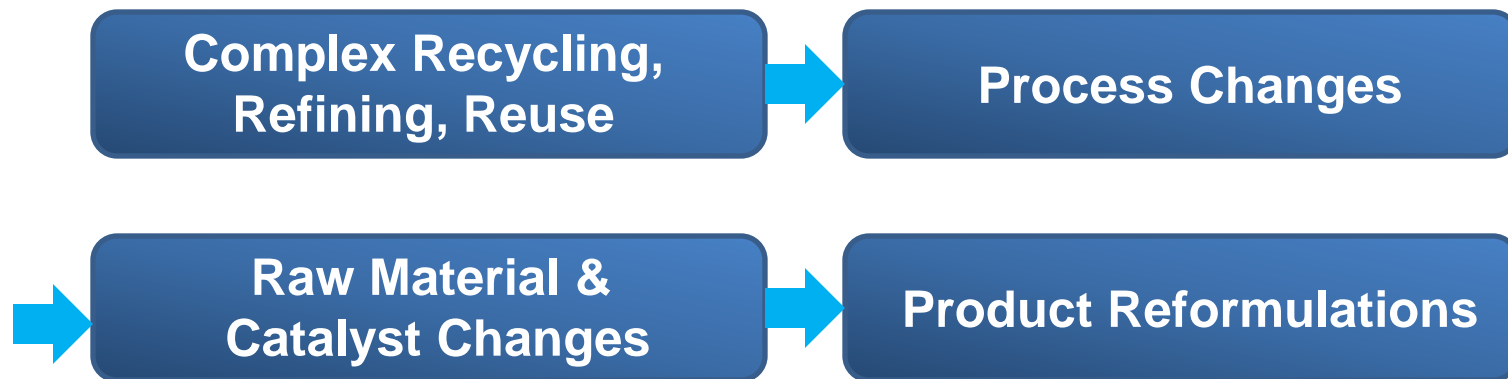
- Energy performance improvement



**Declining Energy Intensity!**

# Source Reduction

## Phase Three – Production Process



2 years - 5 years, **Little Return** on Investment

# Greening of Products & P2 Historically

**Historically, the majority of P2 efforts have been process driven and process focused**

**“How can I change my process?”**



- ✓ Reduce waste
- ✓ Reduce wastewater
- ✓ Reduce VOCs
- ✓ Reduce costs!!

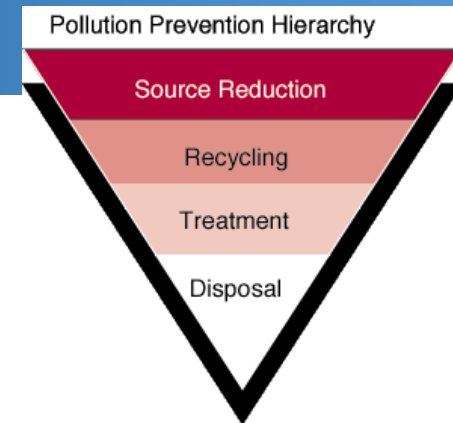


**We all know many examples of process-driven P2:**

- Replacing a TCE vapor degreaser with an aqueous process
- Switching to HVLP spray equipment
- Installing countercurrent washwater flow in a metal finishing operation

**“If it ain’t broke...don’t fix it!”**

# Greening of Products & P2 Historically



**P2 efforts were often constrained by this process focus:**

**“Change the process, but don’t mess with the product”**

**Makes sense when you consider:**

- ✓ **Shift from end-of-Pipe Pollution Control → P2**
- ✓ **Lack of demand for green products**

**Since the late 1980’s, when P2 was beginning to catch on:**

- ✓ **Significant gains were achieved through this process driven approach**
- ✓ **Considerable **low hanging fruit** ready to be picked**

# Policy to Promote & Encourage “Higher & Better Fruit Picking”

- Product reformulation
- Development & use of less or non-hazardous products, constituents, processes & methods
- Collection of products & materials that contain hazardous components for reuse, recycling or hazardous waste management



# Green Products & P2 Today

There are many new product-focused drivers for P2:

- ✓ product-focused regulations
- ✓ certifications
- ✓ green product procurement programs

RoHS	Electronic products
LEED	Building products
EPEAT	Electronic products
Green Seal	Cleaning products, paints, etc.
Greenguard	Interior building materials

Government green procurement programs



GUARANTEEING YOU THE GREENEST REFRIGERATION AVAILABLE



## What are the implications for P2 programs in facilities?

- ✓ Green markets are driving new opportunities to achieve P2

➡ particularly for raw material substitution

- ✓ A need for new models for P2
- ✓ Brings more focus & support to the “P2 table”
- ✓ Companies/facilities need to gear up to provide the skills & knowledge to assist the workforce in this endeavor





## Education & Training for Manufacturers

- KPPC Energy Efficiency Workshops
- KPPC Technical Training Webinars (power factor & demand management)
- US DOE Advanced Manufacturing Office (AMO) Best Practices Workshops

## Develop & Implement Facility Energy Management Plans & Programs

- Customized on-site Energy Team training and E2 assessments
- Evaluate facility's progress toward goals & objectives

## Verification of Energy Reductions & Recognition Program

- Collect & analyze facility's annual energy consumption
- Determine achievement levels for Save Energy Now (SEN) Recognition Program based upon progress

## Facilitate Kentucky Energy Alliance (KEA) Roundtables & Plant Tours

- Promote energy management with networking activities

# Kentucky Save Energy Now

Technical Assistance for Energy-Intensive Facilities



## Kentucky Energy Alliance (KEA)

- Mission is to promote & achieve better energy management with networking, program activities & education
- KEA Roundtable & Plant Tours held at:
  - Sherwin-Williams Richmond plant in fall of 2010
  - LG&E's Trimble County Generation Plant in spring 2011
  - US Playing Card Company plant in summer 2011
  - Republic Conduit plant in fall of 2011
  - EKPC's Pearl Hollow Landfill Gas generation plant in spring of 2012
  - Kindred Healthcare Facility on August 22, 2012



Sharing information on energy management projects, vendors, training, and resources







## Recognition Program – Implement the 7-Steps

Achievement Level	Necessary Attributes
★	<ul style="list-style-type: none"> <li>• Sign KY SEN Pledge</li> <li>• Establish Energy Use Baseline</li> </ul>
★★	<ul style="list-style-type: none"> <li>• Institute Energy Management Policy</li> <li>• Establish Cross-Functional Energy Team</li> <li>• Attend Energy Management Training</li> </ul>
★★★	<ul style="list-style-type: none"> <li>• Assess operations for Energy Saving Opportunities</li> <li>• Develop Energy Action Plan (must include 2.5 percent/year minimum goal)</li> </ul>
★★★★	<ul style="list-style-type: none"> <li>• Implement Energy Action Plan</li> <li>• Evaluate Progress of Energy Management Program</li> </ul>
★★★★★	<ul style="list-style-type: none"> <li>• Develop Internal Recognition Program</li> <li>• Mentor KY SEN Participants</li> </ul>



# Kentucky Save Energy Now

Technical Assistance for Energy-Intensive Facilities



## Recognition Program – Implement the 7-Steps

- KY SEN participants coordinate with KPPC technical staff to evaluate progress and determine achievement level
- Upon completing first KY SEN award level, participant receives the KY SEN award
- Awards are publicized state-wide through websites, newsletters, press releases & award ceremonies
- First round of recognition on Oct. 28, 2010



# Kentucky Save Energy Now

Technical Assistance for Energy-Intensive Facilities



## KY SEN Pledgers

Advanced Drainage Systems

Anheuser-Busch InBev

Altec Industries

Cardinal Aluminum

Central Motor Wheel of America

Eckart America

Florida Tile

General Cable

Greenlee Textron

Hausner Hard Chrome, Inc.

Hendrickson

Intertape Polymer Group

JOM Pharmaceuticals

Kentucky American Water

Kindred Healthcare Support Center

Muhammad Ali Center  
nth works

Owensboro Grain

Pikeville College

Publishers Printing

Republic Conduit

Reynolds Flexible Packaging

Sherwin-Williams Richmond

Sypris Technologies

Temple-Inland

TG Kentucky

Topy America, Inc.

US Playing Card Company

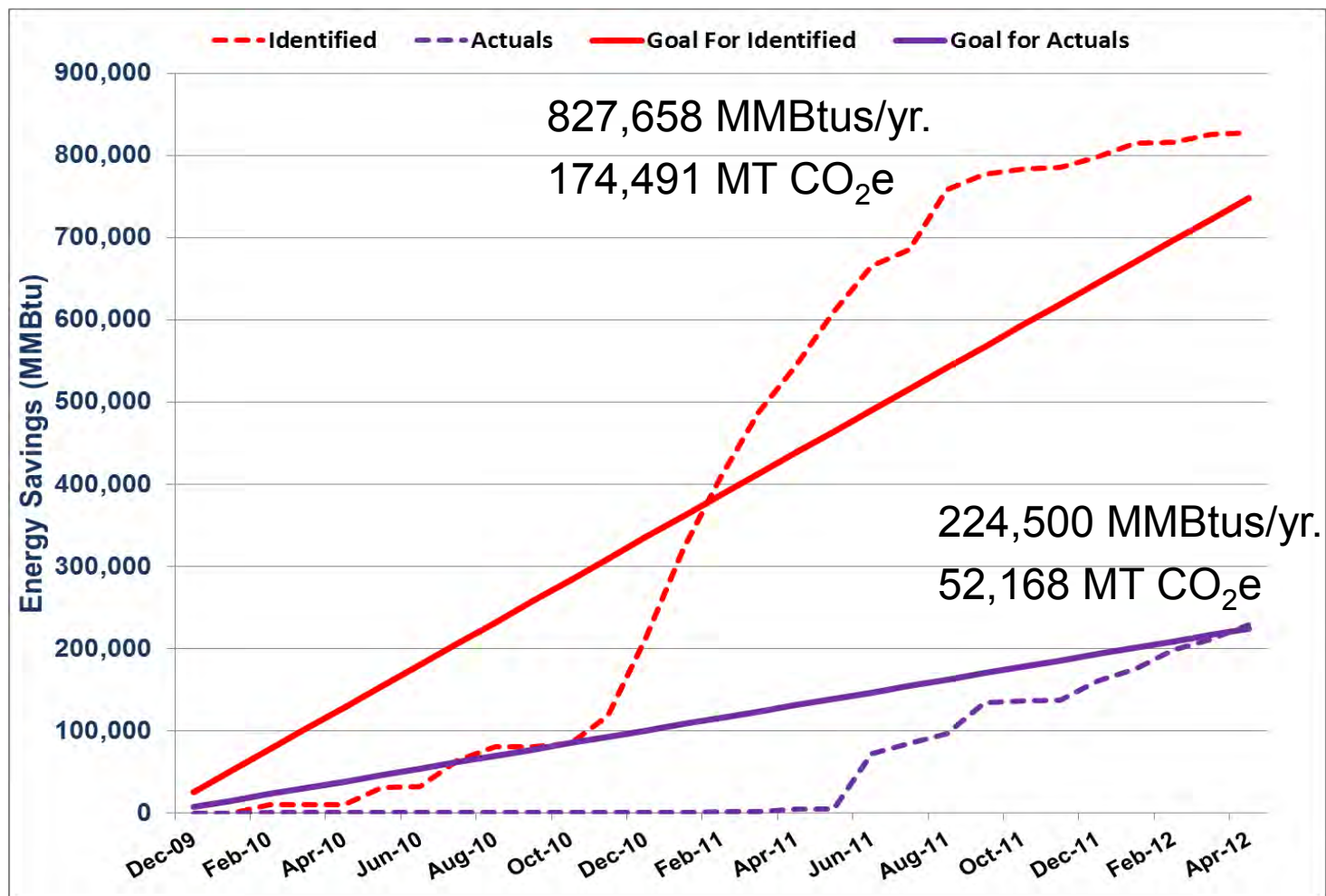
Vogt Ice

# Kentucky Save Energy Now

Technical Assistance for Energy-Intensive Facilities



## Progress toward our KY SEN goals





# What Business leaders want to Know (and will likely ask!)

- What is the benefit to me?
  - How many dollars?
  - How quickly do the dollars accrue?
  - What is the risk of investing?
  - What is the risk of not investing?
- What's the most I should pay for it?
- How does it compare to other ways to use the same money?

# KPPC is nationally recognized Center of Excellence @ the University of Louisville

KPPC has received numerous awards for its accomplishments, including:

- 2011, **2012** - US EPA ENERGY STAR Partner of the Year in Program Delivery
- 2008, 2011, **2012** - National Pollution Prevention Roundtable Most Valuable Program (Kentucky Save Energy Now – KY SEN)
- **2012** - National Pollution Prevention Roundtable MVP2 Award for Multimedia (KPPC's YouTube Channel)
- 2005, 2009, 2010 - National Pollution Prevention (P2) Roundtable Most Valuable P2 Publication
- 2009 - Southern Growth Policy Board's Innovator Award for KREC
- 2008 - USDA Bio Energy Awareness Days Grand Challenge Award for KREC
- 2007 - US EPA National Water Efficiency Leader Award for NGOs



# STAY FOCUSED ON THE TASK





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