

# GLOBAL SUPERIOR ENERGY PERFORMANCE



Energy Management Systems: A More Comprehensive  
Approach to Energy Efficiency

Graziella F. Siciliano

U.S. Department of Energy

Conference on Energy Efficiency in Cities

Mexico City, Mexico

June 17-18<sup>th</sup>, 2014

## PROJECT-BASED APPROACH TO ENERGY EFFICIENCY

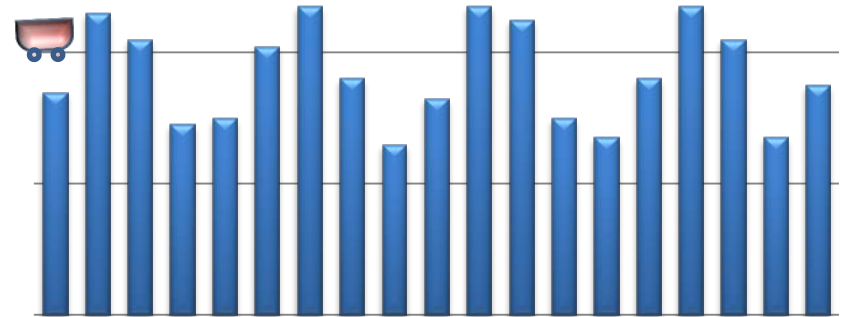
Project - based approach focuses more on investments in new, more efficient technologies.

### Technological Change

Key challenges with this approach:

- Investments in projects are cyclical, depending on a number of internal and external factors (i.e., energy prices, cost of capital, regulatory environment, etc.)
- Energy saving of projects are often not sustained due to lack of sound operational practices

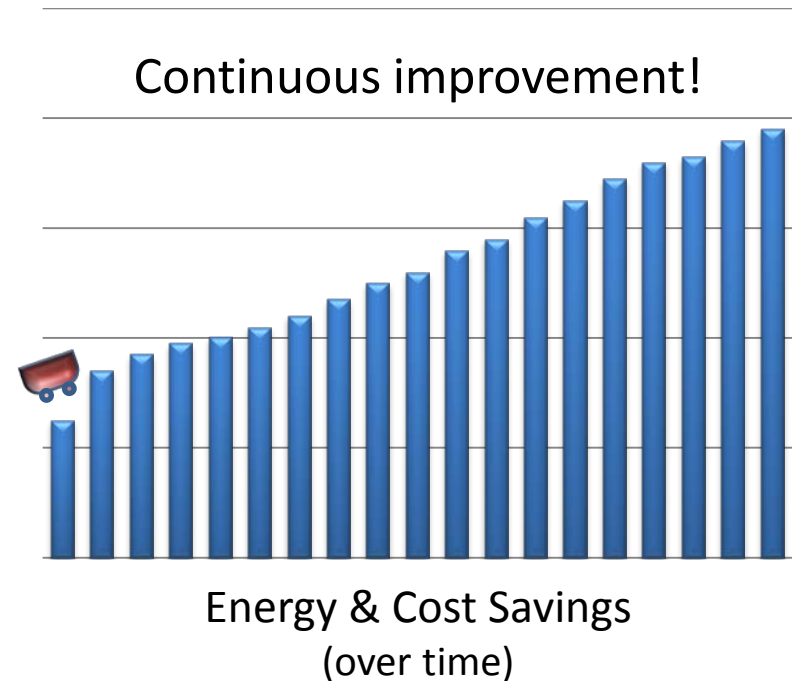
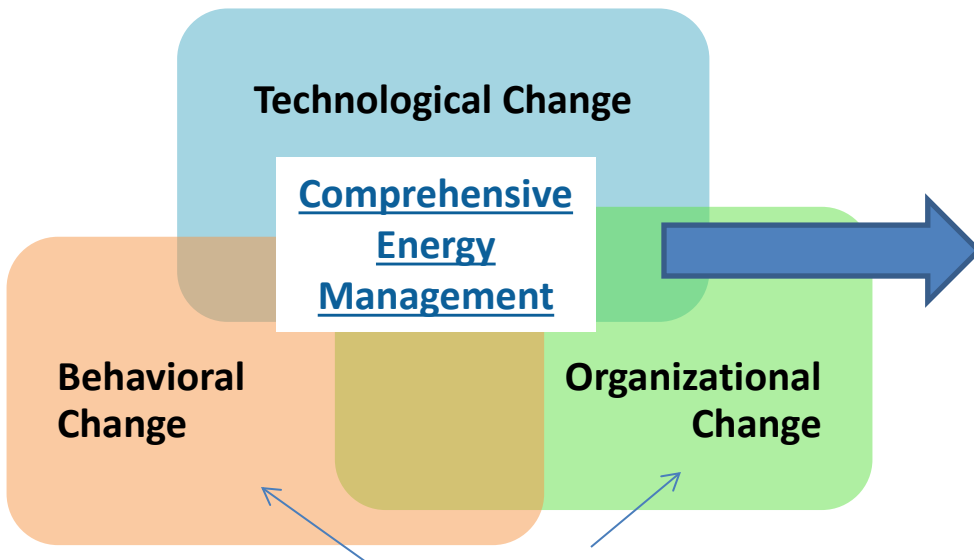
**The result is that over time energy performance fluctuates and efficiency potential goes unrealized!**



Energy & Cost Savings  
(over time)

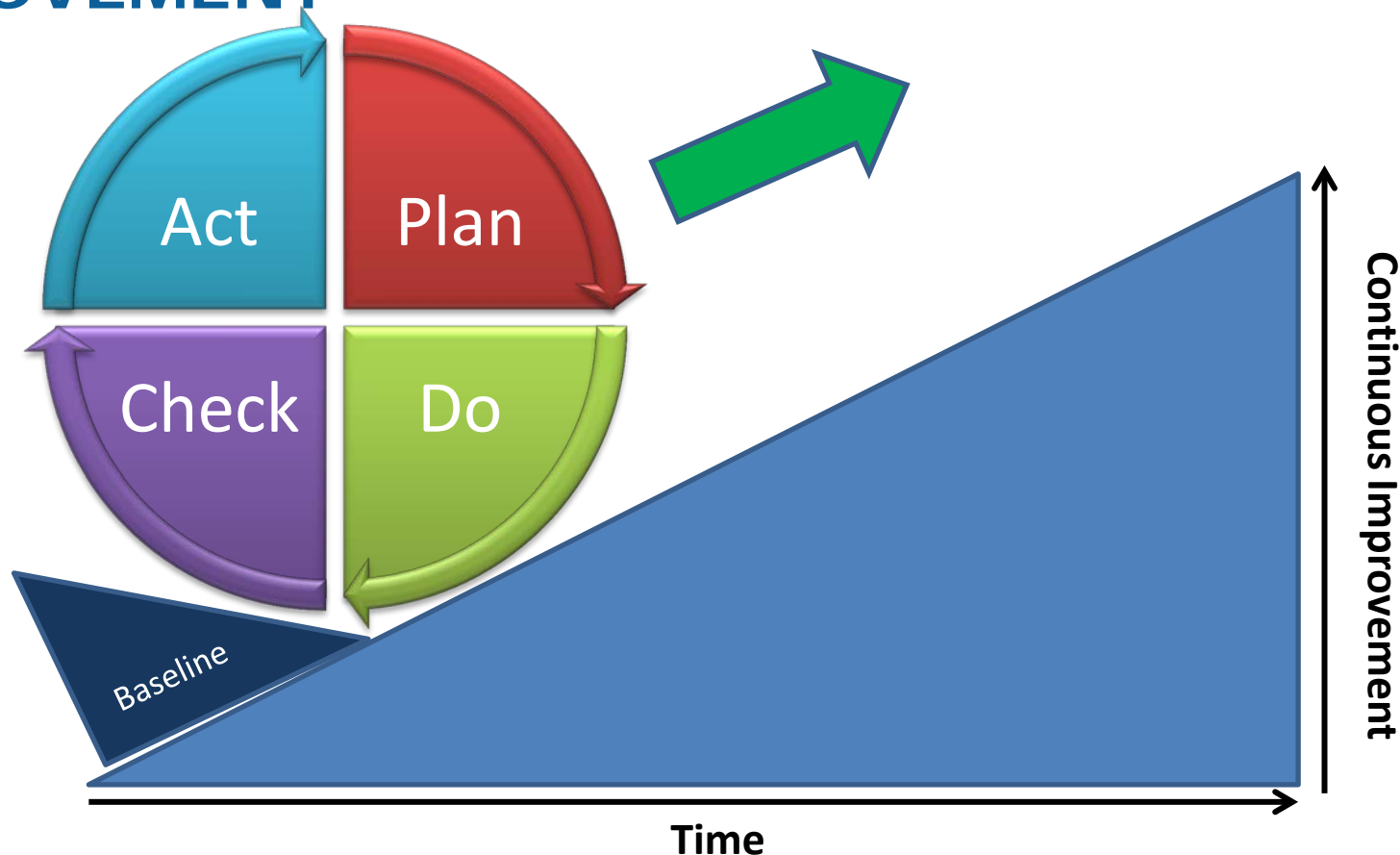
## A MORE COMPREHENSIVE APPROACH TO ENERGY EFFICIENCY IS NEEDED

Organizations that target behavioral and organizational barriers, as well as technological, can achieve continual improvement in energy performance.



Staff at every level of an organization need to be engaged and involved in order to achieve energy goals!

## THE PDCA MODEL FOR ACHIEVING CONTINUAL IMPROVEMENT



- Based on the scientific method – Hypothesis, experiment, evaluate
- Used as a foundation for best practices widely used in business - LEAN, Six Sigma
- Applied to a range of organizational objectives including quality, environmental, etc.

# Global Superior Energy Performance

## PDCA FOR ENERGY - ENERGY MANAGEMENT SYSTEMS (EnMS)

### Plan

- Learn energy management basics
- Understand and communication benefits
- Secure senior leadership commitment
- Establish an energy policy
- Establish an energy team
- Conducts an energy review
- Identify energy performance improvements
- Establish an energy baseline and goals
- Design an action plan

### Do

- Assure resources are allocated for action plan
- Address training and communication needs
- Execute action plan
- Establish operational control over actions taken

### Check

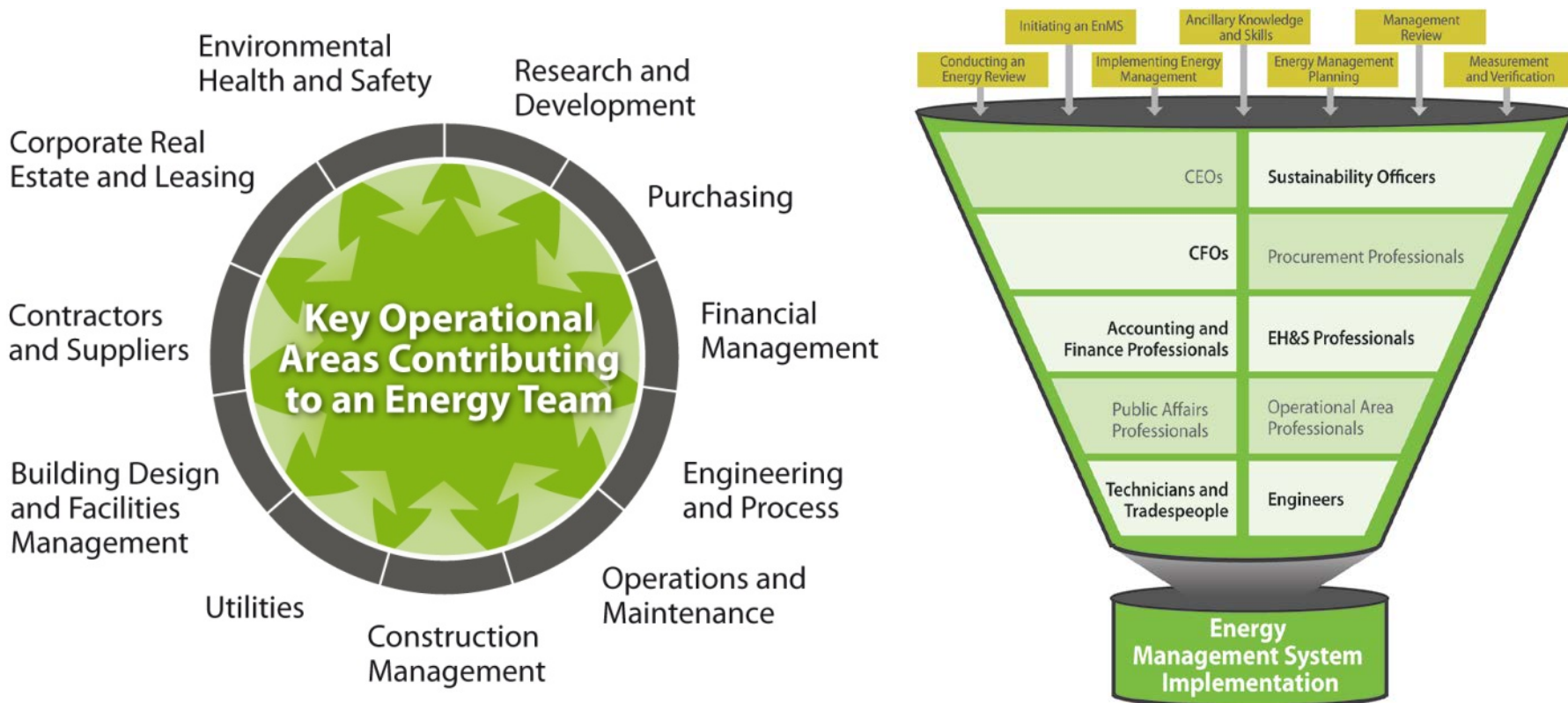
- Monitor and analyze performance metrics
- Compare actual vs. anticipated results of action plans – internal audits
- Take corrective and preventive action

### Act

- Management reviews progress of EnMS
- Management reviews energy performance improvements
- Take actions to sustain gains
- Recognize successes and communicate results

Leads to continual improvement

## ENERGY MANAGEMENT SYSTEMS: A FOCUS ON COMMUNICATION AND CAPACITY BUILDING



Keys to success - Communication, engagement and training of key personnel.



## GLOBAL BEST PRACTICE: ISO 50001 INTERNATIONAL ENERGY MANAGEMENT SYSTEM STANDARD

**Published: June 15, 2011**

- Uses the Plan-Do-Check-Act framework for continual improvement
- Provides the requirements for energy management systems
- Applicable to any organization that uses energy.

### Global Best Practice

- Over 50 countries currently involved in standard making process – many countries adopting ISO 50001 as national standard
- The standard offers the opportunity for increasing consistency and success in energy management system implementation



**7,100 certified sites worldwide as of May 2014**

## UPTAKE OF COMPREHENSIVE ENERGY MANAGEMENT PRACTICES

Evidence has shown that organizations implementing EnMS have saved around to 10-30% of their total energy use, with most savings coming from no- to low cost operational improvements.

There is increasing recognition of the value that energy management and energy management systems can bring to an organization. All types of organizations from different parts of the world have implemented energy management systems:

- **Industrial facilities**
- **Commercial buildings**
- **Water/wastewater facilities**
- **Hospital/university campuses**
- **Transport sector**
- **Power generation and distribution**
- **Cities**
- **Etc.**



## CITY ENERGY EFFICIENCY EFFORTS ARE CRITICAL

*Cities occupy just 2% of the Earth's land, but account for **60-80%** of energy consumption and **75%** of carbon emissions.*

- EE efforts in cities are necessary to:
  - Contribute to global energy and climate change mitigation goals
  - Deliver significant energy and non-energy benefits such as improved the provision of city services.
- Municipal governments often control significant city energy uses
- City policies and programs can also promote energy efficiency in the private sector and residential sectors.

### Significant Sources of Energy Use in Cities Under Direct Control of Municipal Governments

- ☑ Municipally-owned buildings
- ☑ Power distribution systems
- ☑ Public transportation
- ☑ Water/wastewater treatment facilities
- ☑ Public lighting systems

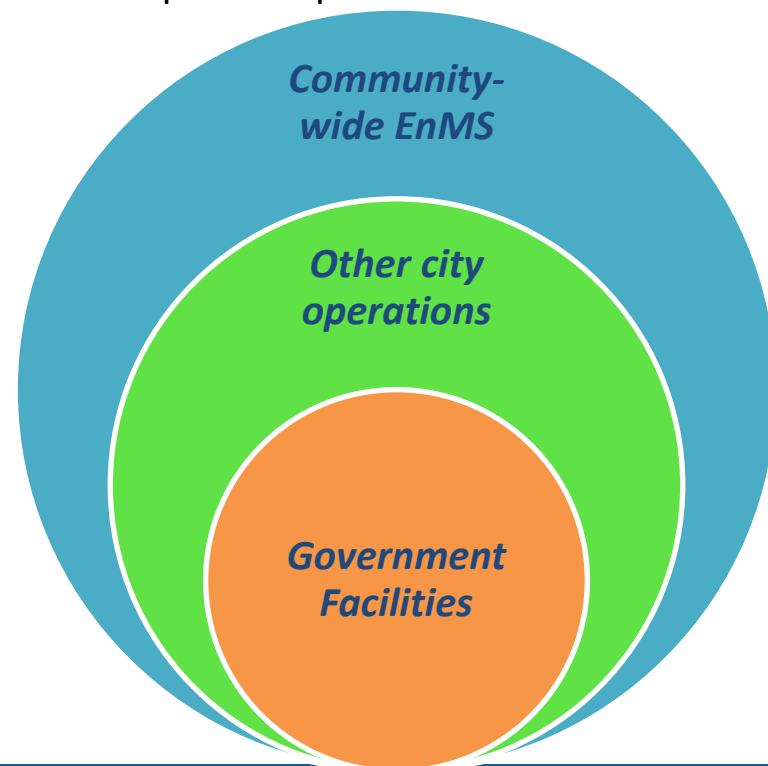
## ENERGY MANAGEMENT SYSTEMS FOR CITIES

### How can an Energy Management Systems be integrated into city operations?

- Standalone EnMS
- Integrate in city master plan or economic development plan
- Strategy for achieving broader climate action or sustainability goals/plans
- Should be integrated into budget planning cycle
- Should complement existing policies and activities to facilitate coordination and leverage resources

### New to energy management?

- **EnMS allows significant flexibility**
  - Cities can define the EnMS scope based on their energy management experience – start small and then expand scope!



## CASE STUDY: ENERGY FOR MAYORS



- **Description:** Europe-based organization that supported work of 8 municipalities in 5 countries (Italy, Bulgaria, Greece, Poland and Spain) to implement an EnMS compliant with ISO 50001
- **Goal:** Evaluate how ISO 50001 could help European cities meet commitments to reduce GHG emissions by at least 20%, as outlined through adopted Sustainable Energy Action Plans (SEAP)

- **Conclusion:** *ISO 50001 is the best tool for reaching sustainability goals*
  - EnMS enabled the municipalities to define realistic actions and obtain highly reliable energy data, and created processes for evaluating and improving actions giving them more confidence in the impact of SEAP implementation

<http://www.energyformayors.eu/en/project-results>

## INTERNATIONAL COLLABORATION TO PROMOTE ENERGY MANAGEMENT SYSTEMS

The Global Superior Energy Performance Partnership (GSEP) leverages the extensive expertise of its 11 member countries to **accelerate the adoption and use of energy management systems such as ISO 50001.**

- **Membership:** Government representatives from ministries leading domestic energy efficiency efforts in the public, commercial and industrial sectors.
- **Partners:** GSEP also partners with a range of other organizations promoting energy efficiency and energy management (i.e., UNIDO, International Organization for Standardization, Institute for Industrial Productivity, etc).



Australia



Canada



Denmark



European Commission



India



Japan



Korea



Mexico



South Africa



Sweden



United States

## CURRENT GSEP WORK

### Build the Business Case

EnMS Case Studies

Energy Performance Database

### Provide Support and Resources

EnMS Toolbox

Workforce Development

Measurement and Verification Resources

### Supportive Programs and Policies

EnMS Pilot Projects

Auditor Certification Scheme

[www.cleanenergyministerial.org/energymanagement](http://www.cleanenergyministerial.org/energymanagement)

## INTERNATIONAL PARTNERSHIP FOR ENERGY EFFICIENCY COOPERATION (IPEEC)

IPEEC is an international government forum that provides global leadership on energy efficiency by facilitating implementation of policies and programs to yield energy efficient gains.

IPEEC is dedicated to facilitating rapid deployment of energy efficiency worldwide and promoting information exchange on best practices to facilitate initiatives that improve energy efficiency.





## CLEAN ENERGY MINISTERIAL (CEM)

The Clean Energy Ministerial (CEM) is a high-level global government forum focused on accelerating the transition to *a global clean energy economy*.

>90% of Global Clean Energy Investment > 80% of Global GHG Emissions

The CEM is focused on three global climate and energy policy goals:

- Improve energy efficiency worldwide
- Enhance clean energy supply
- Expand clean energy access



Australia



European Commission



Brazil



Canada



China



Denmark



Finland



France



Germany



India



Indonesia



Italy



Japan



Korea



Russia



South Africa



Mexico



Norway



Sweden



Spain



United Arab Emirates



United Kingdom



United States

**THANK YOU!**

**Graziella Siciliano**

GSEP Coordinator –

[graziella.siciliano@hq.doe.gov](mailto:graziella.siciliano@hq.doe.gov)

Main site:

[www.cleanenergyministerial.org/energymanagement](http://www.cleanenergyministerial.org/energymanagement)

Additional information:

[www.ipeec.org/GSEP](http://www.ipeec.org/GSEP)