
ISO 50001
Energy Management Systems

What is ISO 50001?

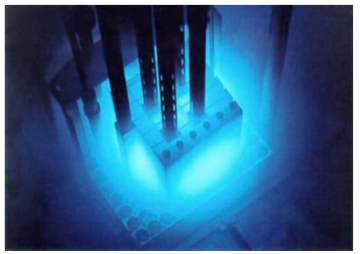
- The cornerstone for improving energy performance.
  - ❖ Energy performance = Measurable results related to energy efficiency, energy use and energy consumption.
- A standard for energy management developed by the International Organization for Standardization (ISO).
- Published by ISO on June 15, 2011.

Why consider ISO 50001 when ISO 14001 already exists?

- ISO 50001 has been designed solely for the management of energy.
- Energy management is often overlooked with ISO 14001.
- Most companies do not truly understand how much energy they currently use and how much money they can potential save by implementing an EnMS.
- Forces companies to establish baselines and identify areas for significant improvements in energy performance.
- Encourages companies to look into renewable energy sources.

What is the purpose of ISO 50001?

- ISO 50001 provides organizations with an internationally recognized framework for implementing an energy management system (EnMS).
- The standard addresses the following:
  - Energy use and consumption
  - Measurement, documentation, and reporting of energy use and consumption
  - Design and procurement practices for energy-using equipment, systems, and processes
  - All variables affecting energy performance that can be monitored and influenced by the organization.



What is the purpose of ISO 50001?

- ISO 50001 intends to help organizations:
  - Better manage their existing significant energy uses.
  - Promote energy management best practices.
  - Evaluate and prioritize the implementation of new energy-efficient technologies or OFIs.
  - Integrate an EnMS with other management systems.
    - Examples: environmental, health and safety.

ISO 50001 Benefits

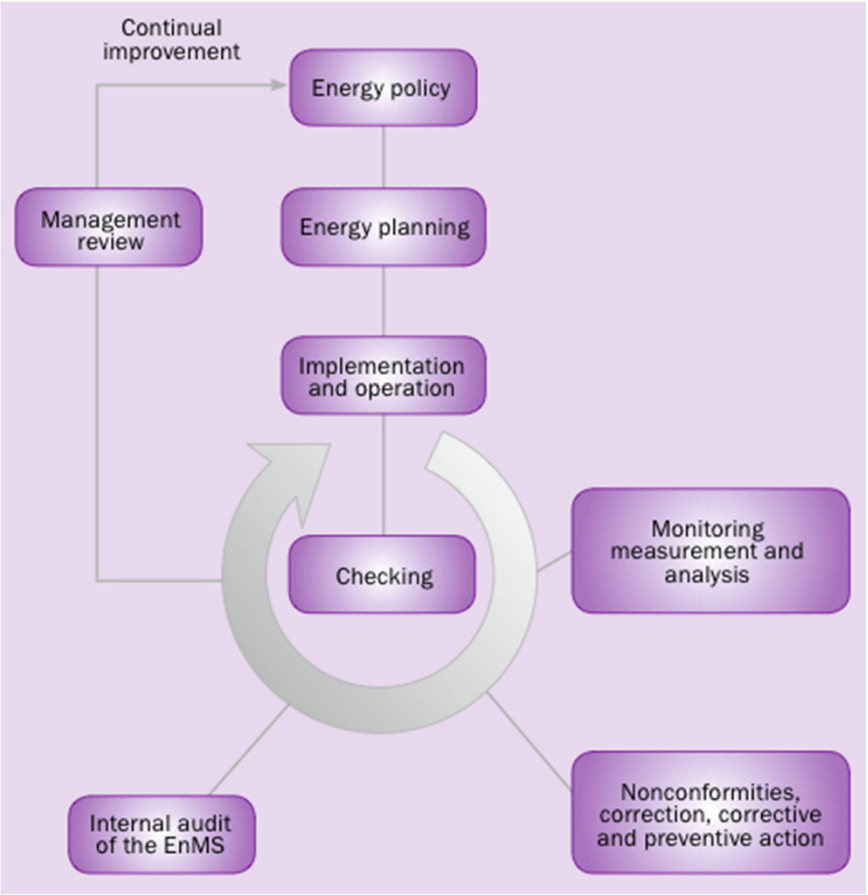
- **Realization of energy cost savings**
- Reduced energy consumption
- increased energy efficiency
- increase energy performance
- Reduced environmental impact
- Helps to achieve energy compliance
- Worldwide credibility for energy consciousness.
- Able to be used by small to large organizations across diverse commercial, industrial, and public sectors.

❖ **Improves the ability to set baselines, measure, monitor and report on energy performance**

Key Elements of an EnMS

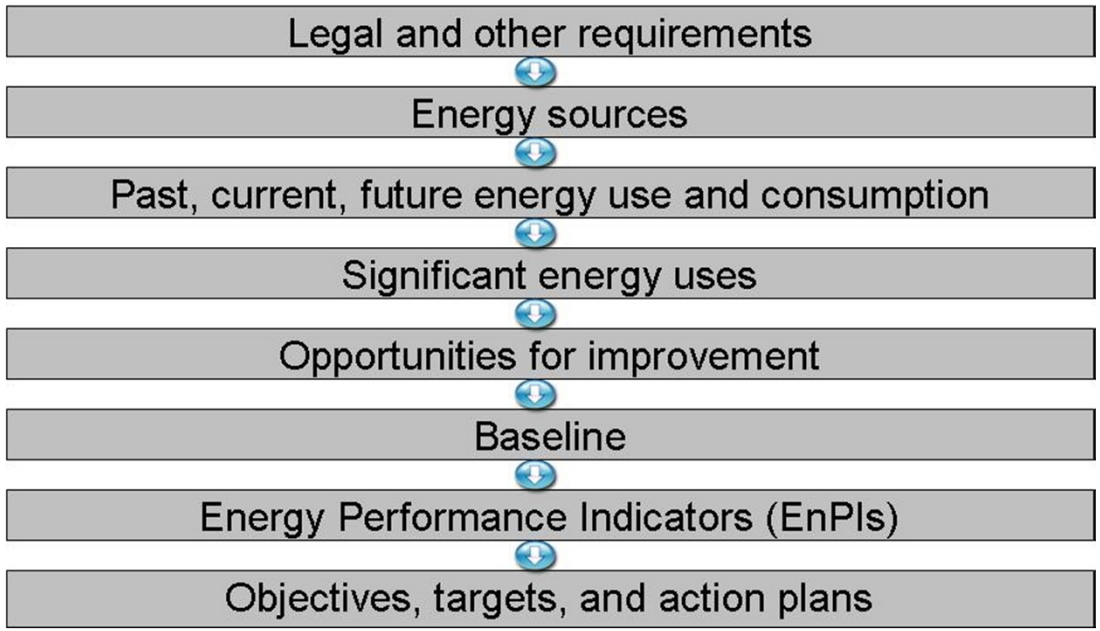
- One key difference from other management systems is that an EnMS has a requirement that the organization shall achieve continual improvement of its **energy performance** and of its EnMS.

PDCA Model for Continual Improvement



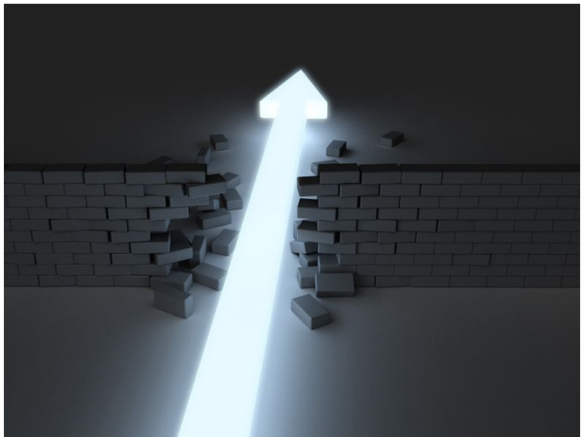
PLAN

- Determine the Scope and Boundaries.
- Do an energy review & establish a baseline for your energy consumption.
- Set objectives and targets you want to reach in your energy usage.
- Develop action plans to take advantage of energy opportunities.
- Define your Energy Performance Indicators (EnPIs).



Scope and Boundaries - PLAN

- EnMS Scope and Boundaries
  - Scope: extent of activities, facilities and decisions that the organization addresses through an EnMS, which can include several boundaries.
    - Note: the scope can include energy related to transport
  - Boundaries: physical or site limits and/or organizational limits as defined by the organization.
    - Note: a process; a group of processes; a site; an entire organization; multiple sites under the control of an organization.

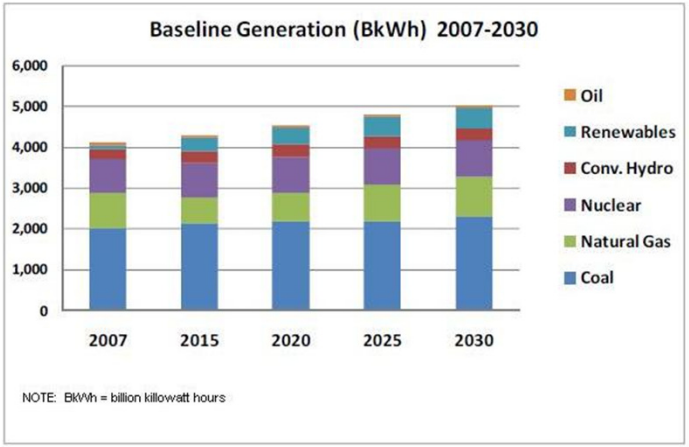


Energy Review

- Determination of energy performance, leading to identification of opportunities for improvement.
- Conduct an energy review that includes:
  - Current energy sources
  - Past and present energy use and consumption
  - Significant energy uses (SEUs)
  - Identify and prioritize opportunities for improving energy performance
  - When prioritizing improvement opportunities, some things to consider are:
    - Costs involved vs. payback
    - Risk factors
    - SEUs

Improvement Opportunities

- Set objectives and targets you want to reach in your energy usage.
- Develop action plans to take advantage of energy opportunities.
- Define your Energy Performance Indicators (EnPIs).
- Establish Energy Baselines:
  - Basis for comparison of energy performance (starting point)
  - Initial baseline should be developed from the energy review



Energy Performance OFIs

Facility Type	Yearly Energy Costs	Recommendation	Cost to Implement ($)	Annual Savings ($)	Payback Period (Yr)
Aluminum Die Casting	$534,927	Investigate the Possibility of Alternative Electric Rate Schedule	$0	$12,973	0
		Install Economizers on the Existing Pad-mounted Units	$2,400	$3,034	0.8
		Insulate the Gas Kilns	$3,782	$7,575	0.5
		Implement A Regular Maintenance Program to Eliminate Air Leaks	$535	$6,211	0.1
		Install Adequate Compressed Air Storage	$3,690	$2,882	1.3
		Replace T12 Fluorescent Lighting with T8 Fluorescent Lighting	$5,444	$763	7.1
		Retrofit Exit Signs With LED Kits	$745	$464	1.6
		Replace Mercury Vapor With Metal Halide	$1,846	$550	3.4

Energy Performance Indicators (EnPIs)

- Quantitative value or measure of energy performance:
  - Helps turn energy data into useful information for top management
  - Can be expressed as a simple metric, ratio or a more complex model
  - Examples:
    - Btu per widget
    - Btu per lb of paint

Energy Objectives and Targets

- Energy Objectives
  - Specified result set to meet the organization's energy policy related to improved energy performance

- Energy Targets
  - Detailed and quantifiable energy performance requirement related to the energy objective

- Objectives and targets can apply to an entire organization or specific areas or functions.

Examples of Energy Objectives and Targets

OBJECTIVES	TARGETS
Reduce energy use	Σ Reduce electricity use by 5% in 1999 Σ Reduce natural gas use by 15% in 1999 Σ Reduce use of diesel oil by 10% in 1999
Reduce usage of hazardous chemicals	Σ Eliminate use of CFC's by 2005 Σ Reduce use of high-VOC paints by 50%
Reduce hazardous waste generation	Σ Reduce chrome wastes in plating area by 50% in 1997
Improve employee awareness of environmental	Σ Hold monthly awareness training courses Σ Train 100% of employees by end of 1999
Reduce waste water discharge	Σ Recycle water by 20% in boiler by 1999

Action Plans

- Developed to achieve objectives and targets
- Shall include:
  - Designation of responsibility
  - Means and time frames by which individual targets are to be achieved
  - A statement of the method by which an improvement in energy performance shall be verified
  - A statement of the method of verifying results

Implementation and Operation – “DO”

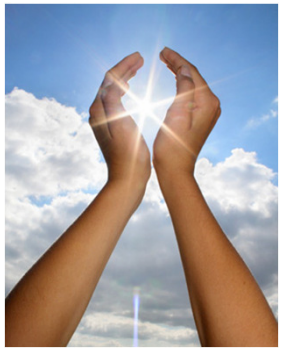
- Implement Action plans and other outputs of the planning process:
  - Competence, training and awareness
  - Communication
  - Documentation
    - Scope and boundaries,
    - energy policy,
    - energy objectives, targets, and action plans.

CHECKING

- The following items should be completed to ensure an effective EnMS:
  - Monitor your processes and measure your energy usage.
  - Check your results against the targets and objectives you set.
  - Report and communicate the results (particularly with key decision makers).

Management Review – "ACT"

- The ACT portion should:
  - Consider the outputs (e.g. strengths and weaknesses) of the CHECK portion to determine what improvements can be made to the management system.
    - Establish new objectives, targets and action plans
    - Address issues which prevented existing objectives and targets to be achieved.



Energy Performance

- Measurable results related to energy efficiency, energy use and energy consumption
- EnPIs are used to determine changes in energy performance
- Examples:
  - Btu/widget
  - Btu/lb of paint

Energy Performance

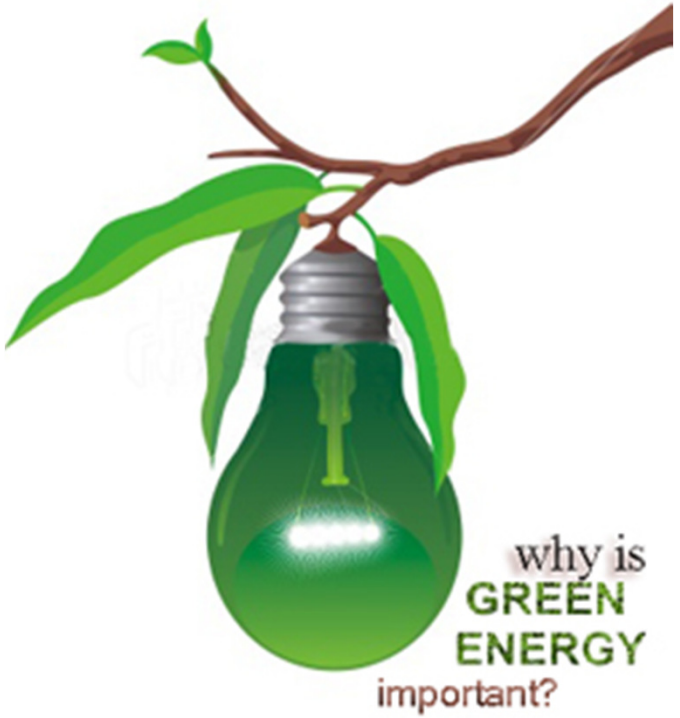
- Related to <u>energy efficiency</u>:
  - Relationship between an output of performance, service, goods or energy, and an input of energy
- Examples:
  - Equipment efficiency
  - Process efficiency
  - Conversion efficiency

Energy Performance

- Related to <u>energy use</u>:
  - Manner or kind of application of energy (e.g. lighting, heating, cooling)
- Examples
  - Incandescent vs. fluorescent light bulbs
  - Blowers vs. compressed air
  - Electric vs. gas heating

Energy Performance

- Related to <u>energy consumption</u>:
  - Amount of energy applied
- Examples:
  - 500 gallons of oil consumption
  - 15,000 kWh of electricity consumption
  - 750 MBtu of natural gas consumption



Benefits of Certification

- Intangible EnMS benefits include:
  - Reduce energy costs
  - Improved corporate image among regulators, customers and the public
  - Proof of social responsibility
  - Improved employee morale

Certification Process

The initial audit consists of two stages:

- Stage 1:
  - On-site document review of your EnMS
  - Evaluates the readiness of your organization to move to stage 2.
- Stage 2:
  - Scheduled 30 to 45 days after the stage 1 audit.
  - On-site audit of your entire EnMS.
  - Nonconformities will need to be resolved prior to issuing of the certificate.

Certification Process

- Surveillance audits
  - Scheduled at either six or twelve month intervals depending on the contract.
  - Partial system audit.
- Re-certification audit
  - On-site audit conducted prior to the third anniversary of the initial certification
  - Surveillance visits will then continue, as before, on a 3-year cycle.

Seeking ISO 50001
Program Launch Candidate

- PJR is offering an ISO 50001 Certification Audit at a 50% discount with no travel costs to the first company to sign up as our program launch audit candidate.
- PJR has been a leader in the ISO 50001 standard since its inception. Here are just a few reasons why PJR is at the top for ISO 50001:
  - We provide technical expertise to guide our clients in the field of energy
  - We provide flexibility
  - We always consider the best interests of the client
- For more information about this exciting opportunity and to learn more about ISO 50001, please contact Scott Jones, EHS Program Manager.

Resources for Establishing and Implementing an EnMS

- http://www1.eere.energy.gov/energymanagement/
  - Information and resources provided by the U.S. Department of Energy (DOE)
- https://save-energy-now.org
  - Step by step guide for establishing and implementing an EnMS
  - Provides templates for requirements of the standard
- http://www.iso.org
  - Information on purchasing the ISO 50001:2011 standard
- http://www.energystar.gov
  - Provides guidelines for Energy Management

ISO 50001 (EnMS) Webinar

For additional technical information or for a quote, please contact Scott Jones.

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