



Energy Management System Standard ISO 50001

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Why an Energy Management System?

- Most energy efficiency achieved through changes in how energy is managed rather than through installation of new technologies;
- An energy management system provides a method for integrating energy issues into existing management systems for continual improvement
- The PDCA model of management systems has proven successful for quality, health and safety, and environment (changes culture, engages management, changes behavior)

But why an ISO standard for Energy Management?????

- National standards being developed elsewhere
- Energy efficiency and climate are ISO priority areas
- Can be made compatible with other ISO management system standards (i.e., 9000/14000)
- Can be made applicable to commercial, institutional, and transportation sectors
- For energy, allows more flexibility for significance determination of key issues than ISO 14001
- Stronger on performance than ISO 14001

Business Benefits

Implementation of an energy management system assists an organization to:

- Develop a baseline of energy use
- Actively managing energy use and costs
- Reduce emissions without negative effect on operations
- Continue to improve energy use/output over time
- Document savings for internal and external use (e.g. emission credits)

PC/TC 242 timeline

- September 2008 - 1st Plenary in Washington D.C. work starts
- June 25 -Sept 25, 2009 - CD ballot (approved)
- November 2009 - 3rd Plenary meeting in London to develop Draft International Standard (DIS)
- March 26-Aug 26, 2010 DIS ballot (approved)
- Oct 2010 – 4th Plenary meeting in China to develop Final Draft International Standard (FDIS)
- March 28-May 28, 2011 FDIS ballot
- **May 30th 2011 – ISO/FDIS 50001 approved unanimously** (43 approval (39 “P” Members)
- June 2011- Publication of ISO 50001
- December 2011- First meeting of TC and start of next documents



ISO 50001 – the Standard

Scope

This international standard specifies requirements for establishing, implementing, maintaining, and improving an **energy management system**, whose purpose is to enable an organization to follow a systematic approach in **achieving continual improvement of energy performance**, including energy efficiency, energy use and consumption.

Scope

This International standard specifies requirements applicable to energy use and consumption, including measurement, documentation and reporting, design and procurement practices for equipment, systems, processes and personnel that contribute to energy performance.

Scope

This International Standard applies to all variables affecting energy performance that can be monitored and influenced by the organization. **This International Standard does not prescribe specific performance criteria with respect to energy.**

This International Standard has been designed to be used independently, but it can be aligned or integrated with other management systems.

Scope

This International Standard **is applicable to any organization** wishing to ensure it conforms to its stated energy policy and wishing to demonstrate this to others, such conformity being confirmed either **by means of self-evaluation and self-declaration of conformity, or by certification of the energy management system by an external organization.**

This International Standard also provides, in Annex A, informative guidance on its use.

Compatibility

- Intended and designed to be fully compatible with other ISO management system standards
- Systems can be easily integrated
- Many identical clauses in regard to system elements (Document Control, Corrective Action, Auditing, Management Review, etc.)

Some Key Definitions- Energy

electricity, fuels, steam, heat, compressed air, and other like media

NOTE 1 For the purposes of this International Standard, energy refers to the various forms of energy, including renewable energy, that can be purchased, stored, treated, used in equipment or in a process, or recovered.

NOTE 2 In physical terms, energy can be defined as the capacity of a system to produce external activity or perform work.

Energy Performance

measurable results related to energy efficiency, use and consumption

NOTE 1 In the context of energy management systems, results can be measured against the organization's energy policy, objectives, targets and other energy performance requirements.

NOTE 2 Energy performance is one component of the performance of the energy management system.

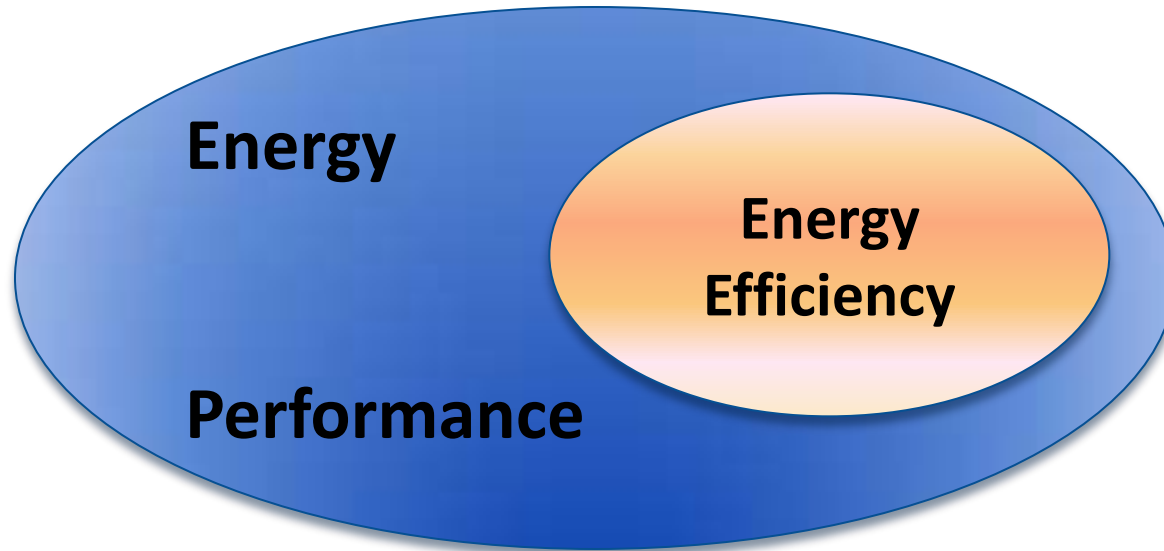
Energy Efficiency

ratio or other quantitative relationship between an output of performance, service, goods or energy, and an input of energy

EXAMPLE Conversion efficiency; $\text{energy required/energy used}$; output/input ; $\text{theoretical energy used to operate/energy used to operate}$.

NOTE Both input and output need to be clearly specified in quantity and quality, and be measurable.

Energy Performance vs. Energy Efficiency



Energy Use

manner or kind of application of energy

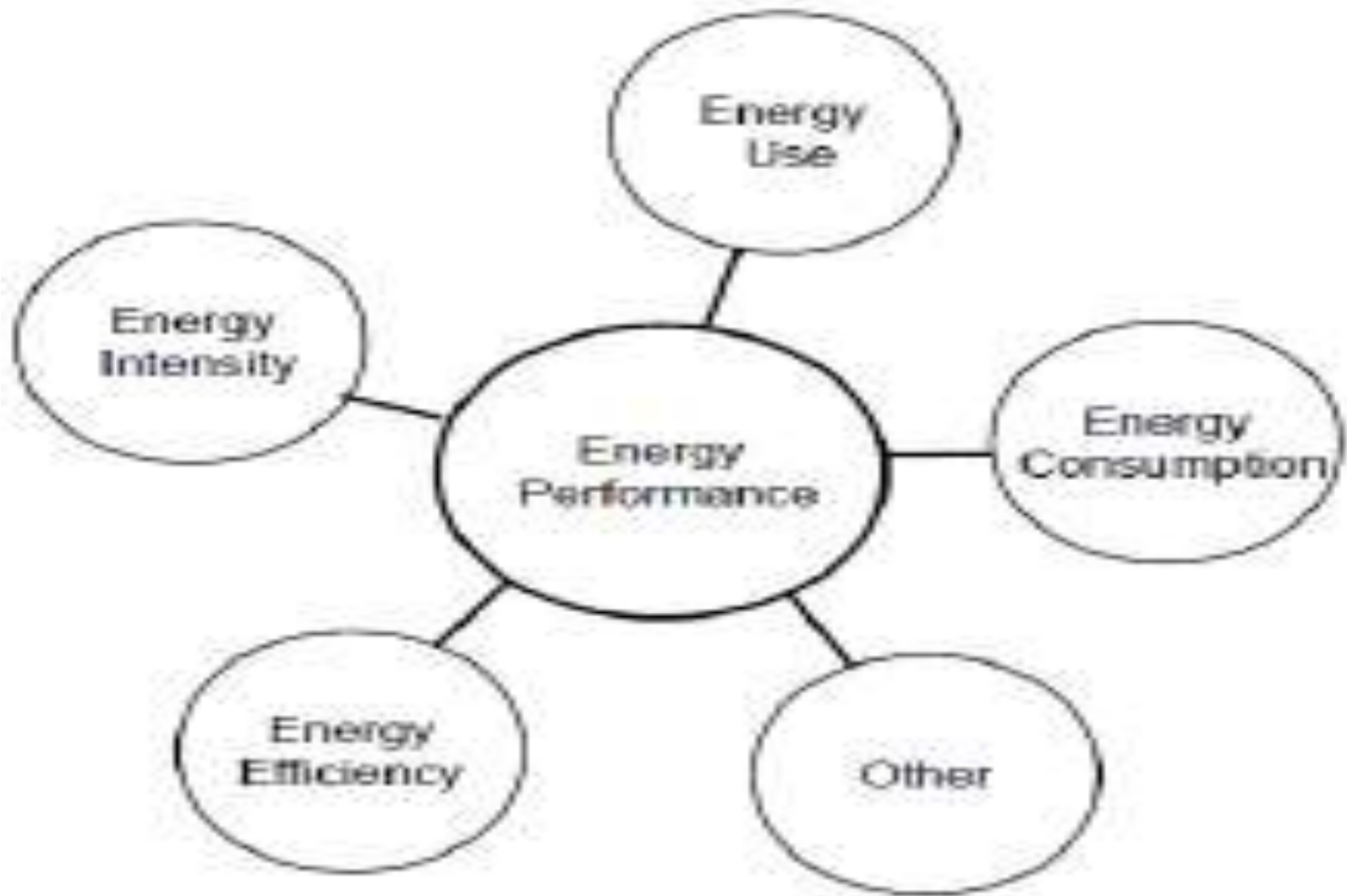
EXAMPLE Ventilation, lighting, heating, cooling, transportation, processes, production lines.

Energy use refers to what purpose the energy is applied. It does not currently include the concept of how much energy is used, just what it is used for. The use of “manner” in the definition is related to the way that people apply the energy, so could include human interaction and therefore could be improved with training, for example.

Energy Consumption

quantity of energy applied

Energy consumption represents “how much” as it relates to energy use above. This is a separate concept from the energy use but these related terms appear together throughout the standard



Energy Baseline

quantitative reference(s) providing a basis for comparison of energy performance

NOTE 1 An energy baseline reflects a specified period of time.

NOTE 2 An energy baseline can be normalized using variables which affect energy use and/or consumption, e.g.

production level, degree days (outdoor temperature), etc.

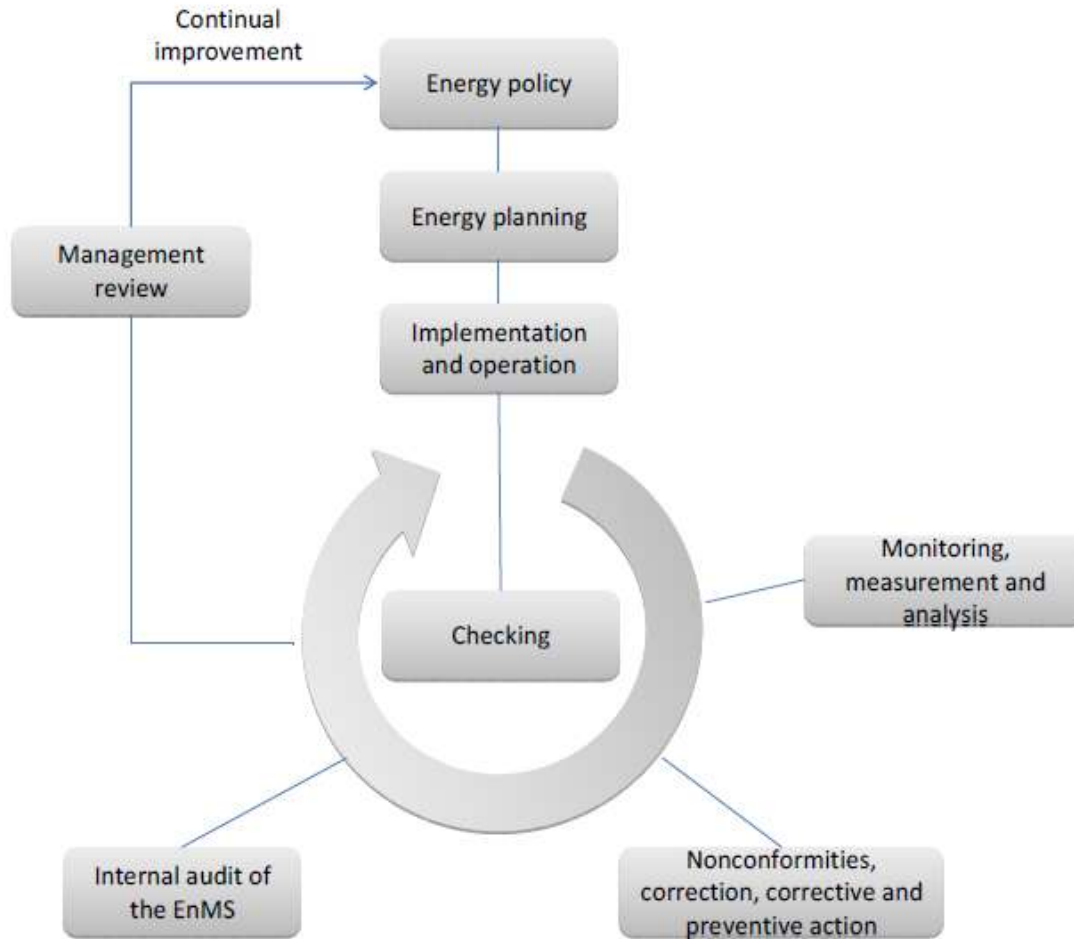
NOTE 3 The energy baseline is also used for calculation of energy savings, as a reference before and after

implementation of energy performance improvement actions.

Other words used....

- **Energy Performance Indicator**-quantitative value or measure of energy performance as defined by the organization
- **Significant energy use**-energy use accounting for substantial energy consumption and/or offering considerable potential for energy performance improvement
- **Energy services**- activities and their results related to the provision and/or use of energy
- **Energy review**-determination of the organization's energy performance based on data and other information leading to identification of opportunities for improvement

EnMS



The Requirements-General

- Set up the system in accordance with the standard
- Define and document the scope and boundaries
- Determine how you will meet the requirements in order to achieve **continual improvement of its energy performance and of its EnMS**

Management Responsibility

- Top Management
 - Set policy, identify scope and boundaries
 - Provide resources, consider energy in long term planning
 - Appoint a Management Representative
 - Communicate importance
 - Ensure objectives and targets are set
 - Ensure relevant KPIs
 - Ensure measurement and reporting
 - Conduct management reviews

Management Responsibility

- Management System Representative
 - Ensure EnMS is established, implemented, and maintained
 - Identify those to ensure implementation
 - Report to Top Management on performance and EnMS
 - Ensure activities support policy
 - Define and communicate responsibilities
 - Determine criteria and methods to ensure implementation
 - Promote awareness

Energy Planning

- Need to define the energy planning process that will lead to conformance with the policy and continually improve energy performance. (Need to review activities!)
 - Legal and Other Requirements
 - Energy Review
 - Energy Baseline
 - Energy Performance Indicators
 - Energy Objectives, Targets, Energy Management Action Plans

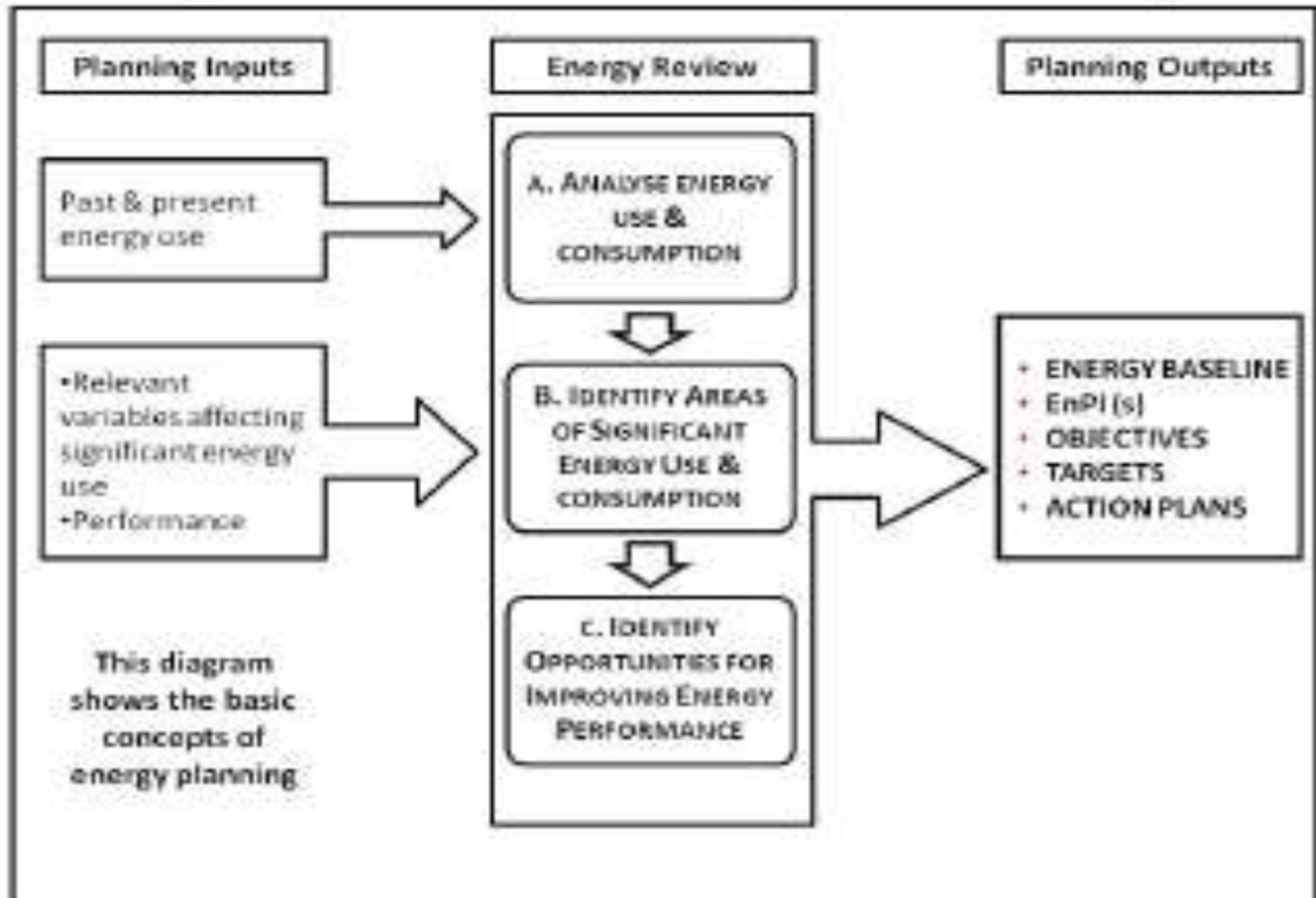
Energy Review

- Define a methodology to do the review
- Analyze energy use and consumption
- Determine significant energy use based on use and consumption
- Estimate future uses
- Identify, prioritize, and record opportunities for improving energy performance
- To occur at set intervals and whenever major changes occur to facilities, equipment, systems, or processes

Energy Baseline

- Sets the baseline, or reference point, against which performance will be measured
- Determined based on information from the initial energy review
- Can be updated if appropriate based on changes to conditions

Energy Planning Process



Implementation and Operation

- Competence, Training, and Awareness
- Communication
- Documentation (requirements and control)
- Operational Control
- Design
 - Of facilities, equipment, systems, and processes
- Procurement of Energy Services, Products, Equipment, and Energy

Checking

- Monitoring, Measurement, and Analysis
- Evaluation of compliance with legal and other requirements
- Internal Audit of the EnMS
- Nonconformance, Correction, Corrective Action, Preventive Action
- Control of Records

Management Review

- General requirements
- Input to Management Review
 - Typical management systems items, including performance information
- Output from Management Review
 - Changes and actions that address performance of the EnMS and energy performance



What Happens Now?- Implementation

First Steps

- Further familiarization with the standard and what it requires
- Assess value to the organization- do you want to go down this path?
- Get management on board
- Assemble the right team
- Train the team
- Begin policy development and initial reviews- “where are we?”

Construct the Pieces

- Identify key roles and responsibilities
- Determine training and awareness needs
- Start the communication process- raise awareness, build capacity
- Fill in the blanks- procedures and processes
- Deploy expectations-objectives and targets
- Let the system gel and evolve

Check how it is going

- Monitoring and measurement
- Audits (of all types potentially (EnMS, Energy, regulatory, etc.))
- “Fix what’s broken, run with what works” - the corrective action process
- Amass the records
- Get ready for management review

Continual Improvement

- Conduct management reviews
- Make decisions that support the commitment to continual improvement
- Enhance and modify the system as needed

To certify or not to certify?

- Not required by ISO 50001
- Drivers would be of the same “type” as ISO 9001, 14001, or OHSAS 18001 but different stakeholders
- Current registrars are adapting to 50001
- Integrated certifications likely
- Will depend on who needs to know conformance

Why not just use 14001?

- Up to organization- very possible to do so
- 14001 has not been able to fully engage energy managers
- 14001 focuses on related impacts to environment, not conducive to other energy drivers (e.g., reliability, independence, security)
- Not as strong on performance
- Less documentation requirements
- Stronger on metrics and measurement

The Future- ISO/TC 242 Work Program

- Guidance for the Implementation, Maintenance and Improvement of an EnMS (ISO 17579)
- Energy Baseline General Principles and Guidance (ISO 17570)
- Energy Performance Indicators (EnPIs) General Principles and Guidance (ISO 17578)
- Energy Audit (ISO 17590)
- EnMS Auditing (ISO 17595)
- Monitoring, measurement, analysis and verification of organizational energy performance (ISO 17580)



ISO 50001 and Superior Energy Performance

courtesy Aimee T. McKane; DOE, LBNL

What is Superior Energy Performance?

A market-based, ANSI/ANAB-accredited certification program that provides industrial and commercial facilities with a roadmap for achieving continual improvement in energy efficiency while boosting competitiveness.

Goals:

- Drive continual improvement in energy performance
- Develop a transparent system to validate energy performance improvements and management practices
- Encourage broad participation throughout industry
- Support and build the energy efficiency market and workforce



Superior Energy Performance for industry will be launched nationwide in early 2012.

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. Energy Management System 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 validated energy performance improvement

ISO 50001



Superior Energy Performance Program

Design

The two-tiered approach accommodates:

- Maturity of facility's energy management program
- Level of external validation desired
- Business climate/cycle

Two Program Tiers

Partner

Self Declaration

Criteria

- Conformance to ISO 50001
- Measure and audit energy performance improvement

Performance Levels

- Energy performance improvement required

Method of Verifying Results

- Self Declaration

Certified Partner

ANSI/ANAB-accredited certification

Criteria

- Conformance to ISO 50001
- Measure, verify, and certify energy performance improvement

Performance Levels

- Energy performance improvement required, minimum requirements set by program
- Two Pathways Available: Energy Performance or Mature Energy

Method of Verifying Results

- ANSI/ANAB-accredited certification with on-site visit



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