



Introduction to MM ISO 50001:Energy Management System (Requirements with guidance for use)

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What is Management System



Why have a management system in the first place?

- When business organization become bigger, just talking by personal opinion is not enough.
- **Management decisions** have to be **formalized** and **disseminated** efficiently and widely.
- **Work activities** have to be **standardized** and documented.
- **Employees** have to be **trained** – and kept trained in line with standard requirement.
- **Records** have to be kept.
- **Results** have to be **tracked** and **review**
- business has to **systematize** all above.



Management system: Definitions

- “The **framework** of **processes** and **procedures** used to ensure that an organization can **fulfill** all tasks required to achieve its **objectives**”
- “A **documented** and **tested** step-by-step **method** aimed at smooth functioning through **standard practices**”
- “The **leadership** and **control** within an organization. It is made up of people interacting with other people and machines that, together, set the **goals and objectives**, outline the **strategies and tactics**, and develop the **plans, schedules** and necessary **controls** to run an organization”



PDCA cycle

All modern management systems are based on “Plan – Do – Check – Act”

- **Plan:** Establish the **targets / goals / objectives**. Establish the plans and processes necessary to deliver these.
- **Do:** Implement the **plans**, execute the **processes**, make the product.
- **Check** Compare **actual results** to **expected results**, to check for any differences / deviations. Analyze the differences / deviations to determine their root causes.
- **Act:** Take **corrective actions** on significant differences / deviations between actual and planned results. Start the cycle again.



Some terms to understand

- **Energy Management System (EnMS)**
 - Systematic approach to the management of energy use
- **Energy Management System Standard**
 - Standardised approach to implementing an EnMS
 - You may decide to base your EnMS on a standard e.g. ISO 50001:2011
- **Certification of EnMS**
 - You may decide to have your EnMS certified to a standard
- **Self-evaluation and self declaration of conformance**



ISO 50001 Energy Management Standard

- **Purpose of ISO 50001**

“..to enable organizations to establish the systems and processes necessary to **improve energy performance**...”
- **Scope of ISO 50001**

“.. 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”

➤ “.. is applicable to all organizations.”

ISO 50001 does NOT prescribe specific performance criteria with respect to energy.
- ISO 50001 was published on 15 June 2011



Clauses of ISO 50001 and ISO 9001



ISO 50001:2011		ISO 9001 :2008
4.1	General requirements	General requirements
4.2	Management responsibility	Management responsibility
4.2.1	Top management	Management commitment
4.2.2	Management representative	Responsibility and authority
4.3	Energy Policy	Management representative
4.4	Energy planning	Quality Policy
4.4.1	General	Planning
		Quality objectives
		Determination of requirements related to the product
4.4.2	Legal requirements and other requirements	Determination of requirements related to the product
4.4.3	Energy review	Design and development inputs
		Quality objectives
		Determination of requirements related to the product



4.4	Energy planning	Planning
4.4.1	General	Quality objectives Determination of requirements related to the product
4.4.2	Legal requirements and other requirements	Determination of requirements related to the product Design and development inputs
4.4.3	Energy review	Quality objectives Determination of requirements related to the product
4.4.4	Energy baseline	-
4.4.5	Energy performance indicators	-
4.5	Implementation and operation	Product realization
4.5.1	General	Control of production and service provision
4.5.2	Competence, training and awareness	Competence, training and awareness



4.5.3	Communication	Internal communication
4.5.4	Documentation	Documentation
4.5.4.1	Documentation requirements	General
4.5.4.2	Control of documents	Control of documents
4.5.5	Operational control	Control of production and service provision
4.5.6	Design	Design and development
4.5.7	Procurement of energy services, products, equipment and energy	Purchasing
4.6	Checking	Measurement analysis and improvement
4.6.1	Monitoring, measurement and analysis	Monitoring and measurement of Process Monitoring and measurement of product Analysis of data
4.6.2	Evaluation of compliance with legal requirements and other requirements	Design and develop review



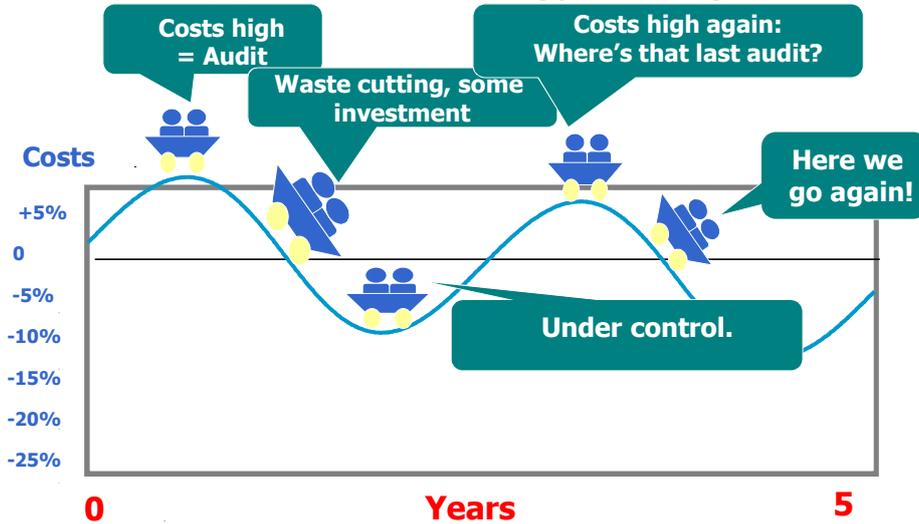
4.6.3	Internal audit of the EnMS	Internal audit
4.6.4	Nonconformities, correction, corrective action and preventive action	Control of nonconforming product Corrective action Preventive action
4.6.5	Control of records	Control of records
4.7	Management review	Management review
4.7.1	General	General
4.7.2	Input to management review	Review input
4.7.3	Output from management review	Review output



Energy Management System (EnMS)

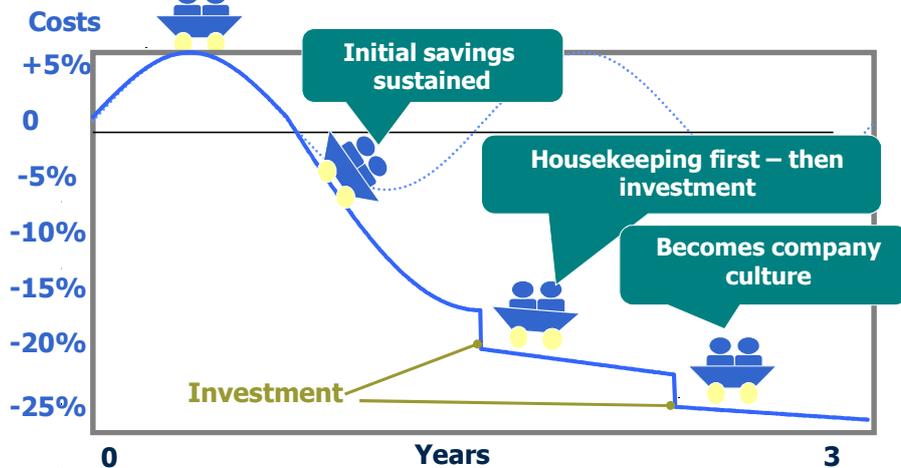


Ad hoc approach to energy management...



Senior management commit to programme

Structured Approach





Energy Efficiency Benefits

- Energy efficiency has demonstrated, time and again, that
 - ✓ It saves industrial firms money
 - ✓ It increases reliability of operations
 - ✓ It has a positive effect on productivity and competitiveness
 - ✓ It can offer attractive financial and economic returns
 - ✓ Improved security of supply
 - ✓ Improved Corporate Social Responsibility
 - ✓

Then

Why it is not happening?

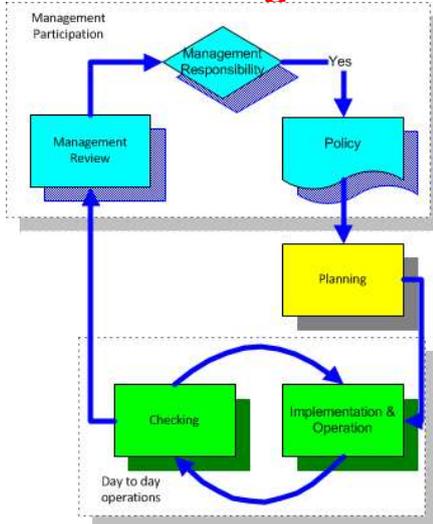


Barriers to Industrial Energy Efficiency

- Management focus is on production and **not on energy efficiency**
- **Lack of** information and **understanding** of financial and qualitative **benefits**
- **Lack of** adequate **technical skills** to assess **performance**, developing and implementing **EE measures and projects**
- First costs more important than recurring costs → **disconnection** between **capital** and **operating** budgets
- When EE knowledge exists it very often resides with individuals rather than with the company/organization → **sustainability risk**
- **Poor realization** among senior management of the **scale of the opportunity**
-



It Works Using Six Key Concepts



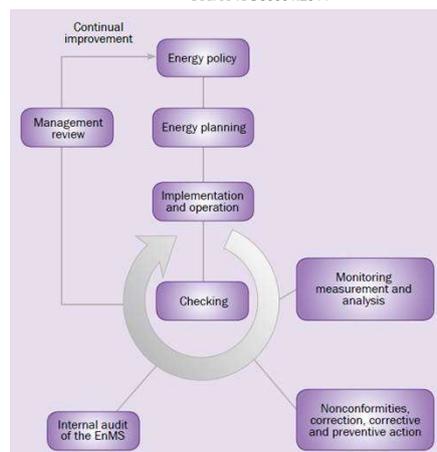
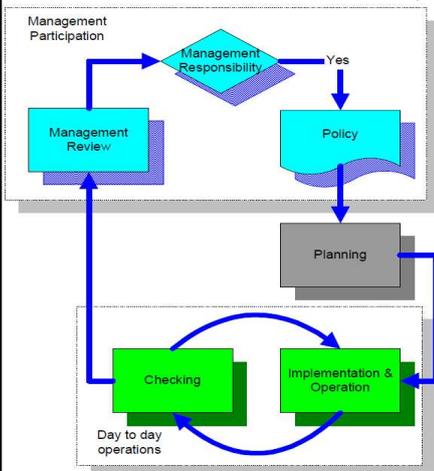
1. Commitment
Roles and Responsibilities
2. Significant Energy Users (SEUs)
3. Energy Performance Indicators (EnPIs)
4. Opportunities List
5. Operational Control
6. Review



ISO 50001 Energy Management Standard

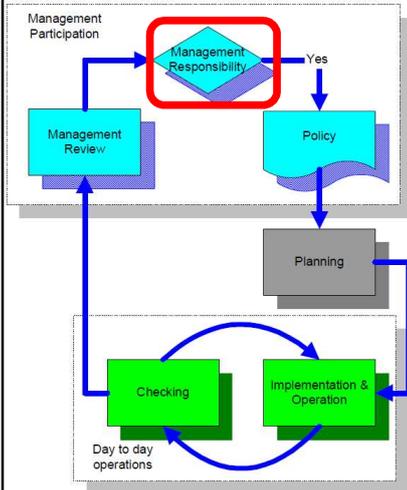
Based on the PDCA concept

Source ISO50001:2011





Management Responsibility



Is the top management really comitted?

Will you support the system?

This is a decision point!

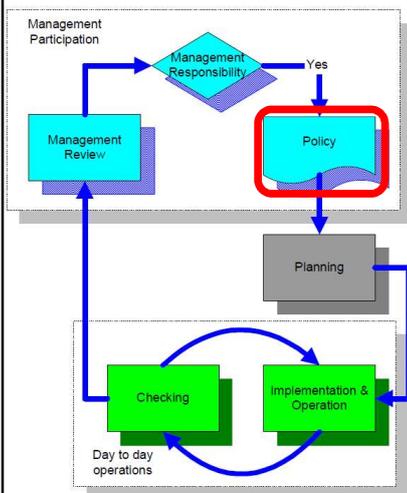
If not, we can all go for more coffee now!

Will you make the necessary resources available (technical, financial and human)

We assume you will if you believe there is an adaqueate return on your effort or investment



Policy



Management commitment

Not just a signature!

Define scope of EnMS

Appropriate to scale

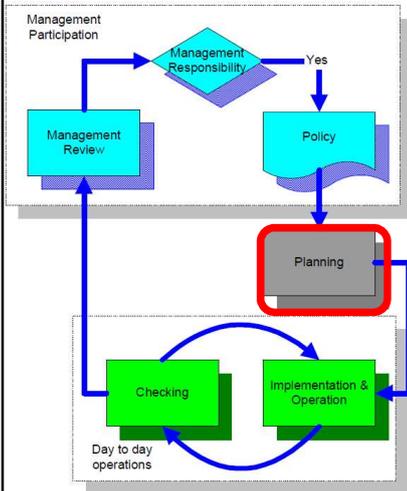
Commitment to continual improvement

Make resources available

Framework for target setting and review organizations



Planning



How much energy are you using?

Where are you using it?

What is driving this use?

What is your baseload?

Who is influencing its use?

Is an energy audit required – focus it?

System Optimization

Renewable energy options

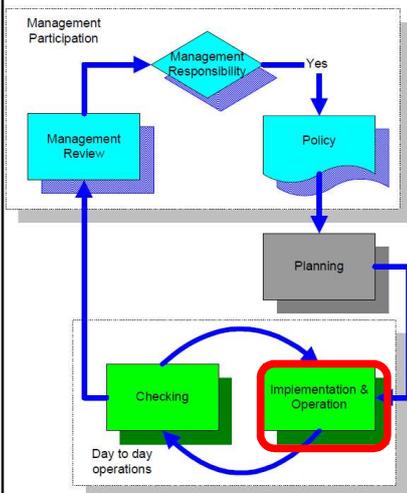
Develop baseline & indicators

Set objectives and targets

Action Plan



Implementation & Operation



Competence, training and awareness

Documentation

Operational control

- KEY AREA
- Operation & Maintenance
- Service contractors
- Training
- Implement your action plan

Communication

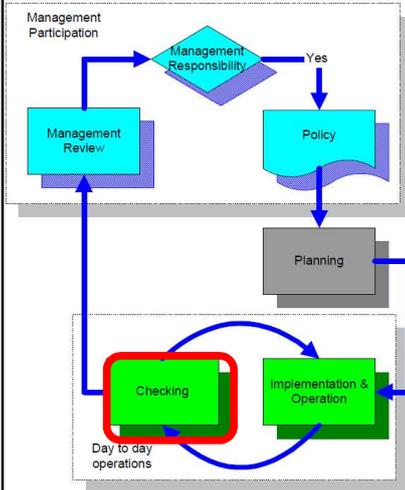
Design

Energy Efficient Design (EED)

Purchasing energy, services, goods



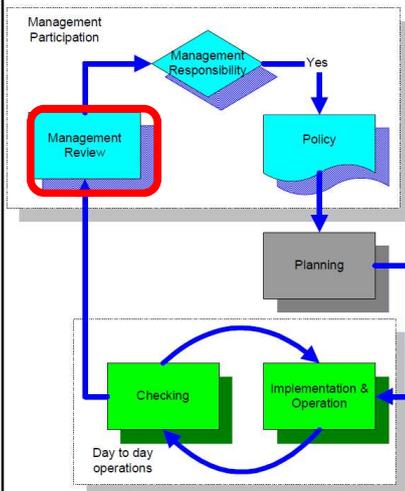
Checking



- Technical checking
 - Monitoring and targeting (software may be justifiable?)
 - Equipment checking
- System checking
 - Is everyone doing what is required?
 - Corrective and preventive action
 - Non-conformities
- Performance checking
 - Check Energy Performance Indicators (EnPIs)



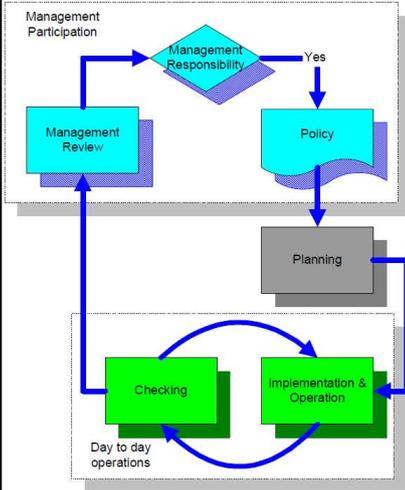
Management Review



- Regular presentation
- Frequency based on requirements
- How are we getting on?
- Is performance improving as targeted?
 - Problems and barriers to overcome?
 - Achievements
- What is the plan for next year?
- What do we need to achieve this plan?



You're **not finished** – this is not a project!



Then
you
start
all
over
again!!



Sample audit questions for EnMS



1. Commitment and policy		
	1. Has the organization defined and documented the scope and boundaries of its energy management system?	General Requirement
4.2	2. Has the organization determined and documented how it will meet the requirements of the standard in order to achieve continual improvement?	
	3. Does the policy define the scope and boundaries of the energy management system?	
	4. Is the policy appropriate to the nature and scale of, and impact on, the organization's energy use?	
	5. Does the policy include a commitment to continual improvement in energy efficiency?	
	6. Does the policy include a commitment to ensure the availability of information and of all necessary resources to achieve objectives and targets?	
4.3	7. Does the policy provide a framework for setting and reviewing energy objectives and targets?	Policy
	8. Does the policy include a commitment to comply with all applicable requirements relating to its energy aspects?	
	9. Is the policy documented and communicated to all personnel working for, or on behalf of, the organization?	
	10. Does the organization commit itself to periodically reviewing and updating the policy?	
	11. Is the policy made available to the public?	



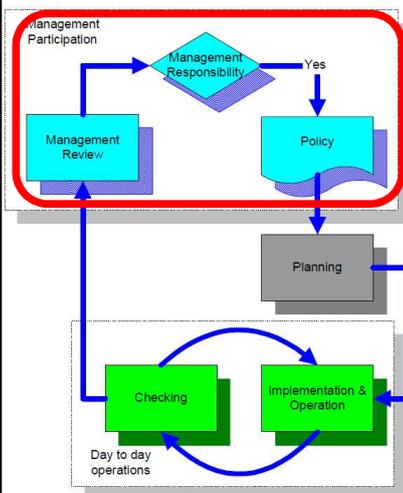
4. Checking		
Monitoring and measuring		
	1. Has the organization established the monitoring, measuring and targeting requirements of its energy management programme?	Key Characteristic
	2. Does the organization have a demonstrable plan for improving the provision of meters?	Measurement Plan
	3. Does the organization monitor, measure and record significant energy consumption and associated energy factors at defined intervals?	SEUs & its Drivers
4.6.1	4. Are records maintained that demonstrate the accuracy and repeatability of monitoring and measuring equipment?	
	5. Does the organization assess and review the relationship between the energy consumption and its associated energy factors and defined intervals?	Driver, Regression Analysis
	6. Does the organization maintain records of all significant accidental deviations from expected energy consumption , including causes and remedies ?	Model, Expected
	7. Does the organization compare its energy performance indicators against similar organizations or situations?	EnPI
Evaluation of compliance		
	1. Does the organization periodically evaluate its compliance with legal and other obligations?	Evaluation of compliance with
4.6.2	2. Does the organization maintain records of compliance against legal and other requirements?	



Management Role and Resources required (Important Issue)



Management Role



- Give commitment
- Sign policy
- Allocate resources
- Assign responsibility
- Top management representative
- Give support
- Participate in annual review
- Make decisions
- Clarify Priorities



What resources are required?

Management Resources required

- Consider the opportunity
- Make the decision to go ahead
- Review and approve the policy
- Participate in the regular review meeting
- Make on-going decisions as required
- Offer encouragement and support

Operational resources

Implementation cost (for EnMS itself)

Capital Investment



What resources are required?

Management Resources required

Operational resources

- Completion of planning steps
- Training is probably the largest cost
- Support from other departments
- Some time for energy manager to focus on Energy

Implementation cost (for EnMS itself)

Capital investment



What resources are required?

Management Resources required

Operational resources

Implementation cost (for EnMS itself)

- Consultancy support (if required)
- Certification cost (if required)

Capital investment



What resources are required?

Management Resources required

Operational resources

Implementation cost (for EnMS itself)

Capital investment is straightforward!

- Either finance is justifiable and available or it isn't!
- The focus of the EnMS is on prioritising opportunities
 - Low Cost First
- Capital projects are also identified and justified



List all tasks that need to be completed in the EnMS

Assign and agree responsibility for each task

A tool can be available UNIDO IEE Project.

For each task:

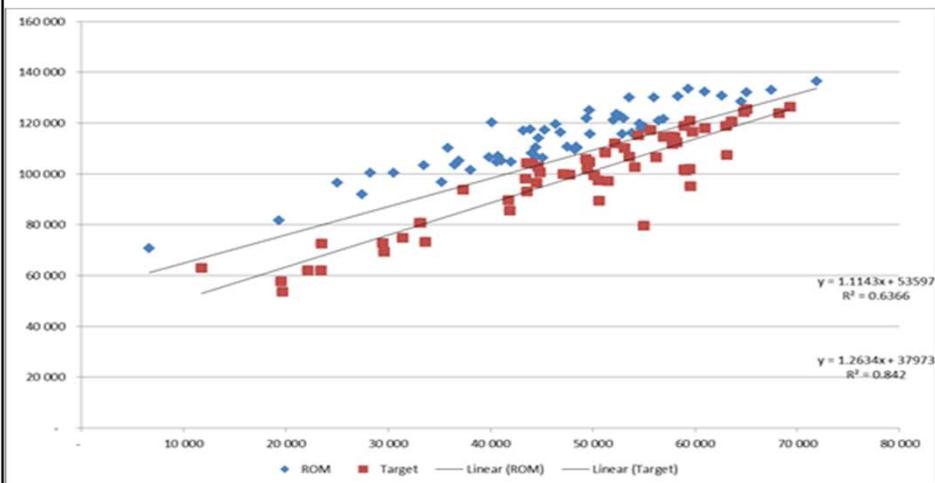
How often?

Who is involved?

Should fit with existing priorities of each participant



What can be achieved?





THANK YOU