



Introduction of energy management standards

Benefits for industry?

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Focus on Industrial Energy Efficiency is Growing

- Energy efficiency is now a major focus of G-8 meetings and is recognized by the International Energy Agency as a primary source of short-term GHG emission reductions.
- European Commission Green Paper and Directives on Energy Efficiency - Standards for energy consuming equipment and energy management are between the policy-driven market-based instruments recommended (EN 16001)
- International Organization for Standardization (ISO) is initiating a broad portfolio of energy efficiency and energy management standards for developing and emerging nations.





What are Industry's Priorities?

Current

1. Stay *profitable*
2. Operate a safe workplace
3. Be compliant with environmental regulations
4. Meet legal and social responsibilities
5. Monitor supply chain for potential liability



Emerging

6. Increasing Social and Environmental Responsibility.
7. Manage GHG emissions, carbon footprint



Why Isn't Industry More Energy Efficient?

- The business of industry is *not* energy efficiency
- Facility engineers typically do *not* become CEOs or CFOs
- Budgets are *separate* for equipment purchases and operating costs
- Budgets are *separate* for energy and maintenance costs
- *Data* on energy use of systems is
- Lack of experience in *assessing* evaluating performance improvements
- Opportunities to become more energy efficient are overlooked
- Technical ability across many fields may be rare





Industry and Energy Management

Most energy efficiency in industry is achieved through changes in *how energy is managed* in an industrial facility, rather than through installation of new technologies;



Industry and Energy Management

- Companies that establish *an energy management plan (system)* gain a *number of benefits*:

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

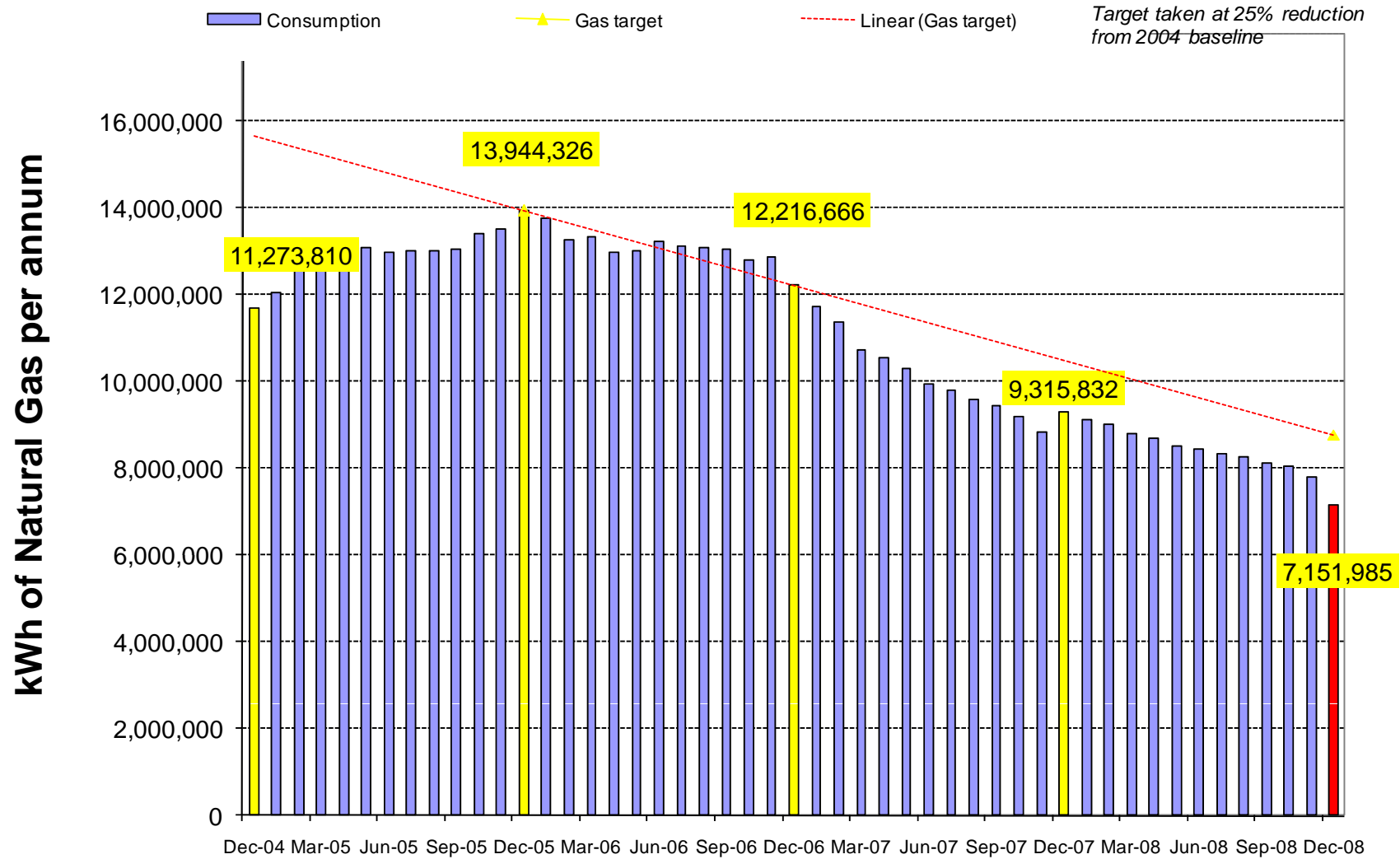
- There are usually additional benefits in



Energy Management Results

- Companies who have used energy management to achieve major energy intensity improvements¹ include:
 - **Dow Chemical** achieved 22% improvement (\$4B savings) between 1994 and 2005, and is now seeking another 25% from 2005 to 2015
 - **United Technologies Corp** reduced global GHG emissions by 46% per dollar of revenue from 2001 to 2006, and is now seeking an additional 12% reduction from 2006 to 2010
 - **Toyota's** North American (NA) Energy Management Organization has reduced energy use per unit by 23% since 2002; company-wide energy-saving efforts have saved \$9.2 million in NA since 1999.

¹ Btu/lb of product





The next step

- Develop an energy management system (EnMS).
- Use current EnMS standards for guidance
- Certify your EnMS to a standard



Taking a Comprehensive Approach

Goal: integrate energy efficiency projects into existing management structures for continual improvement

Elements:

1. Energy management system (standard)
2. Training (energy management, system optimization)
3. Capacity building - create cadre of system experts to develop projects
4. Access to tools to identify opportunities and document compliance
5. Recognition of companies that make outstanding efforts to improve their energy efficiency
6. Agreements with industrial sectors that establish plant-specific energy efficiency targets



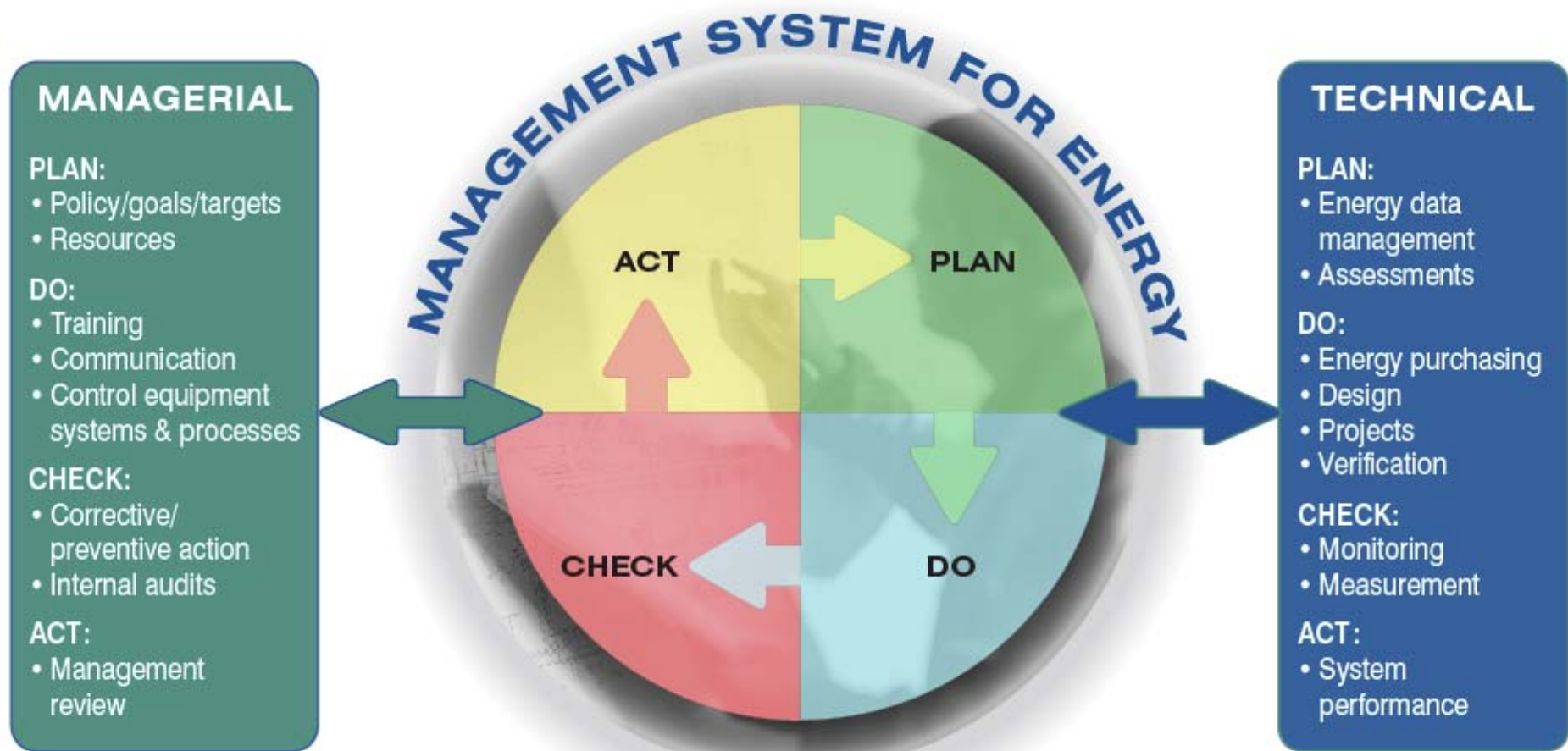
Why an Energy Management Standard?

- An energy management standard provides a *method for integrating energy efficiency* into an industries daily business practices
- All existing and planned energy management standards are compatible with ISO 9000/14000;¹
- Companies who adopt an energy management standard are able to reduce energy use and improve operations, even if they are already complying with ISO 14001.
- Also applicable to commercial, institutional, and transportation sectors

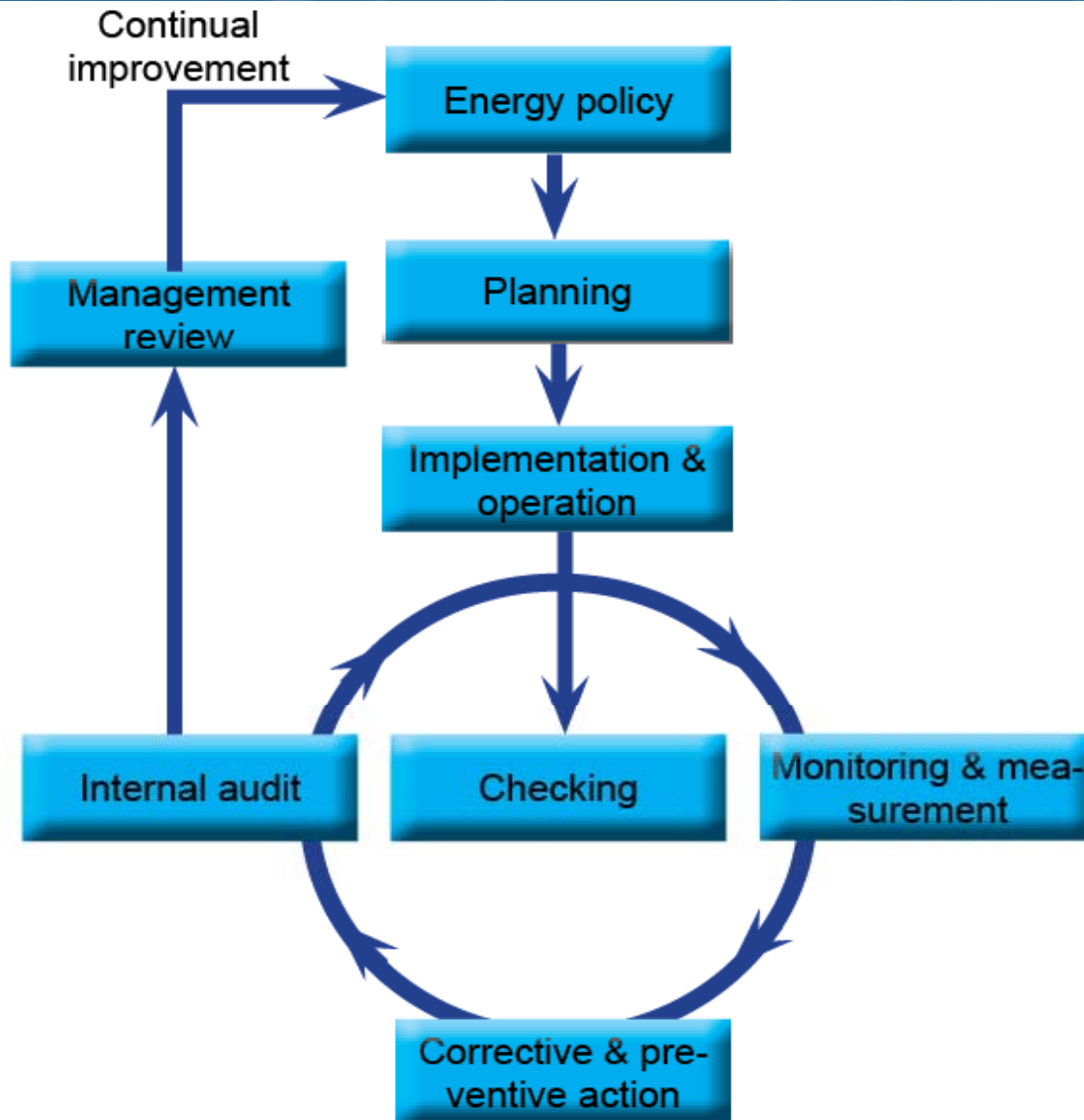
¹ International Organization for Standardization (ISO)



ANSI MSE 2000:2008

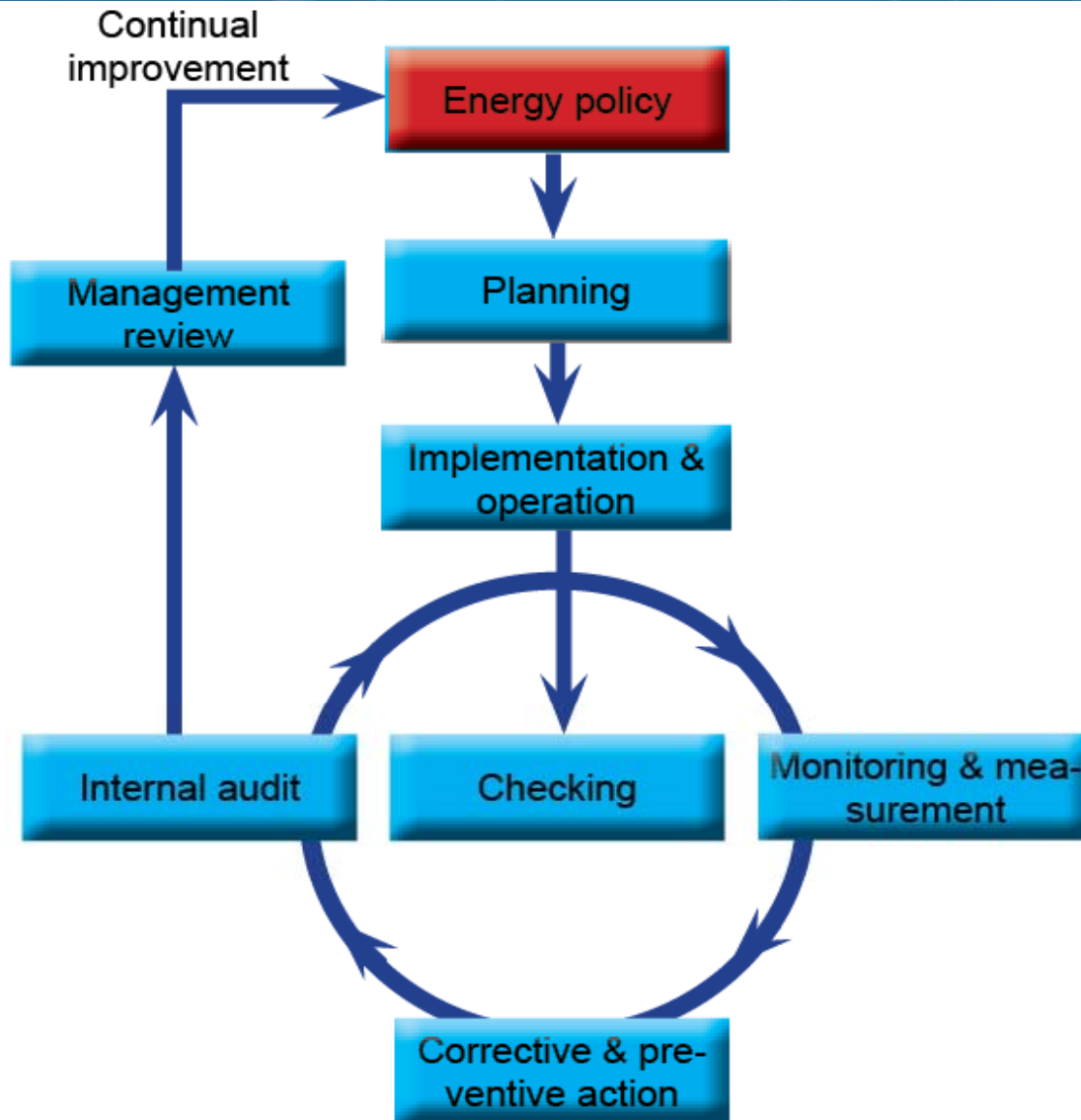


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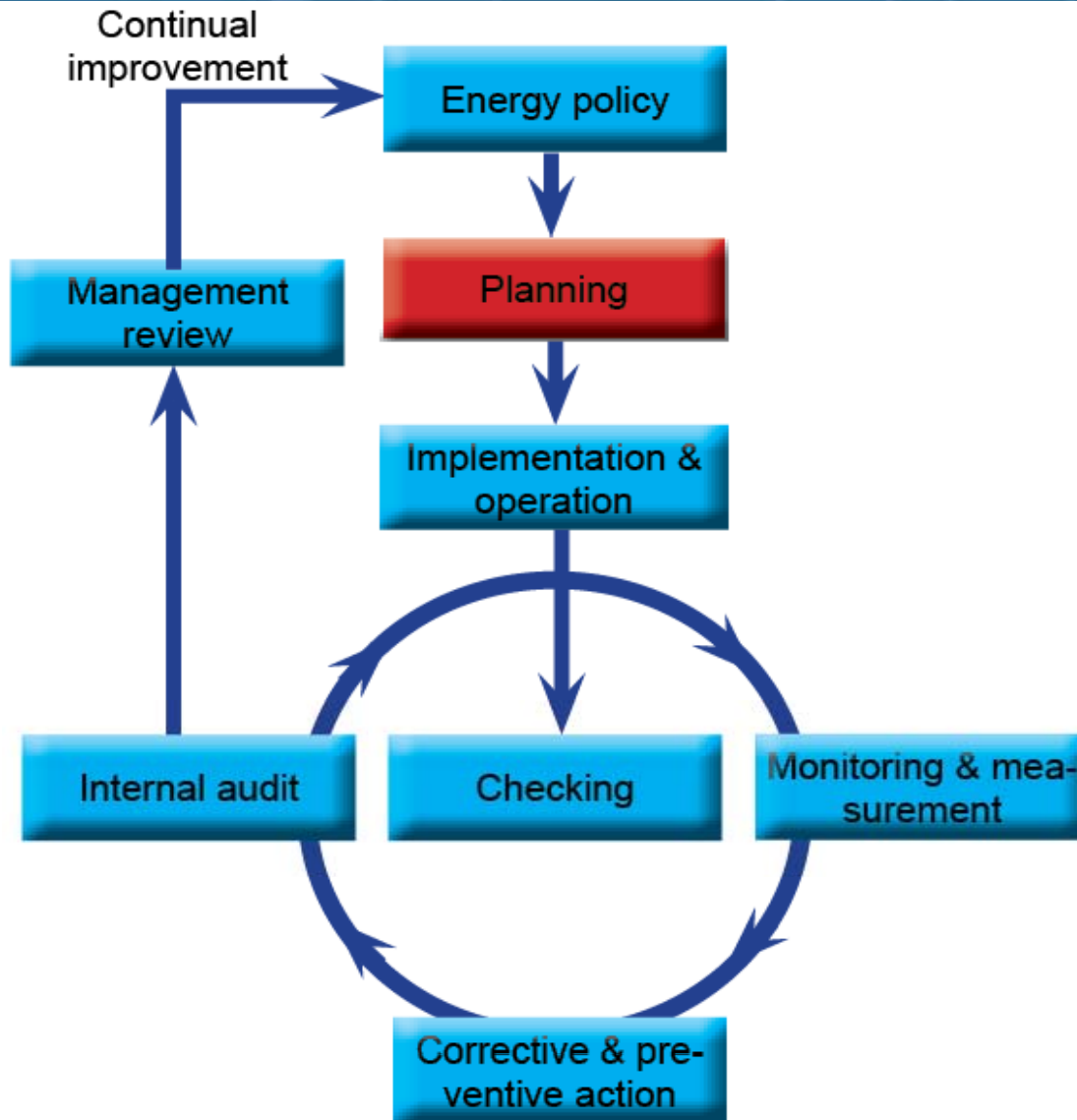
ISO50001

- Plan
- Do
- Check
- Act



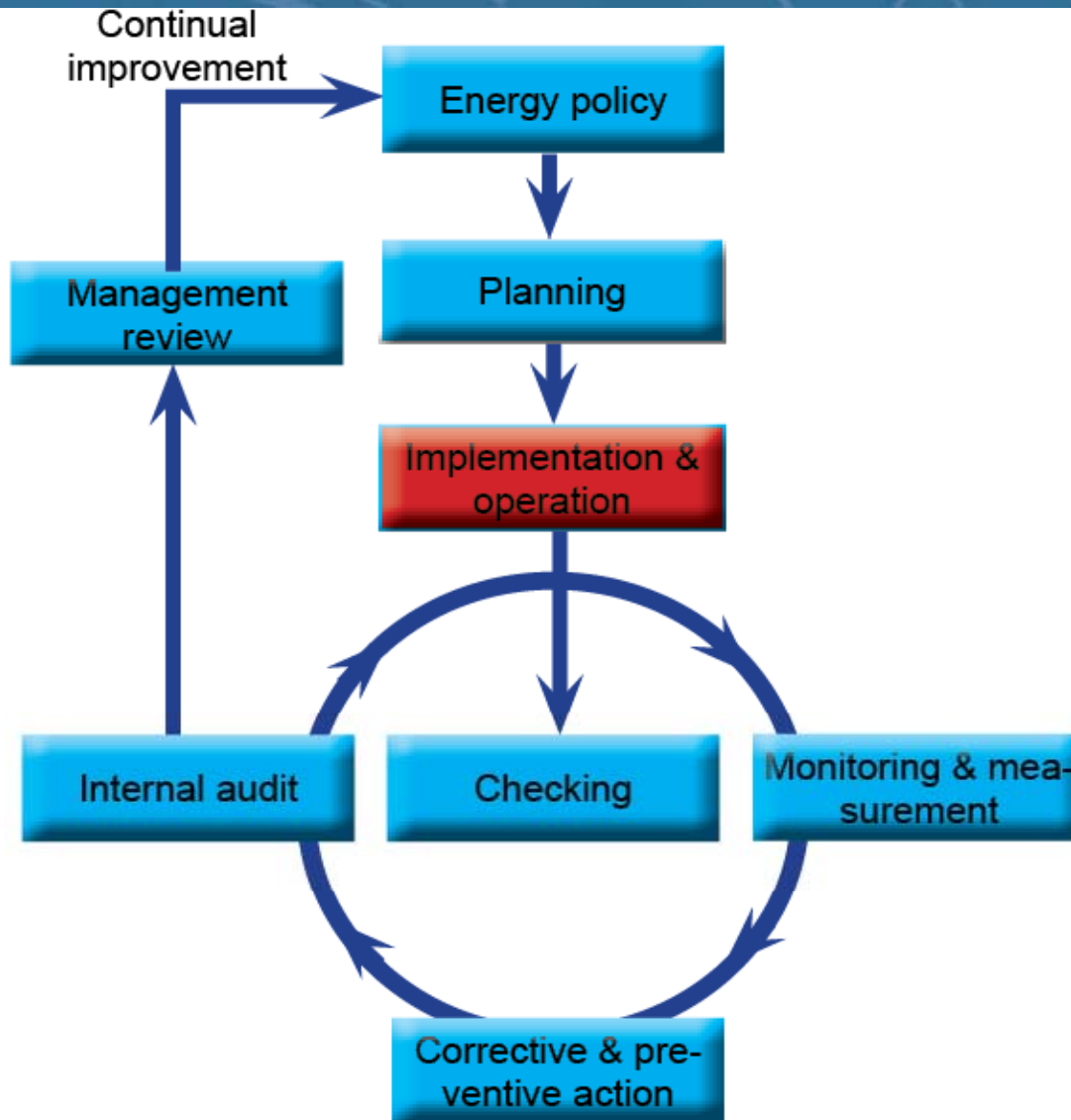
Policy

- 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



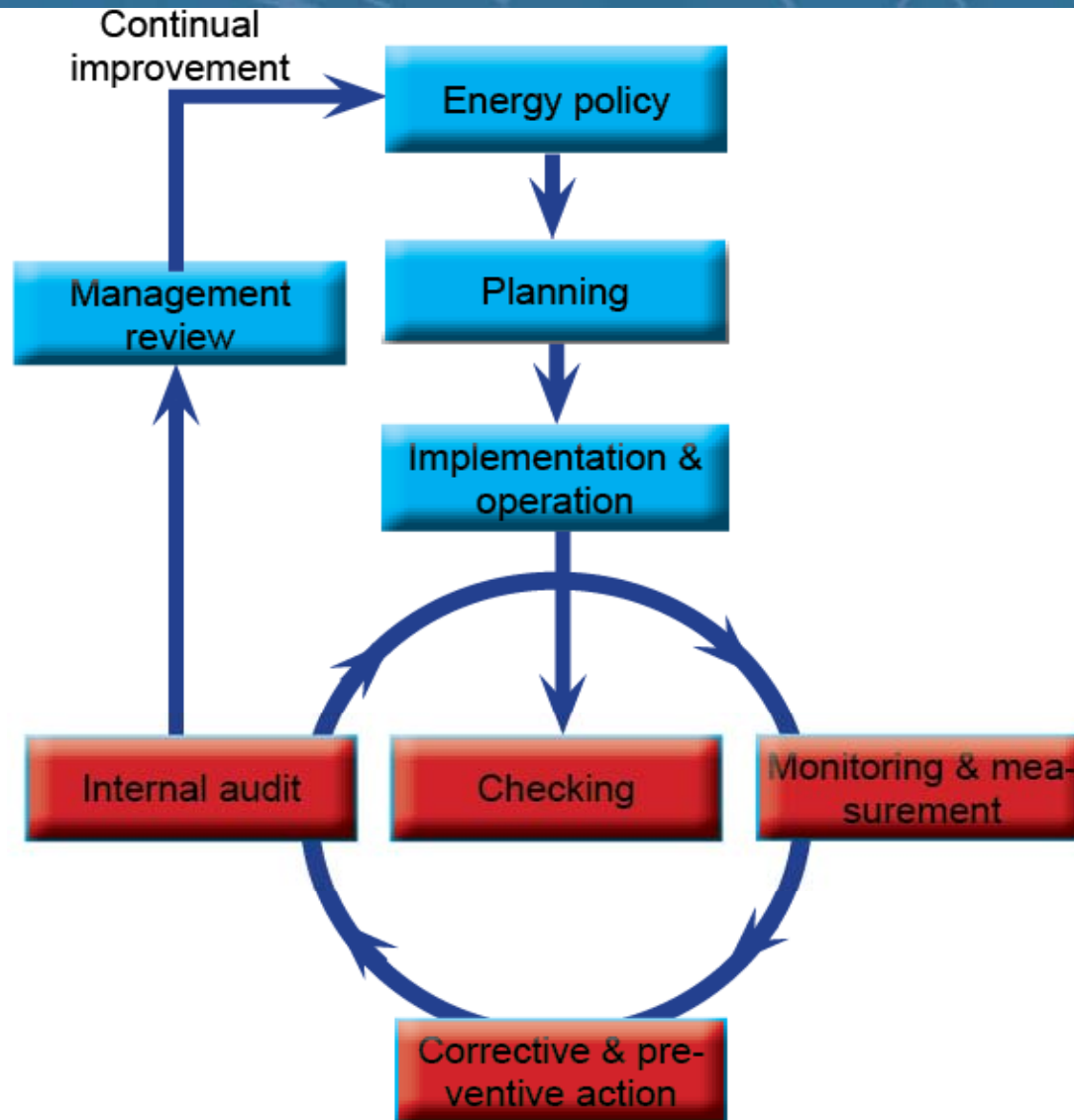
Planning

- How much energy am I using?
- Where am I using it?
- Who is influencing its use?
- Which are significant users?
- What is driving it?
- SYSTEM OPTIMIZATION
- Are there legal or other requirements?
- Develop indicators
- Objectives
- Targets



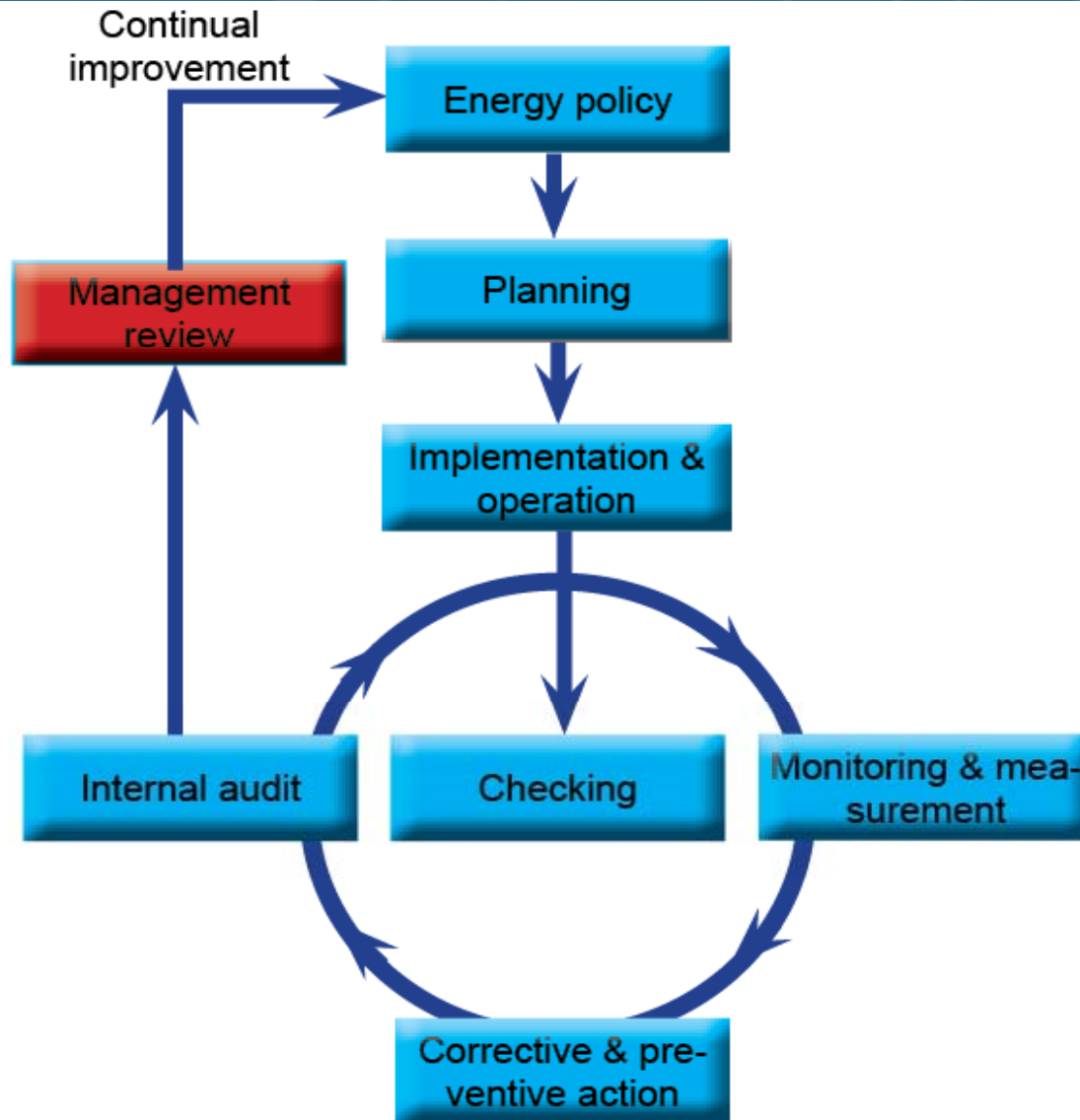
Imp & Op

- Competence, training and awareness
- Documentation
- Operational control (Operation and maintenance)
- Communication
- Design
- Purchasing energy, services, goods



Checking

- Monitoring - technical and system
- Check indicators
- Check action plans
- Check legal and other compliance
- Non-conformities
- Control of records
- Continuous internal audits



Review

- Inputs to review
 - Performance
 - Objectives & targets
 - Audit results
 - Plans for improvement
- Outputs from review
 - Decisions
 - Changes to policy, objectives, targets, etc



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Then start all over again!



Components of an EnMS

- Policy Document - strategy
- Planning
 - Profile, baseline, drivers, objectives, targets, action plan, training plans
- Implementation and Operation
 - Documents, records, communications, specifications
- Checking
 - Monitoring, corrective actions, internal audits



Energy Management Standards

Current Status

- Several countries already have national energy management standards (Denmark, Ireland, Sweden, US, Thailand, Korea)
- The EU has developed a regional energy management standard, EN 16001:2009 (July)
- Energy management standards are under development in China, Spain, and Brazil
- ISO has initiated work on an international energy management standard (2008-2011), with preparatory assistance from UNIDO



ISO 50001: Energy management systems - Requirements with guidance for use

Scope

Standardization in the field of energy management, including:

- energy supply,
- procurement practices for energy using equipment and systems,
- energy use, and
- any use-related disposal issues.

The standard will also address measurement of current energy usage, and implementation of a measurement system to

document, report, and validate continual improvement in the area



Supportive Policies for National Energy Management Standards

- In all countries with existing standards:
 - Energy management standards are voluntary
 - Programs target large energy users (often industrial)
 - Technical assistance is available
 - Case studies are used to publicize benefits
 - Provide recognition for outstanding



Supportive Policies for National Energy Management Standards

In addition, most countries:

- Offer financial incentives for compliance, usually as part of a target-setting agreement¹
- Provide training on standards compliance
- Provide opportunities for companies to network and learn from each other

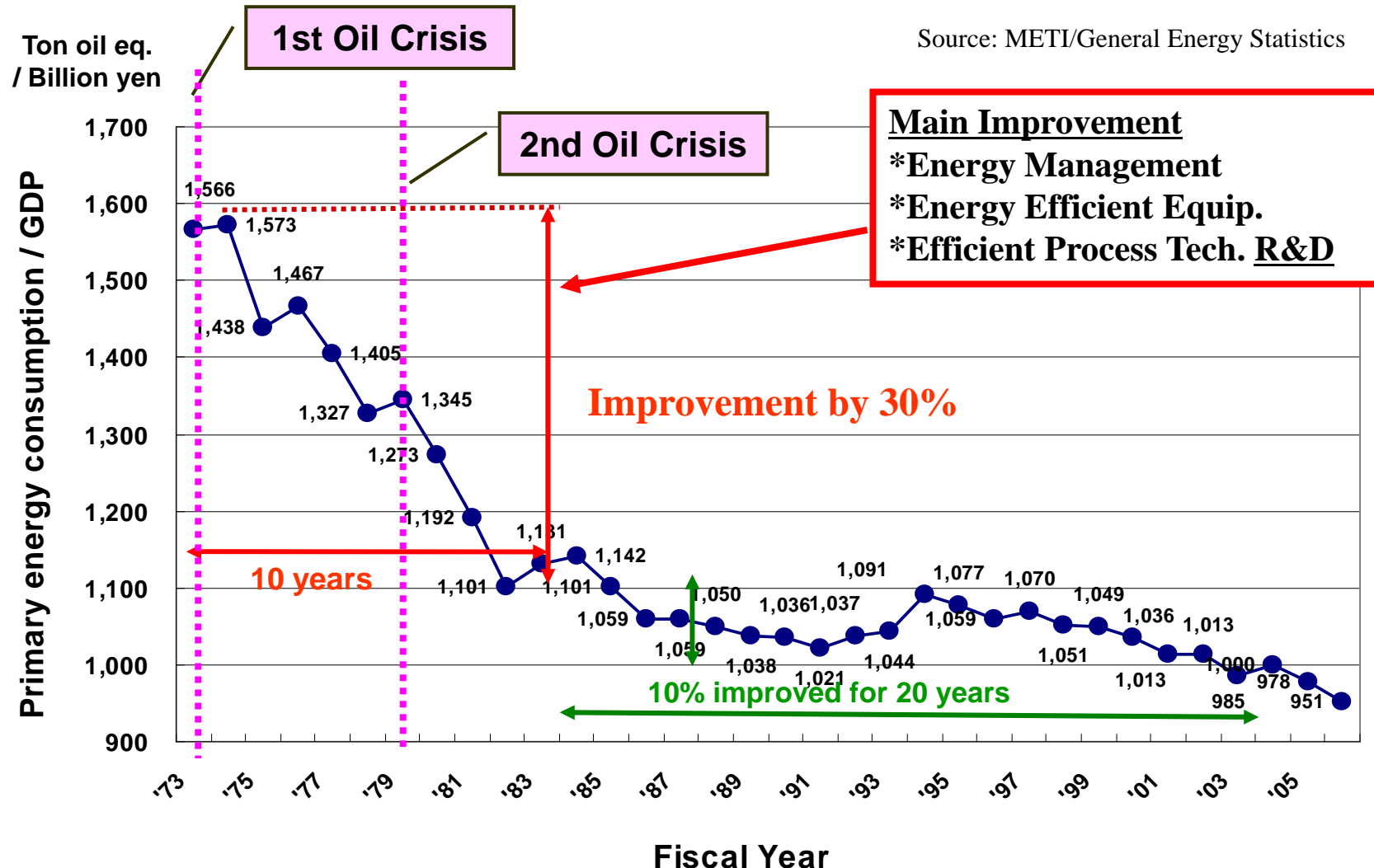
¹ typically energy or carbon dioxide tax relief

- Several countries also offer system optimization training

For more information, see McKane, A. et al, 2007 Setting the Standard for Industrial Energy Efficiency, <http://industrial-energy.lbl.gov/node/399>



Impact of Energy Efficiency Policies in Japan





Energy Management & Systems Optimization

- A good EnMS provides:
 - A framework for understanding significant energy use
 - Action Plans to continually improve energy use
 - Documentation to sustain energy performance improvements
- System optimization provides:
 - A method of assessing systems to identify energy performance improvement opportunities
 - Actions that can provide significant energy savings with limited capital investments
 - More reliable operations

Energy Management + Systems Optimization = Winning



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Industrial Energy Policy

<http://www.unido.org/index.php?id=o71852>

Energy Management Standards and System Standards

<http://industrial-energy.lbl.gov/node/94>

ISO 50001

<http://www.unido.org/index.php?id=o86084>

<http://www.iso.org/iso/pressrelease?refid=Ref1157>