



## Industrial Strategic Energy Management

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Paul Scheihing, U.S. Department of Energy

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# SEM: A Strategy for Continuous Improvement

## Strategic Energy Management (SEM)

- A holistic approach to continuously managing energy use
- Focuses on business practice culture change from senior management through shop floor staff
- Also referred to as:
  - Continuous energy improvement (CEI)
  - Energy management systems (EnMS)
  - High performance energy management (HPEM)

*Source: Consortium for Energy Efficiency, 2014*

## ISO 50001 EnMS is a type of SEM

# Types of Strategic Energy Management - SEM

## Foundational level

### **ENERGY STAR Energy Management and Utility SEM programs**

Fundamental approaches to developing a systematic energy management program based on industry best practices and benchmarking tools

- ▶ Establish energy policy
- ▶ Baseline energy performance
- ▶ Set goals
- ▶ Create action plan
- ▶ Implement plan
- ▶ Evaluate progress
- ▶ Re-assess

## Build on foundational processes to unlock greater benefits

### **ISO 50001**

Global Energy Management System (EnMS)  
standard framework for all type of organizations  
and operations

- ▶ Incorporate energy into procurement & design
- ▶ Formally document EnMS
- ▶ Conduct internal EnMS audit
- ▶ Management reviews
- ▶ Achieve ISO 50001 EnMS
- ▶ Option for 3<sup>rd</sup> party certification

# Energy Management *Program* vs. *System*

- Typical energy *program*
  - Management decides energy cost and use are too high
  - Energy technical manager tries different tactics to reduce consumption
  - Issues are tackled on a project-by-project basis: energy engineering emphasis
  - Effectiveness and sustainability vary
- Energy management *system*
  - Top management supports energy team with energy policy, resources and staffing
  - System-wide versus project orientation
  - Sustained and continuous improvement
  - Cross-organizational communication and involvement



# ISO 50001 Overview

- What it is:
  - A **global standard** around managing energy across an organization
  - An **organizing framework** for all types of energy: renewable and non-renewable
  - A **management model** for continual improvement of energy performance
- What it does:
  - Builds institutional knowledge throughout an organization
  - Engages all staff (executive, facility, procurement, communications, etc.), not just facility management.
  - Creates business culture for industry to invest in advanced energy efficiency technologies
  - Reduces business risk associated with unpredictable energy costs and supply
  - Enables more cost-effective and rapid investment in advanced energy efficient technologies

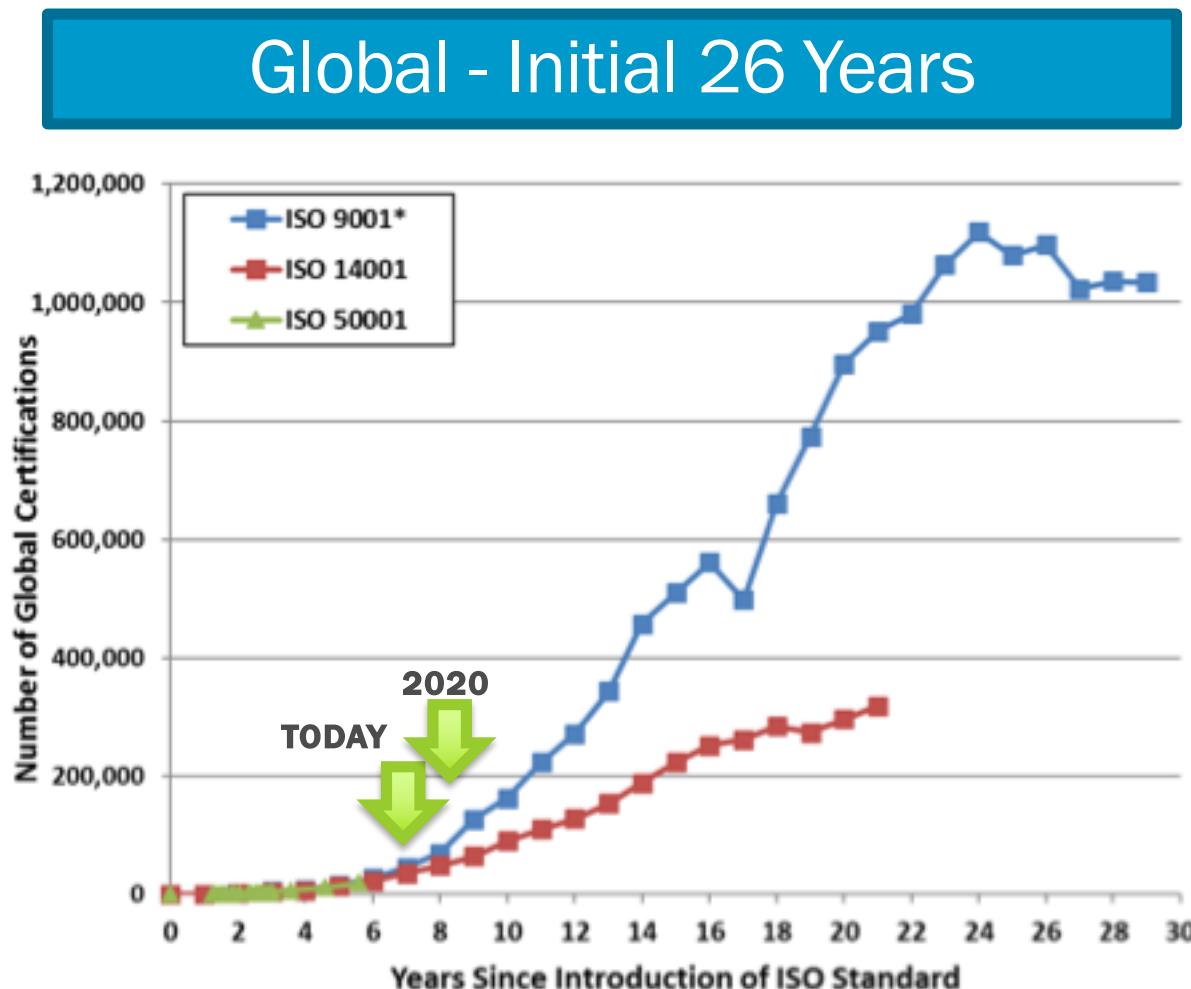


**A management system is:**

- ✓ Say what you do
- ✓ Do what you say
- ✓ Prove it
- ✓ Improve it

# The Uptake Wave of ISO 50001 Is Coming

Adoption of management system standards have typically seen an inflection point ~10 years after introduction.



# Compatibility with other ISO management system standards

**Leverage Common & Similar Elements**

**ISO 14001**  
**ENVIRONMENTAL POLICY**  
Environmental aspects  
Emergency preparedness  
Environmental management program

**ISO 50001**  
**ENERGY POLICY**  
Energy review  
Energy performance indicators  
Energy baseline  
Energy management  
Energy baseline  
Energy management  
**MANAGEMENT COMMITMENT**  
ROLES, RESPONSIBILITY & AUTHORITY  
COMPETENCE, TRAINING & AWARENESS  
COMMUNICATION  
OPERATIONAL CONTROL  
MONITORING & MEASUREMENT  
DOCUMENTATION  
INTERNAL AUDIT  
CORRECTIVE & PREVENTATIVE ACTION  
MANAGEMENT REVIEW  
DESIGN  
PROCUREMENT

**Unique Elements:**  
data-driven approach

**ISO 9001**  
**QUALITY POLICY**  
Customer focus  
Planning of product realization  
Customer-related processes  
Control of nonconforming

# Sample of Companies using ISO 50001 in the US



- 3M
- Aflac
- American Axle & Manufacturing
- BAE Systems
- BMW
- Bosch Rexroth
- Bridgestone
- Cargill
- Chrysler
- Coca-Cola
- Cummins
- Curtiss-Wright EMD
- Detroit Diesel
- Fiat Chrysler Auto
- Google
- HARBEC
- Hilton Worldwide
- IBM
- Intertape Polymer Group
- Land O'Lakes
- Johnson Controls
- Mack Trucks
- Marriott International
- MedImmune
- NewGold
- Nissan North America
- Samsung
- Schneider Electric
- Subaru
- Titan America
- Volkswagen
- Volvo Truck

# What U.S. Business says about the value of ISO 50001



"ISO 50001 helped us nearly double our ENERGY STAR Portfolio Manager score over the years."

- **Alfred Blackmar**, Aflac Vice President, Facilities Support



JW MARRIOTT

"At Marriott, ISO 50001 helped us save over one million kWh of electricity and improve guest satisfaction—our top priority. Using the standard helped us identify and correct a room thermostat malfunction to enhance guest comfort."

- **Rajaram Srinivasan**, Director of Engineering  
JW Marriott, Washington DC



"The ISO 50001 framework not only builds upon our energy management systems, but also help us drive consistency and performance improvements across our locations."

- **Steve Sacco**, Schneider Electric  
Vice Pres., Safety, Environment & Real Estate

# The Value of a Structured Approach

Based on DOE findings, a structured EnMS yields greater, more cost-effective, and more sustainable energy savings than a more traditional, project-based energy efficiency program.

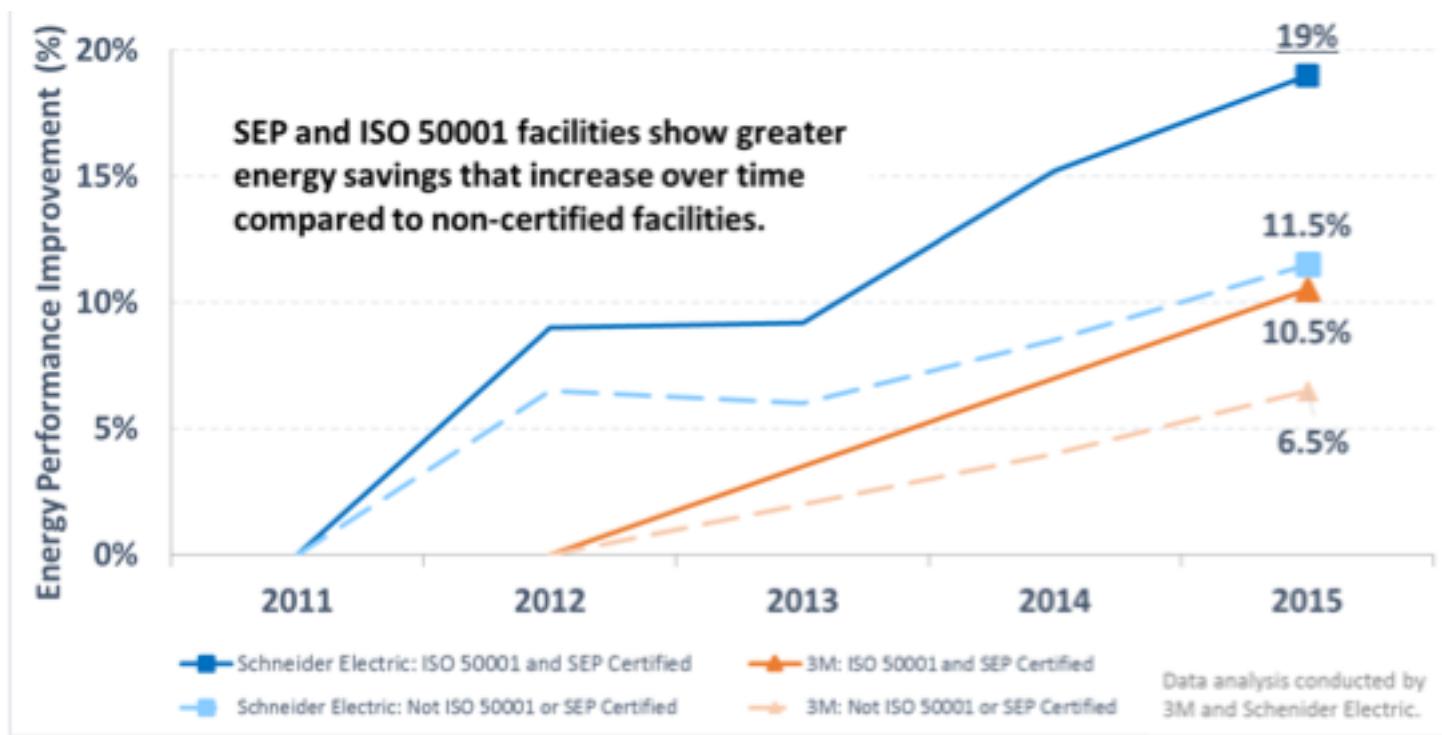
- US manufacturing Business-as-Usual      ~1% per year
- US manufacturing Industry Leaders      ~ 2.5% per year
- **ISO 50001 certified plants**      **~4% per year**
- **Enterprise-Wide SEP Approach**      **~5% per year**

Paybacks of less than 2 years for most facilities; payback of less than 1 year for many facilities

75% of energy savings from no/low cost operational improvements

# ISO 50001: Performance Data

The most effective way for U.S. manufacturing facilities and buildings to **achieve their fullest potential** in energy efficiency is to adopt programs & policies that improve energy performance on a continuing basis.



Savings at certified facilities greater on average compared to non-certified facilities:

- **3M: 62% greater over 3 years:** 18 ISO 50001 sites across 7 economies; 2 US SEP, 1 Korea SEP certified; 257 non-ISO 50001
- **Schneider Electric: 65% greater over 4 years:** 20 ISO 50001 in North America; 16 US SEP certified; 30 non-ISO 50001

# DOE's Spectrum Approach to ISO 50001 Adoption



DOE has developed an energy management continuum that begins with market-driven business culture and culminates in verified savings.



# ISO 50001 Workforce

Organizations need access to reliable, skilled ISO 50001 professionals to maximize energy saving potential and return on investment.

## Implementation Consultants

- **50001 Certified Practitioner in Energy Management System (EnMS):**  
Help facilities implement ISO 50001.
  - <https://ienmp.org/certifications/cp-enms/>

## Auditors

- **Certified Energy Professionals International (EPI) ISO 50001 Lead Auditor:**  
Assess a facility's EnMS conformance to ISO 50001
  - <https://ienmp.org/certifications/epi-iso-50001-lead-auditor/>
- **SEP Performance Verifier:**  
Assess a facility's conformance to the SEP Measurement and Verification Protocol and energy performance improvement.
  - <https://ienmp.org/certifications/sep-performance-verifier/>

# North American Alignment on 50001 Ready & SEP

- Accomplishments:
  - 50001 Ready Navigator translated into Spanish and French
  - Trained 19 facilities on ISO 50001 and SEP program across North America
  - Intent by Canada and Mexico to deploy 50001 Ready and SEP programs
- North American Supply Chain Energy Management program:
  - Current project to deploy ISO 50001 in supply chains
  - **Commission for Environmental Cooperation (CEC)** partnership with Natural Resources Canada, *Comisión Nacional para el Uso Eficiente de la Energía* and the U.S. Department of Energy.



Natural Resources  
Canada



# Conclusions

- **SEM is accessible to any facility or organization:**
  - SEM systematic approach yields greater benefit than conventional project-by-project approach.
  - ISO 50001 enables organizations to verify SEM benefits.
- **ISO 50001 is a set of best practices that:**
  - Helps you organize your existing energy management system around industry best practice.
  - Gives you a better ability to continuously achieve your energy management goals.
  - Aligns your organization with industry best practice and international standards.
- **DOE partnerships expand voluntary implementation options:**
  - Utility partnerships
  - Supply chain pilot in North America
  - Product sustainability standards (electronic products for now)

# More Information



## Online resources:

[energy.gov/50001Ready](http://energy.gov/50001Ready)

- Download infosheets and FAQs
- Find links to the Navigator and EnPI Lite
- Read case studies about certified facilities
- Find M&V guides
- Find reports and studies on energy impact of certification

[energy.gov/ISOSEP](http://energy.gov/ISOSEP)

[energy.gov/IS050001](http://energy.gov/IS050001)

## Contacts:

### **Paul Scheihing**

Technology Manager, Technical Assistance  
Advanced Manufacturing Office  
US Department of Energy  
[paul.scheihing@ee.doe.gov](mailto:paul.scheihing@ee.doe.gov)  
202-586-7234