

ISO 50001 Overview

- What it is:

- A **global standard** around managing energy based on expertise from 56 countries
- A **management model** for continual improvement of energy performance
 - Manages energy efficiency, energy security, energy use and energy consumption
 - Similar to quality (ISO 9001) and environmental (ISO 14001) management system standards



A management system is:

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

- What it does:

- Builds institutional knowledge throughout an organization
- Engages all staff (executive, facility, procurement, communications, etc.), not just facility management.
- Creates the market pull and business culture for industry to invest in advanced energy efficiency technologies
- Reduces business risk associated with unpredictable energy costs and supply
- Establishes an ingrained culture and practice around energy performance
- Enables more cost-effective and rapid investment in advanced energy efficient technologies

U.S. Energy Management Practices - Current to Future

	Current State: Project by Project	Desired Future State: ISO 50001
Approach and Scope	<p>Project-based</p> <p>Equipment and physical systems.</p>	<p>System-wide</p> <p>Equipment, systems, personnel, processes → <i>culture change</i></p>
Project prioritization	<p>Ad hoc and reactionary, often budget-driven</p> <p>Often no established process for new projects</p>	<p>Structured prioritization of significant energy uses</p> <p>Established process for energy consideration in new facilities, systems, equipment and processes</p>
Management buy-in	<p>Ad hoc or none</p>	<p>Executive decision-maker involvement</p> <p>Top management commitment</p>
Resilience to staff turnover	<p>Dependent on energy champion or individuals</p>	<p>Cross-organizational involvement.</p> <p>Integrated in core organizational and business practice.</p>
Self-sustaining	<p>No – based on individual projects</p> <p>Individual-dependent</p>	<p>Yes – Plan-Do-Check-Act management cycle</p> <p>Individual-independent</p>
Outcomes	<p>Reliant on continuous streams of capital to support EE upgrades and sustained improvement</p>	<p>Establishes operational control procedures and organizational structure designed for continual improvement</p>
Current adoption levels	<p>Increasingly commonplace: 46% of U.S. manufacturing facilities have set goals for improving energy efficiency</p>	<p>Minimal: <0.1% of U.S. manufacturing facilities have adopted ISO 50001</p>

ISO 50001 Energy Management Systems (EnMS)

Planning

1. Scope and Boundaries
2. Energy Policy
3. Management Commitment
4. Energy Team
5. Legal Requirements

Energy Review

6. Data Collection
7. Data Analysis
8. Performance Indicators (EnPIs)
9. Significant Energy Uses (SEUs)
10. Relevant Variables
11. Baselines, Objectives and Targets
12. Improvement Opportunities
13. Improvement Projects

Continual Improvement

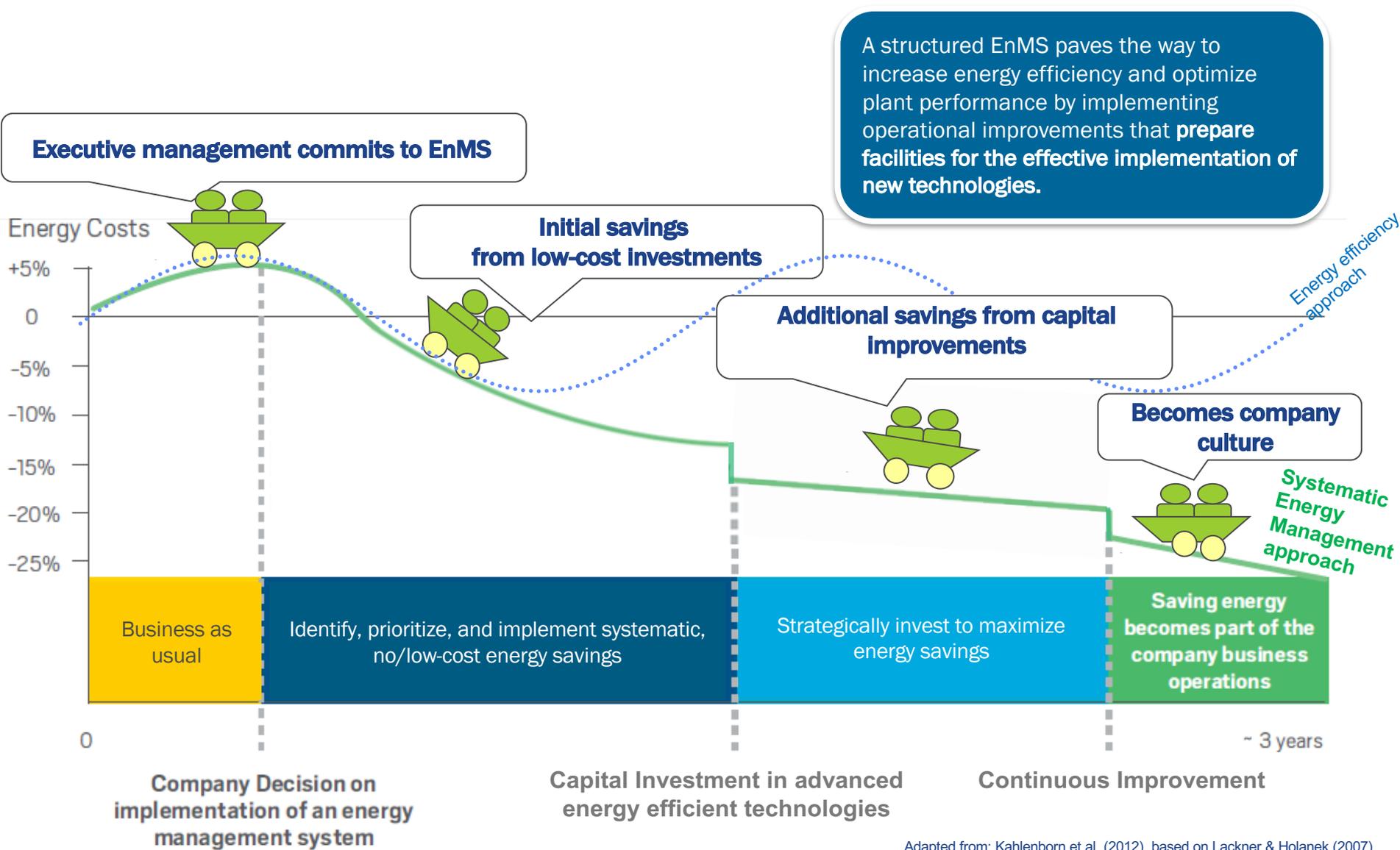
14. Monitoring
15. Measurement
16. Operational Controls
17. Corrective Actions
18. Energy Consideration in Design

System Management

19. Documentation and Records
20. Communications
21. Training
22. Procurement
23. Internal Audit
24. Calculate Energy Savings
25. Management Review

- Translates ISO 50001's "shall" requirements into actionable tasks
- Tasks do not need to be completed linearly or chronologically

Systematic Energy Management Results in Continuous Improvement



Adapted from: Kahlenborn et al. (2012), based on Lackner & Holanek (2007)

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.

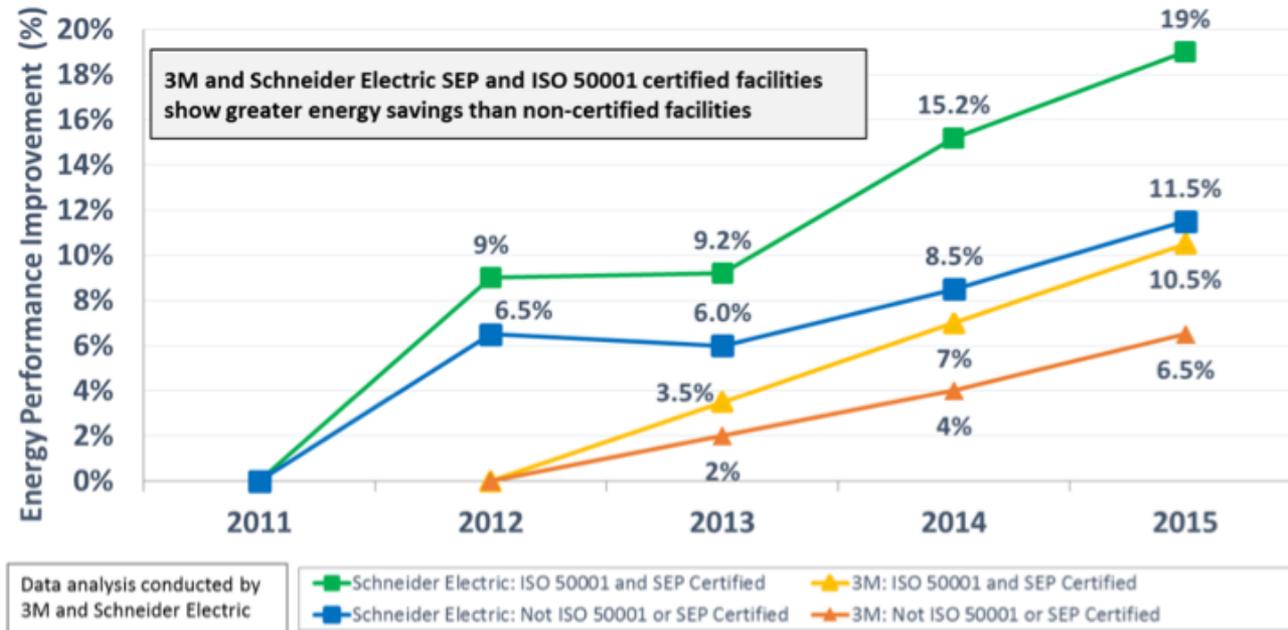
- US manufacturing Business-as-Usual ~1% per year
- US manufacturing Industry Leaders ~ 2.5% per year
- **SEP/ISO 50001 certified plants ~4% per year**
- **Enterprise-Wide SEP Approach ~5% per year**

A 2017 review of 43 US-based facilities found:

- ISO 50001 resulted in 12.9% average reduction in energy consumption over 3-year period, equivalent to 3.71 trillion BTU source energy.
- SEP facilities saved over **\$430,000/year** on average from **low- and no-cost operational improvements**
- An enterprise-wide approach saved over **\$600,000/year**.
- Paybacks of less than 2 years for most facilities

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.



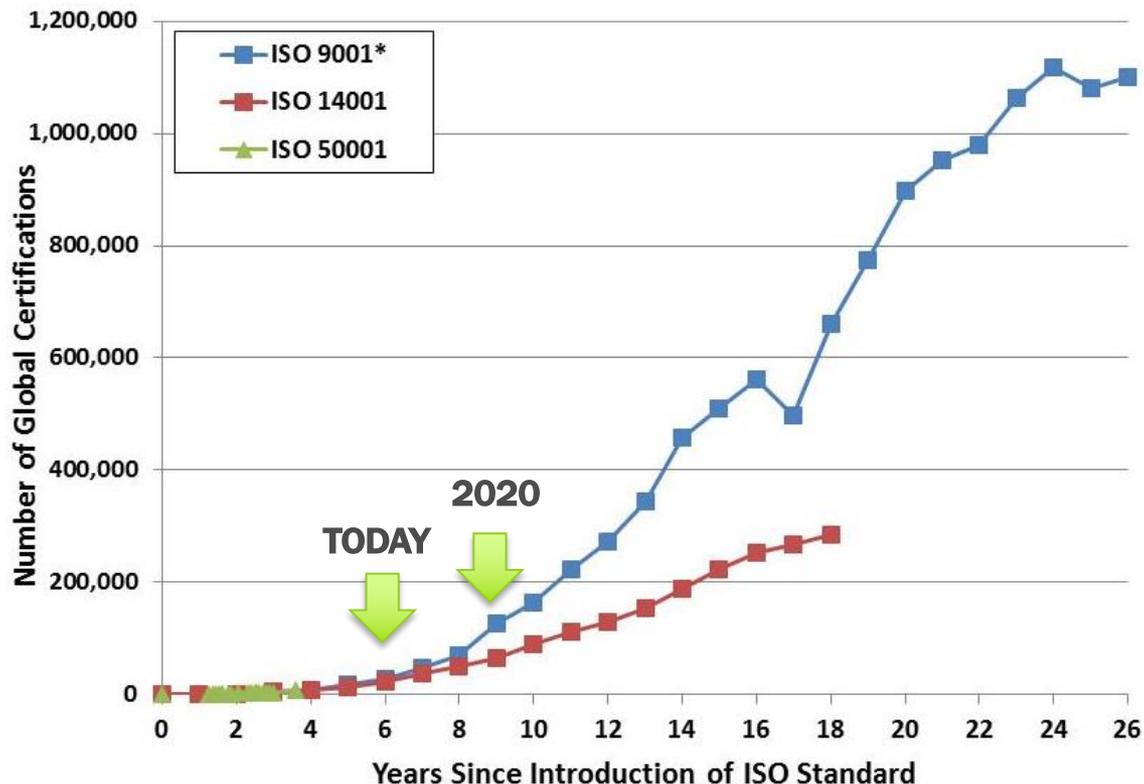
Savings at certified facilities greater on average compared to non-certified facilities:

- **3M: 62% greater over 3 years:** 18 ISO 50001 sites across 7 countries; 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

Demonstrating leadership in energy management

Adoption of management system standards have typically seen an inflection point ~10 years after introduction. Demonstrate leadership in responsible manufacturing by driving adoption of 50001, and help overcome market barriers to unlock wide-ranging energy savings potential.

Global - Initial 26 Years



Approaches to ISO 50001 Adoption

DOE supports a continuum that begins with business culture and culminates in verified savings.



	SELF ATTEST	CERTIFY	VERIFY
Purpose & Recognition	<p>Implement and self-attest to ISO 50001 Benefit from its cultural value</p> <p>Earn recognition from DOE for ISO 50001 conformance</p>	<p>Establish a rigorous energy management system, audited by a 3rd party certification body</p> <p>Certify to globally recognized ISO standard</p>	<p>Verify energy savings from ISO 50001, using 3rd party SEP verification body</p> <p>Earn recognition from DOE for ISO 50001 certification and verified energy performance improvement</p>
Steps	<ol style="list-style-type: none"> 1. Complete 25 steps in Navigator 2. Self-attest to completion 3. Report energy performance 	<ol style="list-style-type: none"> 1. ANAB-accredited audit 	<ol style="list-style-type: none"> 1. ISO 50001 certification 2. 3rd party SEP Performance Verification audit
Target Facilities	Good approach for any organization, particularly for facilities with a moderate energy bill	Ideal for organizations with prior ISO management system experience	Ideal for facilities seeking deep, sustained energy savings
Tools & References	ISO 50001 Standard		
	50001 Ready M&V Protocol		SEP M&V Protocol
	50001 Ready Navigator – Developed for 50001 Ready, provides full guidance in line with ISO 50001 and SEP Energy Performance Indicator (EnPI) Tools – Lite version designed for 50001 Ready; Full version designed for SEP		

50001 Ready Recognition

Three Steps to Becoming 50001 Ready

STEP 1

Start Implementation of ISO 50001 principles

Use the 50001 Ready Navigator Online Tool

- ✓ The Navigator walks you through the process of implementing an energy management system and prepares you to be 50001 Ready.

STEP 2

Analysis of energy and emissions reductions

Adopt Valid Tool to Present Energy Performance

- ✓ DOE offers the EnPI Lite tool for 50001 Ready.
- ✓ EPA's Portfolio Manager can also be used
- ✓ Other tools can be approved by DOE

STEP 3

Request 50001 Ready recognition

Submit information to DOE for Review

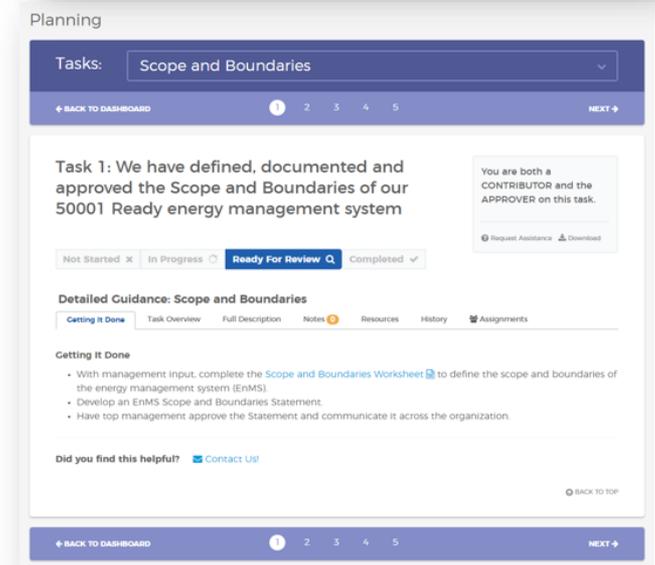
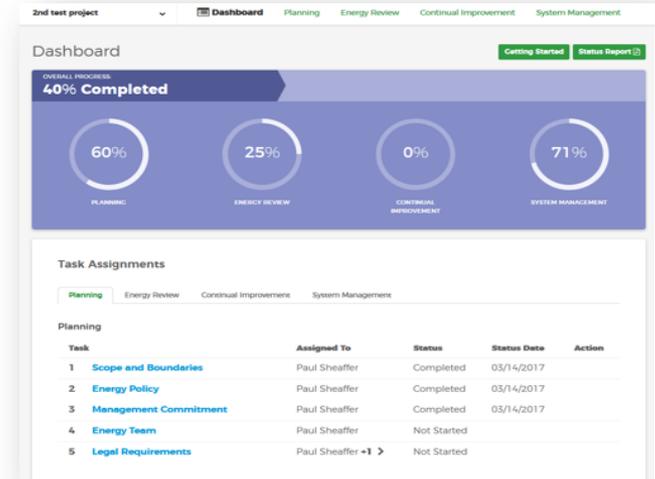
- ✓ Self-attestation of completion of Navigator, executed by team leader and executive
- ✓ Submit energy performance data



DOE or Utility
recognizes
50001 Ready
achievement

50001 Ready Navigator

- Developed and maintained by DOE
- Resource to provide free training and information to the market
- Online tool with simple, step-by-step approach to ISO 50001 implementation
- Guidance broken into straight forward sections, including:
 - Getting It Done – what specifically needs to be accomplished
 - Task Overview – how does this task connect with ISO50001
 - Full Guidance – comprehensive guidance about the task
 - Transition Tips – from other ISO management systems or ENERGY STAR
- Track and update task progress
- Ability to assign tasks to team members to facilitate team collaboration
- Access over 100 related resources



Designed for Varied Audiences

- 50001 Ready Navigator is designed for a range of technical abilities:
 - Staff ranging from engineers to energy managers to sustainability champions.
 - Facilities with varying levels of familiarity with energy management.
- Builds on existing expertise with ISO 14001, ISO 9001, and ENERGY STAR Guidelines for Energy Management
 - Specific tooltips enable transition between related standards and programs.

Collaborative, Team-Based Approach

Assign tasks to team members and track progress.

Tabs for action:

- Getting It Done provides links to worksheets, templates, and checklists to complete this task.

Detailed Guidance: Legal Requirements

Assignments **Getting It Done** Task Overview Full Description Notes 1 Resources History

Getting It Done

Identify and list all applicable legal and other requirements related to energy by completing the [Legal and Other Requirements Tracking Matrix](#). Review the [Legal and Other Requirements Related to Energy \(example\)](#) to gain ideas about the types of legal and other requirements that may be relevant to your EnMS.

Establish a frequency for reviewing and updating the completed Matrix form. Assign responsibilities for identifying requirements and ensuring they are followed.

Establish a process to periodically evaluate compliance with those requirements. Consider any existing similar processes your organization has for identifying and meeting mandatory requirements.

Conduct compliance evaluations using the [Compliance Evaluation Checklist](#) to record your organization's results.

Did you find this helpful? [Contact Us!](#)

[BACK TO TOP](#)

Links to resources

Collaborative, Team-Based Approach

Assign tasks to team members and track progress.

Tabs for action:

- Getting It Done provides links to worksheets, templates, and checklists to complete this task.
- View tooltips from related standards and programs, e.g., ISO 14001, ISO 9001, and ENERGY STAR.

The screenshot shows a web interface with a navigation bar containing tabs: 'Assignments', 'Getting It Done', 'Task Overview', 'Full Description' (which is active), 'Notes 1', 'Resources', and 'History'. Below the navigation bar, the 'Full Description' section is visible. A callout box with an orange border and a pointer highlights a specific tip. The tip text reads: 'Tips for users with ISO 9001 and ISO 14001 expertise'. Below the callout, the main content area contains several paragraphs of text under the heading 'ISO 9001 and/or ISO 14001 transition tips'. The text discusses the integration of ISO 14001:2015 processes with ISO 50001:2011 requirements, the differences between ISO 9001:2015 and ISO 50001 requirements, and the challenges of integrating compliance evaluations. At the bottom of the page, there is a section titled 'Identify and access applicable legal requirements' with a 'Learn More: Examples' link.

Collaborative, Team-Based Approach

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Tabs for action:

- Getting It Done provides links to worksheets, templates, and checklists to complete this task.
- View tooltips from related standards and programs, e.g., ISO 14001, ISO 9001, and ENERGY STAR.
- Create notes to track progress and coordinate team members.

The screenshot shows a web interface for 'Detailed Guidance: Legal Requirements'. It features a navigation bar with tabs: Assignments, Getting It Done, Task Overview, Full Description, Notes (1), Resources, and History. The main content area includes a paragraph of instructions, an 'Activity (1 Comments)' section with a comment from Christine Wu dated 02/27/2017, and an 'Add a Comment' form. Two orange callout boxes highlight specific features: one points to the comment text 'See document legalreqs.docx emailed 2/27/17 to Pete' with the text 'Add links to files on your shared drive', and the other points to the 'Save' button with the text 'Save meeting dates or record decisions'. A footer bar contains navigation links for 'PREVIOUS' and 'NEXT SECTION' along with a page indicator showing 5 of 5 pages.

Enterprise-Level Tracking

Track facility-level performance across different locations.

The screenshot displays the '50001 Ready Navigator' web application interface. The header includes the '50001 Ready U.S. DEPARTMENT OF ENERGY' logo, the 'Navigator' title, and navigation links for 'Contact', 'FAQs', 'My Tasks', and 'My Navigator'. Below the header, there is a 'My Projects Overview' section with a dropdown menu, a 'Hide Test Projects' button, and two buttons for 'Create New Project' and 'Create Project for Others'. The main content area features a table with columns for 'Project Name', 'Task Progress', 'Status/Next Action', 'Last Activity', and 'Action'. The table lists four projects: 'San Francisco facility', 'Berkeley Lab', 'Oakland office', and 'Building 90'. Each project row includes a progress indicator (checkmark or percentage), a status box with an action button, and a last activity date.

Project Name	Task Progress	Status/Next Action	Last Activity	Action
[test] San Francisco facility	✓	⚠ Recognition Request Returned	07/25/2017	⋮
[test] <small>Associated with:</small> Berkeley Lab	✓	📌 Request DOE Recognition	07/05/2017	⋮
[test] Oakland office	✓	📌 Request DOE Recognition	04/03/2017	⋮
[test] <small>Associated with:</small> Building 90	0%	👥 Team Completing Tasks	04/03/2017	⋮

Co-branding and Customization

- Navigator has been developed on open-source standards to enable co-branding and customization.
- Issue 50001 Ready recognition as a partner organization
- Add Tooltips, Resources and FAQs specific to your organizational or regulatory requirements
- Track overall process of ongoing projects

The screenshot displays the '50001 Navigator Admin Section' interface. At the top, there is a navigation bar with the '50001 Ready' logo and links for 'Contact', 'FAQs', 'My Tasks', and 'My Navigator'. Below the navigation bar, the main content area is titled '50001 Navigator Admin Section' and contains several data tables and summary cards.

Summary Cards:

- Total Projects:** 31
- Projects w/ All Tasks Completed:** 3
- Projects w/ Uploaded Files:** 2
- Projects Submitted for Recognition:** 0
- Projects Given DOE Recognition:** 1
- Total Users:** 29
- Total Notes:** 13
- Total Tracked Events:** 297
- Resources:** 119 (with 'Manage Resources' button)
- FAQs:** 62 (with 'Manage FAQs' button)
- Event and Email Trigger List:** (with button)

Task Completion Table:

	Manage 50001 Ready Content	Not Started/Unknown	In Progress	Complete
Planning	Task 1: Scope and Boundaries	32.3%	3.2%	64.5%
	Task 2: Energy Policy	19.4%	9.7%	71.0%
	Task 3: Management Commitment	25.8%	0.0%	74.2%
	Task 4: Energy Team	16.1%	0.0%	83.9%
	Task 5: Legal Requirements	16.1%	6.5%	77.4%
Energy Review	Task 6: Data Collection	16.1%	0.0%	83.9%
	Task 7: Data Analysis	16.1%	0.0%	83.9%
	Task 8: Performance Indicators (EnPis)	16.1%	3.2%	80.6%
	Task 9: Significant Energy Uses (SEUs)	16.1%	3.2%	80.6%
	Task 10: Relevant Variables	16.1%	0.0%	83.9%
	Task 11: Baselines, Objectives and Targets	12.9%	3.2%	83.9%
	Task 12: Improvement Opportunities	16.1%	0.0%	83.9%
	Task 13: Improvement Projects	12.9%	3.2%	83.9%
Continual Improvement	Task 14: Monitoring	9.7%	0.0%	90.3%
	Task 15: Measurement	12.9%	0.0%	87.1%
	Task 16: Operational Controls	9.7%	3.2%	87.1%
	Task 17: Corrective Actions	12.9%	0.0%	87.1%

50001 Ready Recognition

50001 Ready recognition from DOE requires:

- Self-attestation to completion of all 25 tasks in the 50001 Ready Navigator
- Proof of energy performance calculations through EnPI Lite or related energy performance calculators.

Projects can be submitted for recognition directly through the 50001 Ready Navigator

The screenshot displays the '50001 Ready Navigator' interface. The header includes the U.S. Department of Energy logo and navigation links for Contact, FAQs, My Tasks, and My Navigator. Below the header, there are buttons for 'Manage Projects', 'Add Project', and 'Create Project for Others'. The main content area shows two project entries:

- Oakland office** (Created: 02/09/2017)
 - STEP 1: 50001 Ready System Implementation (Completed) with a 'Review' button.
 - STEP 2 (OPTIONAL): Request DOE Recognition (Not Completed) with a 'Request Now' button. An orange callout box points to this button with the text 'Click to request DOE recognition'.
- San Francisco facility** (Created: 01/30/2017)
 - STEP 1: 50001 Ready System Implementation (Completed) with a 'Review' button.
 - STEP 2 (OPTIONAL): Request DOE Recognition (Completed) with a 'DOE Recognition Approved 02/09/2017' status. An orange callout box points to this status with the text 'Date of DOE recognition'.

EnPI Lite

EnPI Lite is a web based calculator developed and maintained by DOE that estimates **energy savings** relative to relevant variables, like production levels and weather, using linear regression.

EnPI Lite provides a user-friendly way for the market to practice regression-based energy modeling.

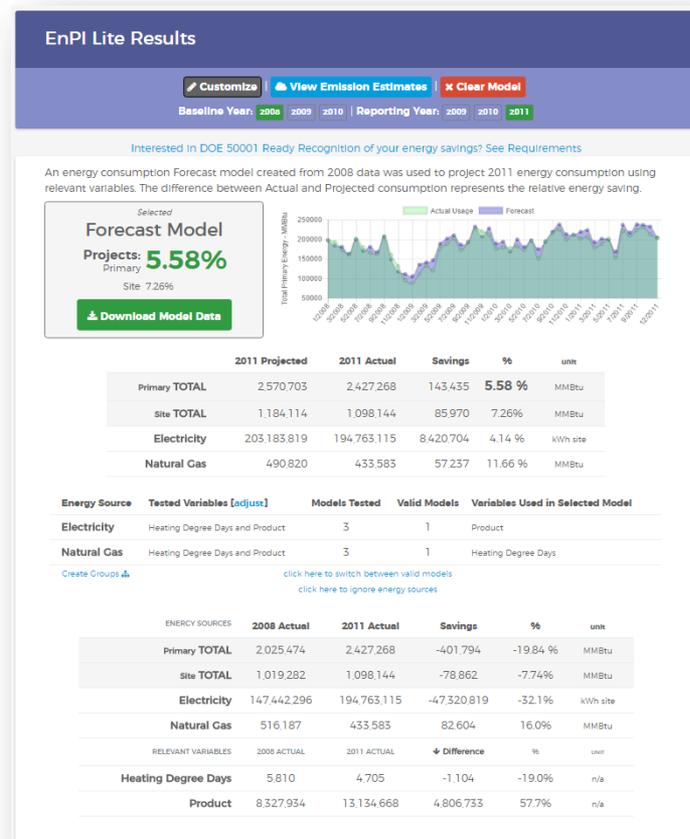
EnPI Lite Steps:

1. Input Energy Consumption and Relevant Variables

Input Options:

- Energy Footprint Tool
- ENERGY STAR Portfolio Manager

2. Regression Analysis (*automatic*)
3. Adjust Data / Models as needed
4. Download Results



50001 Ready Designee: Four Seasons Produce



- First US facility to receive recognition
- 266,000 square foot fruit and vegetable refrigerated warehouse
- Started project in May; recognized as 50001 Ready in June
 - 5 weeks engagement, approx 80 hours effort
- Drew from expertise from every department, including HR, accounting, packing, warehouse, and executive leadership
- “Great refresher” for reconfirming operations and lessons learned from utility Continuous Energy Improvement program
- Hope to use EnMS practices to improve ENERGY STAR score

50001 Ready Designee: Charter Steel



- First industrial plant and Better Plants partner to achieve recognition
- 900,000 square foot melting, rolling, and processing plant
- Engaged in 50001 Ready as interim step before certification. Found the Navigator to increase confidence in their EnMS implementation.
- The 50001 Ready EnMS has increased energy awareness at both upper and lower levels of the organization.
- Coordinated with environmental management software systems and communications methods to integrate with ISO 14001.

50001 Ready Designee: Comau



- First facility under a corporate ISO 50001 certification to achieve 50001 Ready.
- 75% of savings from the energy management system resulted from operational improvements.
- Improved energy monitoring enabled better quality control in utility costs and billing.
- Saw benefits beyond energy and cost savings: Replacing lighting resulted in better illumination in the shop, improving productivity.

Find Out More!



Visit the 50001 Ready website at energy.gov/50001Ready

- Download infosheets and FAQs
- Find links to the Navigator and EnPI Lite
- See 50001 Ready facilities
- Read case studies and additional resources
- Read more about ISO 50001 and related programs