Introduction to the Superior Energy Performance® program

Certifying Increased Energy Productivity under ISO 50001

October 2015

Deloitte Sustainability Survey

A global survey in 14 countries of 250 CFOs

Key findings:

- ❑ **Energy tops CFOs list of sustainability issues**
- ❑ **Energy management is viewed as a challenging issue** and **energy prices are viewed as a significant risk.**
- ❑ **More robust, verifiable data is needed** to report performance and risk.

- only 12% of CFOs consider the level of their sustainability data to be excellent
- the quality and credibility of energy data will become more important

Source: The 2012 Sustainability & the CFO Survey. Conducted by Verdantix on behalf of Deloitte, 2012

Ad hoc Approach to Energy Management

Source: UNIDO 2010

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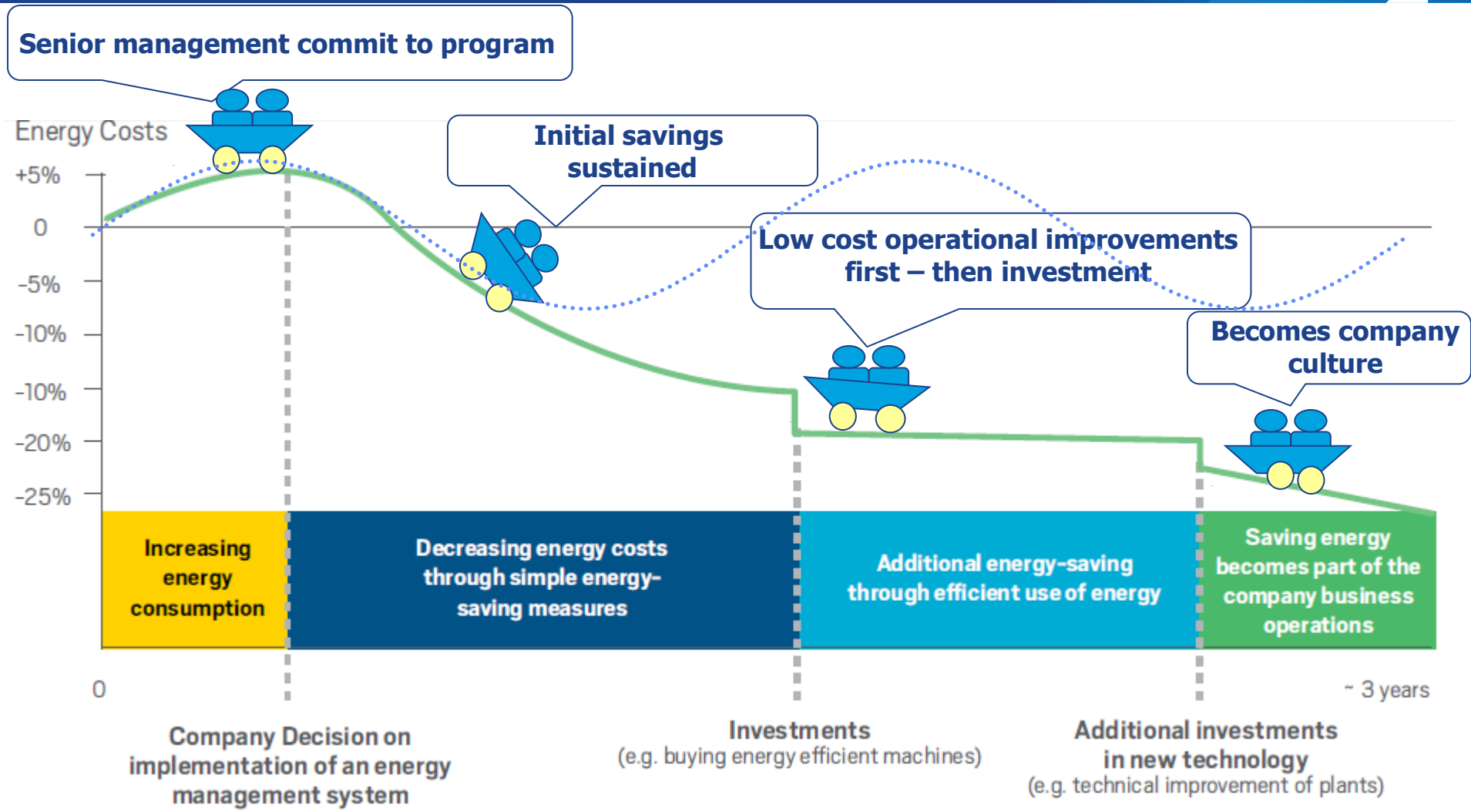
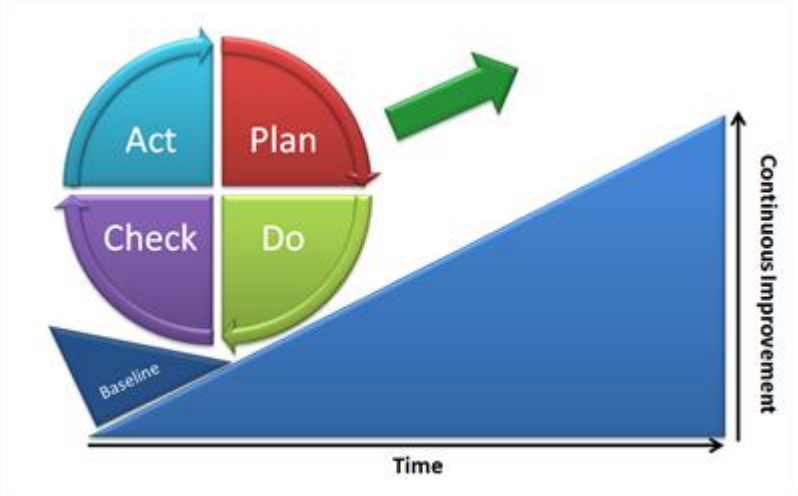
Structured Approach to Energy Management



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

Energy Management System (EnMS)

- **Elevates and integrates energy into normal business systems**, as has happened for safety & quality
- **Involves staff from the board room to the shop floor**: Organizational change in culture
- Systematic energy management leads to **continual improvements** in energy and cost performance



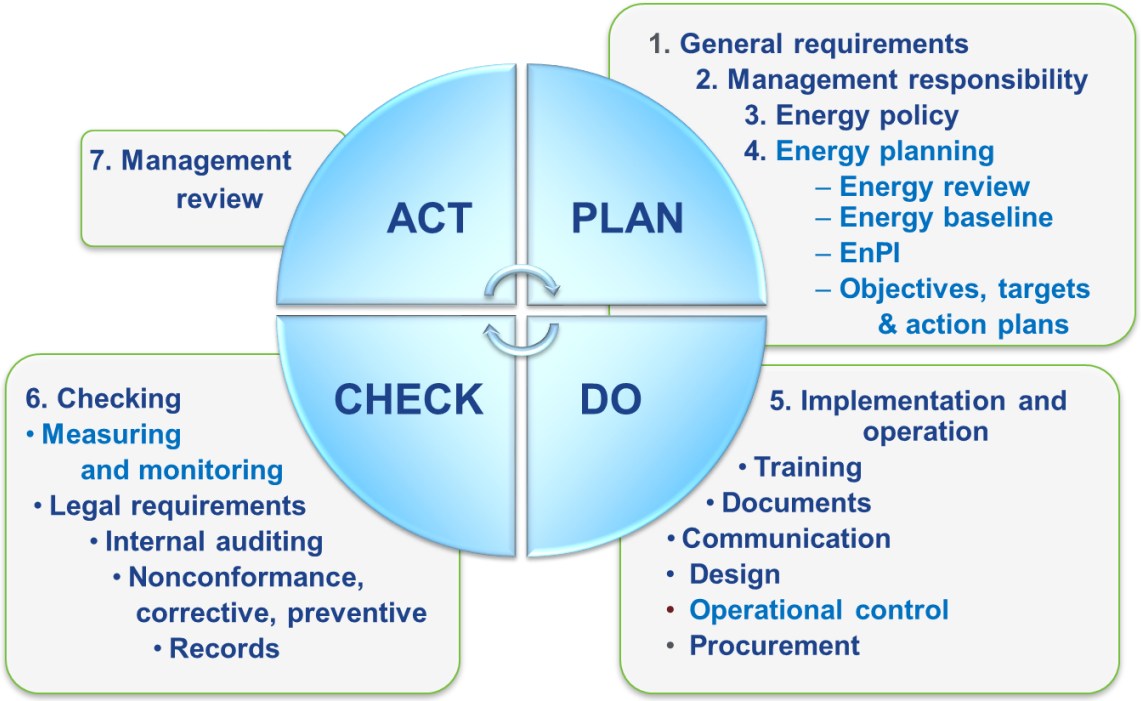
Energy & cost savings over time

ISO 50001–Energy Management Systems (EnMS)

International standard that draws from **best practices around the world**. Developed with input from 56 countries, many countries now adopting it as a national standard.

ISO 50001 specifies requirements for establishing, implementing, maintaining and improving an EnMS.

It does not prescribe specific energy performance improvement criteria.



Light blue text represents new data-driven sections in ISO 50001 that are not in ISO 9001 & ISO 14001

Superior Energy Performance® (SEP™)

SEP is a DOE certification program that verifies energy management excellence and sustained energy savings.

SEP is ISO 50001 plus:

- **Deeper, sustained savings at less cost** through robust tracking and measurement with advanced tools
- **Credible, third-party verification** by ANSI-ANAB accredited entity that market can reward supply chains, utilities, and carbon trading
- **National recognition** by U.S. DOE identifying sustainability leaders

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Strategic Energy Management (SEM) Continuum

SEP

Verified energy performance and ISO 50001

Superior Energy Performance (SEP):

- Rigorous third-party measurement and verification
- **Marginal effort beyond ISO 50001**

ISO 50001

Standard Energy Management System (EnMS) framework for global operations

- ISO standard for EnMS
- Similar framework to ISO 9001 & ISO 14001
- Third-party certification

Foundational Energy Management

(e.g., ENERGY STAR For Buildings & Plants)

- Systematic approach
- Operation of many utility SEM programs at this level

SEP Requirements

SEP certification requires industrial facilities and commercial buildings to meet the ISO 50001 standard and improve energy performance.

Superior Energy Performance

ISO 50001 certification

Verified energy performance improvement

Silver	Gold	Platinum
5% energy performance improvement over 3 years	**10%** energy performance improvement over 3 years	**15%** energy performance improvement over 3 years
-or-	-or-	-or-
15% energy performance improvement over 10 years + **30** Best Practice Scorecard points	15% energy performance improvement over 10 years + **61** Best Practice Scorecard points	15% energy performance improvement over 10 years + **81** Best Practice Scorecard points

Shorter time frames than 3 or 10 years may be allowed, see M&V Protocol for details.

SEP requirements are undergoing an update. See slides at the end of this presentation for a preview of the updated program.

SEP Certified Facilities

Leaders in energy management and performance

PLATINUM
3M Canada Company Brockville, Ontario, Canada
HARBEC Inc. Ontario, NY
Mack Trucks Macungie, PA
Nissan NA Smyrna, TN
Schneider Electric Seneca, SC
Schneider Electric Smyrna, TN
Schneider Electric Clovis, CA
Schneider Electric Saanichton, British Columbia, Canada
Volvo Group Trucks Hagerstown, MD
Volvo Trucks, NA Dublin, VA

GOLD
Coca-Cola Refreshments USA, Inc. Dunedin, Fl
Cummins Whitakers, NC
General Dynamics Scranton, PA
Schneider Electric Hopkins, SC
Schneider Electric Peru, IN
Schneider Electric Tijuana, Mexico

SILVER	
3M Company Cordova, IL	**Olam Spices** Gilroy, CA
Bridgestone Wilson, NC	**Schneider Electric** Cedar Rapids, IA
Curtiss-Wright Cheswick, PA	**Schneider Electric** Lexington, KY
Land O' Lakes Carlisle, PA	**Schneider Electric** Lincoln, NE
MedImmune Gaithersburg, MD	**Schneider Electric** Rojo Gomez, Mexico

SEP is applicable to a **broad range of sectors, sizes, and energy program maturity**. Even those with mature energy management programs have achieved greater savings and other benefits.

Last updated: October 12, 2015

SEP Certified Facilities
and Verified Energy Performance Improvement

Schneider Electric	Saanichton, BC Canada	**30.6%**
	Smyrna, TN	**23.1%**
	Clovis, CA	**16.7%**
	Seneca, SC	**15.6%**
	Hopkins, SC	**10.2%**
	Tijuana, Mexico	**10.2%**
	Peru, IN	**24.9% over 10 years**
	Cedar Rapids, IA	**8.8%**
	Lexington, KY	**6.9%**
	Lincoln, NE	**6.5%**
	Rojo Gomez, Mexico	**5.9%**
VOLVO	Mack Trucks, Macungie, PA	**41.9% over 10 years**
	Dublin, VA	**28.4% over 10 years**
	Hagerstown, MD	**20.9%**

Improvement over 3 years unless stated otherwise

3M	Brockville, Ontario Canada	**21.4% over 7 years**
	Cordova, IL	**5.6%**
NISSAN	Smyrna, TN	**17.7%**
HARBEC	Ontario, NY	**16.5%**
Cummins	Whitakers, NC	**12.6%**
Coca-Cola	Dunedin, FL	**12.2%**
GENERAL DYNAMICS	Scranton, PA	**11.9%**
BRIDGESTONE	Wilson, NC	**16.8% over 10 years**
OLAM	Gilroy, CA	**9.8%**
MedImmune	Gaithersburg, MD	**8.5%**
CURTISS WRIGHT	Cheswick, PA	**7.6%**
LAND O' LAKES	Carlisle, PA	**5.7%**

Last updated: October 12, 2015

SEP Measurement & Verification Protocol provides robust methodology to track and verify energy performance improvement.

Measurement and Verification Guiding Principles

General M&V	SEP
Transparency →	Protocol requires transparency of data and calculations
Completeness →	Data sources for SEnPI calculations must be of sufficient quality to be verifiable
Balancing certainty of results with cost to achieve results →	SEP M&V Protocol balances rigor with industry practicality
Relevant data →	Required data is specified in the SEP M&V Protocol
Consistency →	The SEP M&V Protocol is designed to maximize consistency among users

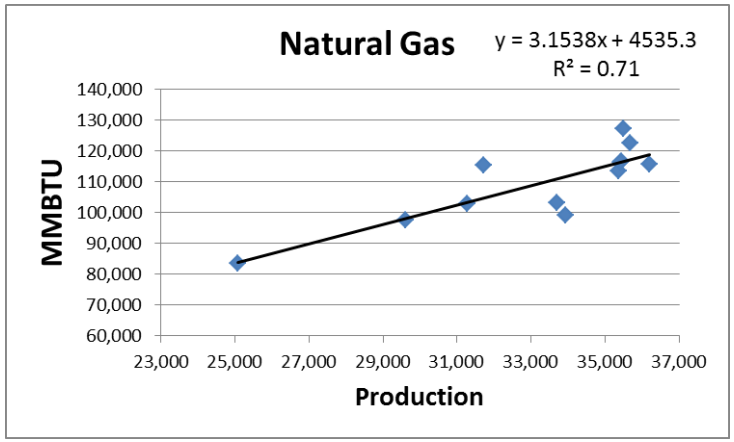
SEP Measurement & Verification

SEP energy performance is demonstrated by:

1. Top-down, whole facility SEP EnPI ("SEnPI")

$$SEnPI = \frac{BTU_{Tot\ actual}}{BTU_{Tot\ expected}}$$

Where $BTU_{Tot\ expected} = f(X1, X2, \ldots Xn)$



2. Bottom-up sanity check

   Project-specific energy saving estimates based on engineering calculations give confidence in top-down result

Savings: Cost-effective, deeper, credible

Deeper, more rapid savings at less cost

- 2015 study of 10 SEP-certified facilities
  - 12% reduction in energy costs within 15 months of starting to implement SEP, on average
  - Saved over **$430,000/year** on average from **low/no cost operational improvements**

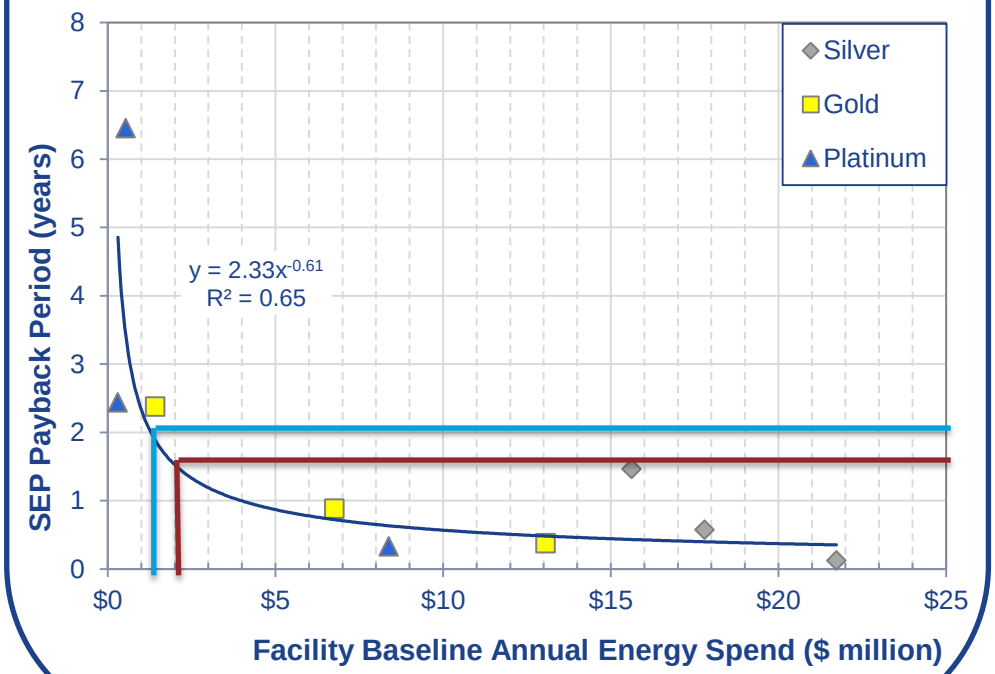
Credible, third-party verification

- Valuable data and analysis for **higher confidence in energy efficiency investments**

Payback:

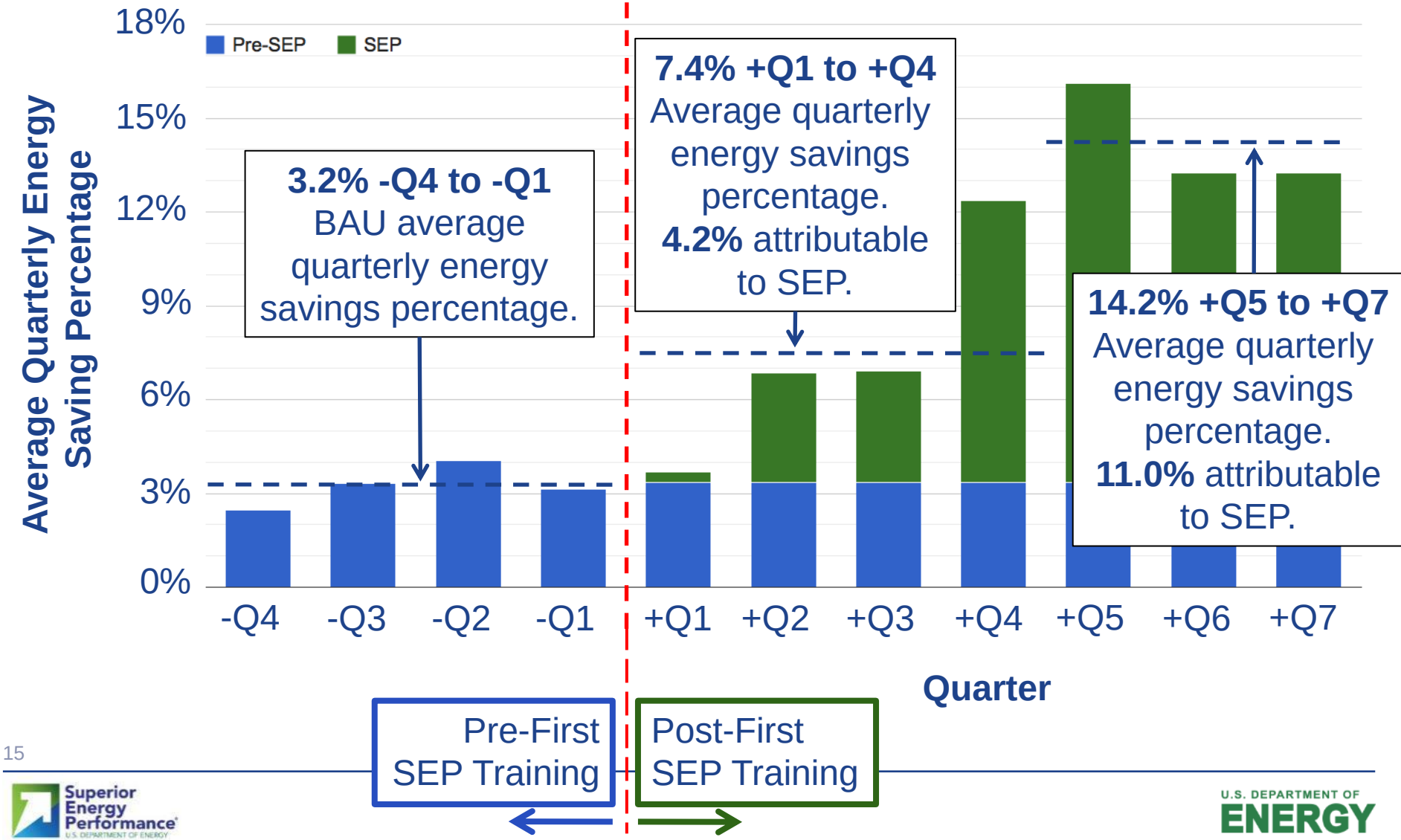
Less than 2 year payback for facility with a baseline annual energy spend greater than $1M

Less than 1.5 year payback for facility with a baseline annual energy spend greater than $2M



Replicate results across company's facility and buildings nationally and internationally

Verified Facility Wide Energy Savings Attributable to SEP



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Nissan
Smyrna, TN facility

SEP Platinum (2015)
(recertified)

17.7% improvement over 3 years, **6 week payback**

2012 SEP Silver: **$938,000 annual savings**; 7.2% improvement over 3 years

Harbec
Ontario, NY facility

SEP Platinum

16.5% improvement over 3 years

$52,000/yr savings via low/no cost operational improvements

Harbec's goal is to be ***carbon-neutral facility***

General Dynamics
Scranton, PA facility

SEP Gold

11.9% improvement over 3 years

$956,000/yr savings, 6 month payback

Meter upgrades to all significant energy-using equipment

SEP Certification Process

1 Enroll
Gain access to SEP resources such as program updates, tips, and phone support. No fees or commitment required, enroll today!

2 Prepare
Implement an EnMS in your facility and work towards meeting SEP requirements; see DOE tools, such as the eGuide

3 Apply
Submit an application to the SEP Administrator, no fees. Once approved, the application will be sent to your selected SEP Verification Body.

4 Verify
The SEP Verification Body uses certified auditors to verify conformance to SEP requirements and issues SEP and ISO 50001 certificates.

Recognize Achievement and Maintain Momentum

Your facility will receive recognition from the SEP Administrator, currently the U.S. DOE. SEP certification is valid for three years, as long as your facility completes the annual surveillance audits to confirm continued EnMS maintenance (an ISO 50001 requirement).

View full details at: www.energy.gov/eere/amo/sep-and-iso-50001-certification-process

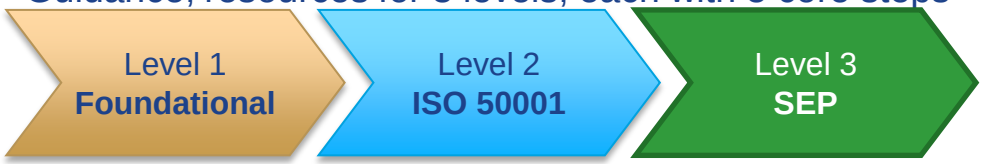
Find an SEP Verification Body: http://www.energy.gov/eere/amo/sep-and-iso-50001-certification-process#choose-a-VB

Tools and Resources for SEP

Accelerate SEP implementation with SEP tools and resources:

DOE eGuide: Use this comprehensive, step-by-step online toolkit to implement ISO 50001 and SEP energy.gov/eguide

Guidance, resources for 3 levels, each with 5 core steps



Step 1: Engage Management

Step 2: Plan for Energy Management

Step 3: Implement Energy Management

Step 4: Measure and Check Results

Step 5: Review for Continual Improvement

Widely applicable: Industrial end users, commercial end users, federal & state public facilities, university campuses, utilities & program administrators

EnPI Tool: Enter energy consumption data, adjust for variables for a normalized view of energy performance & calculate SEP metrics energy.gov/enpi

More SEP resources at: energy.gov/eere/amo/toolbox-and-expertise:

- **Strategic Energy Management Checklist**: High-level assessment to determine readiness for SEP or ISO 50001 & define practical next steps
- **System Assessment Standards:** Assess specific energy systems (compressed air, process heating, pumping, and steam) to help identify opportunities
- **DOE Tools and Training**: Resources on specific energy systems, webinars & more

Certified Professionals that Support SEP

SEP is building workforce capacity for energy management implementation and measurement & verification.

Training and skill are required for appropriate application of the ISO 50001 and SEP standards, and to conduct the SEP certification audit.

- **Certified Practitioners in EnMS (CP EnMS):** Help facilities implement an ISO 50001 energy management system and prepare to meet SEP requirements.

  Find a CP EnMS: http://ienmp.org/pro_search/index.php?action=1

  Become a CP EnMS: energy.gov/eere/amo/become-energy-management-professional

- **SEP Lead Auditors:** Assess a facilities energy management system conformance to ISO 50001 and additional SEP requirements

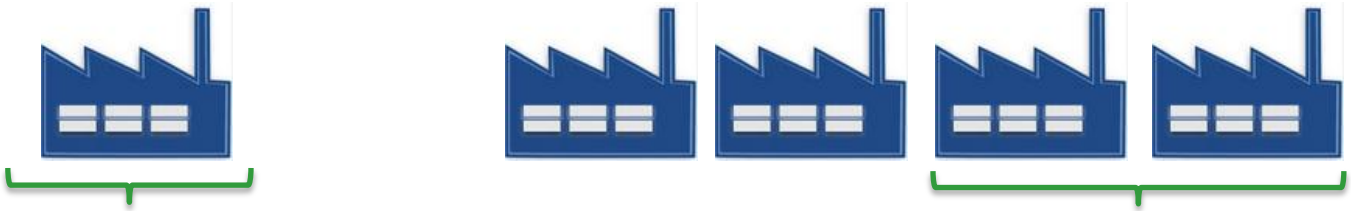
- **SEP Performance Verifiers:** Assess a facility's conformance to the (1) measurement and verification protocol and (2) SEP energy performance improvement requirements.

SEP Expansion: Implementation across multiple facilities to reduce costs

Companies are testing strategies to implement SEP across multiple facilities and benefit from economies of scale.

Central office works with facility staff - reduce level of effort & auditing costs per facility

Central office **and facilities**



ISO 50001 certification audit at enterprise-wide level

ISO 50001 EnMS conformance sampled at facility level

SEP energy performance improvement verified at each facility

- 28 participating facilities from 5 companies:
  - 3M Company
  - Cummins
  - General Dynamics
  - Nissan North America
  - Schneider Electric
  - Participating sites in U.S., Canada, and Mexico

SEP Expansion: Industrial Ratepayer-funded Program Accelerator

Utilities and program administrators (PAs) are working with DOE to offer SEP for their industrial customers.

Benefits to utilities and PAs:

- Cost effective, persistent energy savings
- Additional energy savings projects identified addressing all energy uses
- Option to provide higher value to customers and regulators by offering measurement and verification of projects
- Opportunities to improve relationships with high value customers

SEP Expansion: Industrial Ratepayer-funded Program Accelerator

DOE offers a toolkit to help utilities and Program Administrators (PAs) develop SEP offerings. The toolkit provides SEP program information, cost-effectiveness tools, and guidance and tools for program plans and reports.

Industrial Ratepayer-Funded SEP Toolkit:

- **SEP Guide for the Development of Energy Efficiency Program Plans ("Program Planning Guide")**
- **SEP Program Planning Template**
- **Cost Effectiveness Screening Tool** to estimate SEP benefits & costs
- **Program Transition Tables** for info on level of effort moving between SEM, ISO 50001 and SEP, from perspectives of PA and customer
- **SEP Presentations**: general, for PAs, and for customers
- **Utility EM&V Resources**

SEP Expansion

Organizations beyond industrial are using SEP to achieve energy and savings goals.

- Commercial building pilots
  - Hospitality sector
  - University campus
- International
  - North American initiative
  - ISO 50001 Lead Auditor
  - Clean Energy Ministerial—Energy Management Working Group (EMWG)
- Water/wastewater
  - Des Moines, IA (2)
  - Delta Diablo, CA
  - Ithaca, NY
  - Kent County, DE
  - Victor Valley, CA
  - Alexandria (VA) Renew Enterprises
- Federal
  - DOD contractors
  - DOE national labs

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Additional Slides

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SEP Program Update – Refinement

DOE is refining SEP to improve and simplify the program based on experiences and feedback to date. Improvements include:

- **Single, unified scoring system and qualification pathway** combines best features of the Energy Performance and Mature Energy Pathways
- Provide **flexibility in setting facility baseline year to align with corporate or enterprise**; enable companies to more easily expand SEP participation across facilities
- **Motivate plants to enhance energy management programs** though use of the Scorecard at Gold and Platinum levels
- **For recertification, provide practical and flexible energy performance improvement requirement** that is sustainable over multiple certification cycles

Certification to updated program design anticipated by Fall 2016

- SEP standards and protocols to be updated and peer reviewed
- Current program will continue to be available during a transition period

SEP Program Update – Preview
Initial Certification

SEP - Initial Certification

ISO 50001 certification

Verified energy performance improvement

Certification to this updated program design anticipated by Fall 2016.

Current program will continue to be available during a transition period.

Performance Levels

Achievement period	Energy Performance Improvement
3 years*	5%
4 years	7%
5 years	8%
6 years	10%
7 years	12%
8 years	13%
9 years	15%
10 years	16%

Silver	Gold	Platinum
	+ 40 SEP Scorecard credits, including: 20 points for Energy Management System	+ 60 SEP Scorecard credits, including: 35 points for Energy Management System - and - 10 points for Advanced Practices and Additional Energy Performance

*The 5% improvement may be demonstrated over a period of 1 or 2 years, rather than 3 years.

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SEP Program Update – Preview
Recertification

SEP - Recertification

ISO 50001 certification

Verified energy performance improvement

Certification to this updated program design anticipated by Fall 2016.

Current program will continue to be available during a transition period.

Performance Levels

Achievement period	Energy Performance Improvement
3 years	3%
4 years	3% over most recent 3 years
5 years	3% over most recent 3 years
6 years	3% over most recent 3 years
7 years	3% over most recent 3 years
8 years	3% over most recent 3 years
9 years	3% over most recent 3 years
10 years	3% over most recent 3 years

Silver	Gold	Platinum
	+ 40 SEP Scorecard credits, including: 20 points for Energy Management System	+ 60 SEP Scorecard credits, including: 35 points for Energy Management System - and - 10 points for Advanced Practices and Additional Energy Performance

Better Plants complements SEP

DOE's Better Plants

Corporate-wide Recognition
Aspirational Focus:
Pledge to improve energy performance by
25% in the next 10 years

Superior Energy Performance

Facility-level Certification
Achievement Focus:
Energy performance improved
5% or more over past 3 years or 15% or more over past 10 years

Better Plants Helps SEP Participants

- Provides structure for corporate-wide energy efficiency goals
- Fosters replication of SEP at other facilities

SEP Helps Better Plants Partners

- Helps individual plants to accelerate energy savings that contribute toward corporate goal
- Provides rigor of energy performance measurement at the facility level