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Superior Energy Performance - Customer **Information**

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy
ADVANCED MANUFACTURING OFFICE

Outline

- Value of Energy Management
- ISO 50001- Energy Management Systems
- Superior Energy Performance
- Getting Started with SEP
- Testimonials, Benefits and Key Takeaways

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VALUE OF ENERGY MANAGEMENT

Value of Energy Management

Why do many companies consume more energy than necessary?

- Other priorities prevent implementation of energy efficiency projects
- Some implemented projects do not meet energy savings goals
- Energy savings is not sustained due to operational and maintenance practices
- The only constant in most industrial facilities is change
  - Changes in product mix, production, management, personnel

Root Cause: *Energy efficiency is not integrated into daily management practices*

Solution: *Engage the entire organization in a system for managing energy, shifting from just a project-by-project approach to one of continual improvement in energy performance*

Benefits of an Energy Management System (EnMS)

EnMS results in a change in culture, allowing for these benefits:

- Energy savings from no- and low-cost operational improvements
- A structure and systematic framework for managing energy
- Evaluation of what works to improve energy performance based on hard data
- A context for informed decisions concerning energy projects
- Increased reliability of outcomes and adaptation to future changes
  - Emphasis on business processes rather than a few individuals

- Involvement of energy users and decision makers, not just facility personnel and physical systems, sustain the change

Deloitte Sustainability Survey

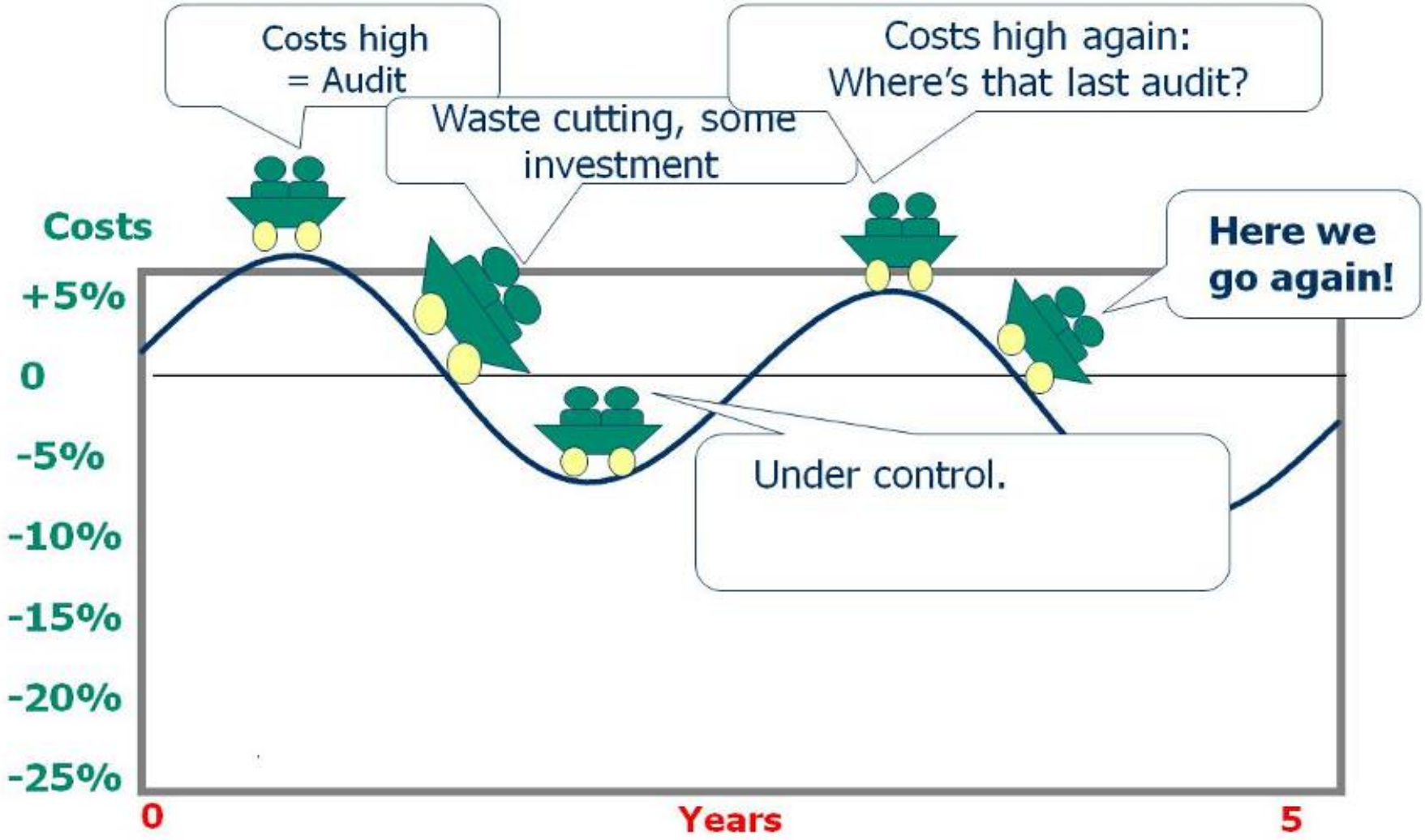
A global survey in 14 countries of 250 CFOs

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

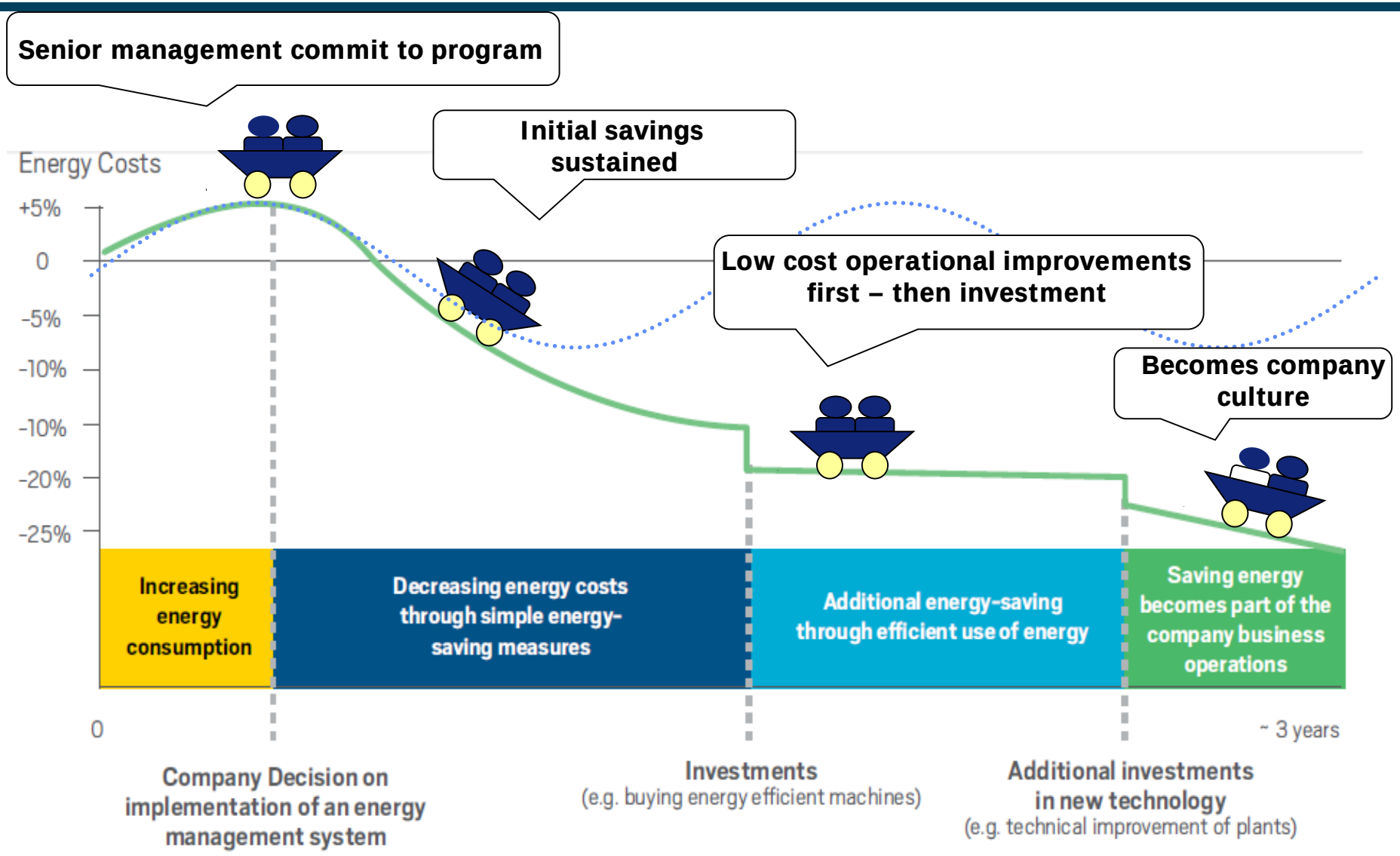
* The 2012 Sustainability & the CFO Survey. Conducted by Verdantix on behalf of Deloitte, 2012

Ad hoc Approach to Energy Management



Source: UNIDO 2010

Structured Approach to Energy Management



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

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ISO 50001

Strategic Energy Management (SEM) Continuum

Superior Energy Performance (SEP):

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

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

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

ISO 50001: an ISO Management System Standard

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

ISO 50001 & Superior Energy Performance

ISO 50001

- Proven, internationally recognized, best practice in energy management building upon other ISO standards
- Requires energy performance improvement with energy data & metrics
- Relevance for global corporation deploying energy management & sustainability programs

- Builds on ISO 50001 with **specific energy performance improvement criteria**
- National program **accommodating diverse facilities**: sector, size, program maturity, etc.
- **Transparency: Rigorous 3rd party verification** that market can reward: supply chains, utilities, carbon trading

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SUPERIOR ENERGY PERFORMANCE

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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SEP Requirements

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

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ISO 50001 certification

Verified energy performance improvement

Silver	Gold	Platinum
5% energy performance improvement over 3 years -or- 15% energy performance improvement over 10 years + 30 Best Practice Scorecard points	10% energy performance improvement over 3 years -or- 15% energy performance improvement over 10 years + 61 Best Practice Scorecard points	15% energy performance improvement over 3 years -or- 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 later in presentation for a preview of the updated program.

Superior Energy Performance® Certified Plants

PLATINUM

3M Canada Company Brockville, Ontario, Canada
Cummins, Inc. Columbus, IN
Detroit Diesel Corporation Detroit, MI
HARBEC Inc. Ontario, NY
Hilton Washington, DC
JW Marriott Hotel Washington, DC
Mack Trucks Macungie, PA
Nissan NA Smyrna, TN
Rexroth Bosch Corporation Bethlehem, PA
Schneider Electric Saanichton, British Columbia, Canada
Schneider Electric Costa Mesa, CA
Schneider Electric West Kingston, RI
Schneider Electric Smyrna, TN
Schneider Electric Clovis, CA
Schneider Electric Seneca, SC
Volvo Group Trucks Hagerstown, MD
Volvo Trucks, NA Dublin, VA

GOLD

3M Company Aberdeen, SD	3M Company Hutchinson, MN
Coca-Cola Refreshments USA, Inc. Dunedin, Fl	
Cummins, Inc. Whitakers, NC	
Schneider Electric Columbia, MO	Schneider Electric Peru, IN
Schneider Electric Hopkins, SC	Schneider Electric Tijuana, Mexico
Schneider Electric Apodaca, Mexico (Monterrey 2)	

SILVER

3M Company Cordova, IL	Hilton San Francisco, CA
3M Company Cynthiana, KY	Hilton Honolulu, HI
3M Company Decatur, AL	MedImmune Gaithersburg, MD
3M Company Prairie du Chien, WI	Schneider Electric Apodaca, Mexico (Monterrey 3)
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
	Schneider Electric Rojo Gomez, Mexico

Last updated: July 7, 2016

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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%
	Peru, IN	24.9% / 10 yrs
	Costa Mesa, CA	23.4%/15 mo's
	West Kingston, RI	20.0%
	Columbia, MO	13.3% / 1 yr
	Apodaca, Mexico (Monterrey 2)	11.3%
	Hopkins, SC	10.2%
	Tijuana, Mexico	10.2%
	Cedar Rapids, IA	8.8%
	Apodaca, Mexico (Monterrey 3)	7.8%
	Lexington, KY	6.9%
	Lincoln, NE	6.5%
	Rojo Gomez, Mexico	5.9%
HILTON WORLDWIDE	Washington, DC	15.9%
	Honolulu, HI	8.4%
	San Francisco, CA	6.3%
VOLVO	Mack Trucks, Macungie, PA	41.9% / 10 yrs
	Dublin, VA	28.4% / 10 yrs
	Hagerstown, MD	20.9%
3M	Brockville, Ontario Canada	21.4% / 7 yrs
	Aberdeen, SD	11.0%
	Hutchinson, MN	10.7%
	Cynthiana, KY	6.9%
	Cordova, IL	5.7%
	Decatur, AL	5.2%
	Prairie du Chien, WI	5.2%
Cummins	Columbus, IN	16.8%
	Whitakers, NC	12.6% / 2 yrs
DETROIT	Detroit, MI	32.5% / 10 yrs
NISSAN	Smyrna, TN	17.7%
Rexroth Bosch Group	Bethlehem, PA	17.0%
JW MARRIOTT	Washington, DC	16.5%
HARBEC	Ontario, NY	16.5%
Coca-Cola	Dunedin, FL	12.2% / 2 yrs
BRIDGESTONE Your Journey, Our Passion	Wilson, NC	15.1% / 10 yrs
MedImmune A member of the AstraZeneca Group	Gaithersburg, MD	8.5%
CURTISS WRIGHT	Cheswick, PA	7.6%
LAND O'LAKES	Carlisle, PA	5.7%

Last updated: July 7, 2016

Improvement over 3 years unless stated otherwise

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Nissan: Smyrna, TN

2015–18 | PLATINUM
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"SEP adds rigor, analysis, and gives good guidance. It's one thing to have a target and objective, but SEP gives tools that empower you to be more disciplined and prove the impact certain activities have."

-Nissan North America Energy Team

- **SEP Platinum Certified**: Smyrna, TN vehicle assembly plant
- **Sustained achievement**:
  - 2015 Recertified SEP Platinum
    - 17.7% improvement in energy performance over 3 years
    - **6 week payback**
  - 2012 Certified SEP Silver
    - $938,000 total annual energy savings; 7.2% improvement over 3 years
    - 4 month payback
- **Used DOE EnPI Tool** to measure & track improvements

See case study:
www.energy.gov/eere/amo/business-case-sep#case-studies

HARBEC Inc.: Ontario, NY

HARBEC Inc. President, Bob Bechtold, and Energy Team Amy Bechtold and Jeff Eisenhauer.

"We are wary of statements of intent, but third-party verification under SEP provides evidence of proven energy savings. Without verification, stated savings are just a nice statement."

- Bob Bechtold, President

2013–16 | PLATINUM
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- **SEP Platinum Certified**: Ontario, NY, facility
- 16.5% improvement in energy performance over 3 years
- EnMS implementation resulted in $52,000 in annual savings through operational improvements ***with no capital investment***
- SEP is the organizing framework in driving the company's goal to be a ***carbon-neutral company***
- Adopted a CHP system and two wind turbines
  - ISO 50001/SEP strengthens management of this equipment, increasing the benefits gained

See case study:
www.energy.gov/eere/amo/business-case-sep#case-studies

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SEP Payback

Deeper, more rapid savings at less cost

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

Credible, third-party verification

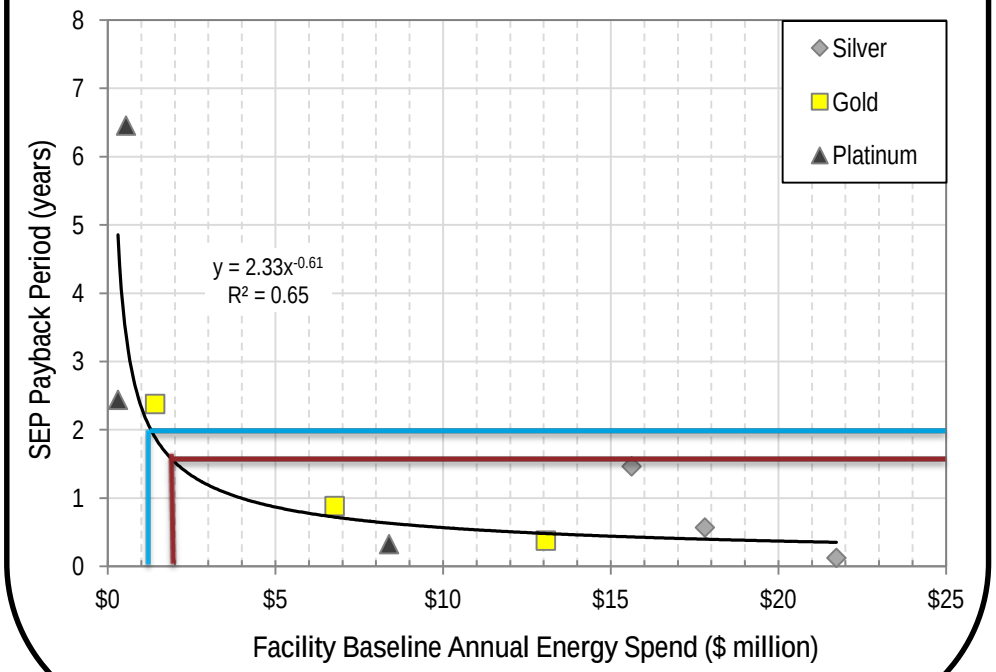
- Valuable data and analysis for **higher confidence in energy efficiency investments**

www.energy.gov/eere/amo/downloads/sep-2015-cost-benefit-analysis-paper

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

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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

Achievement period	Performance Levels: Bronze	Silver	Gold	Platinum
	Energy Performance Improvement			
12-36 months (1-3 yrs)	1%		5%	
37-48 months (~3-4 yrs)	N/A		7%	
49-60 months (~4-5 yrs)	N/A		8%	
61-72 months (~5-6 yrs)	N/A		10%	
73-84 months (~6-7 yrs)	N/A		12%	
85-96 months (~7-8 yrs)	N/A		13%	
97-108 months (~8-9 yrs)	N/A		15%	
109-120 months (~9-10 yrs)	N/A		16%	
			+ 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

Certification to this updated program design anticipated by Fall 2016.

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

SEP Program Update – Preview, Recertification

SEP - Recertification

- ISO 50001 certification
- Verified energy performance improvement

Performance Levels

Achievement period	Bronze	Silver	Gold	Platinum
			Energy Performance Improvement	
12-36 months (1-3 yrs)	1%		3%	
37-48 months (~3-4 yrs)	1% over most recent 3 years		3% over most recent 3 years	
49-60 months (~4-5 yrs)	1% over most recent 3 years		3% over most recent 3 years	
61-72 months (~5-6 yrs)	1% over most recent 3 years		3% over most recent 3 years	
73-84 months (~6-7 yrs)	1% over most recent 3 years		3% over most recent 3 years	
85-96 months (~7-8 yrs)	1% over most recent 3 years		3% over most recent 3 years	
97-108 months (~8-9 yrs)	1% over most recent 3 years		3% over most recent 3 years	
109-120 months (~9-10 yrs)	1% over most recent 3 years		3% over most recent 3 years	
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Certification to this updated program design anticipated by Fall 2016.

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

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GETTING STARTED WITH SEP

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 and easily adjust for variables to receive a normalized view of energy performance and 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

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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.

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TESTIMONIALS, BENEFITS & KEY TAKEAWAYS

Testimonials

"Any facility can claim energy savings, but a third party verification proves the savings to be real."

Schneider Electric, Smyrna, TN

"Third-party certification removes any potential of "green washing" and provides credibility to savings."

General Dynamics, Scranton, PA

"SEP has helped justify expenditures to management. The measurement and verification requirement helps to ***identify real cost savings***, allowing us to reinvest those savings into additional energy projects."

Cooper Tire, Texarkana, AR

"The verification was more important than the management standard, because it provides a performance metric.

SEP provides the ability to have proven performance metrics to quantify actual savings, giving both internal and external credibility to savings claims."

Volvo Trucks, Dublin, VA

More Testimonials

"SEP brought to light many energy intensity savings opportunities that were previously hard to justify. With the EnMS system in place and metering instruments installed, it is much easier to justify improvement projects, and management is more receptive to these proposals."

General Dynamics, Scranton, PA

"The established targets required by SEP kept the team at 3M Canada motivated and dedicated to achieving those targets. Since ISO 50001 does not specify particular energy savings targets on its own, along with SEP we're able to truly demonstrate our level of achievement, which we're quite proud of."

3M Canada, Brockville, Ontario

Benefits & Key Takeaways

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SEP is practicable for varied company types

DOE tools make SEP implementation reasonable

Business case and energy performance improvement are verified through 3rd party

SEP measurement & verification establishes the foundation for **rigorous and transparent** facility-level energy-related greenhouse gas emission mitigation verification

Benefits & Key Takeaways

- Deeper and more sustained energy savings (12%, on average over 3 years)
- Ongoing cost savings (energy, maintenance)
- Enhanced operational efficiency based on improved data utilization
- Informed decisions concerning proposed energy efficiency projects, including new technologies.

Benefits & Key Takeaways

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Increased reliability of outcomes - emphasis on business processes rather than reliance on a few individuals

Cost-effective approach to meeting sustainability targets

External verification of energy performance improvement

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EXTRA SLIDES

ISO 50001: Key Concepts and Approach

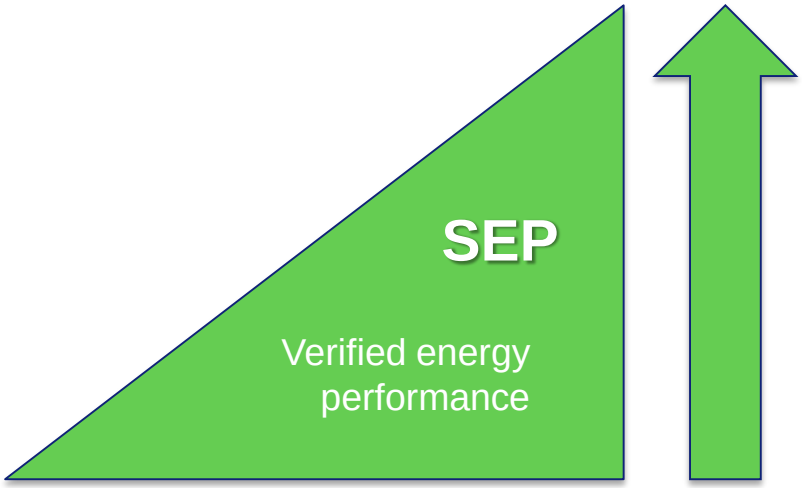
Key Concepts:

- EnMS defined by scope (activities/processes) & boundaries (site limits)
- "Energy review" is process to identify energy performance within site
- "Significant energy use" accounts for substantial energy consumption and/or offering considerable potential for energy performance improvement

Approach:

- ISO 50001 is designed to be very flexible
- Focuses on outcomes that produce energy performance improvements
  - Can start with one or two significant energy uses and build on successes
  - Less emphasis on documentation requirements than other ISO standards
  - Effective use of available metering and analysis to understand operations
- Does not require capital investments to achieve good results
- Does require engagement across the organization
  - Top management support is essential to success!

SEP Measurement & Verification Protocol



SEP requires a facility to determine its energy performance improvement with the:

SEP Measurement and Verification Protocol for Industry

The SEP M&V Protocol offers a best practice methodology to:

1. Verify the results from a facility's implementation of ISO 50001
2. Track energy performance changes over time
3. Document energy performance normalized to production and other relevant variables

Energy Performance Indicator (EnPI) Tool: Enter energy consumption data and easily adjust for variables to receive a normalized view of energy performance and calculate SEP metrics energy.gov/enpi