



**Superior
Energy
Performance[®]**
U.S. DEPARTMENT OF ENERGY

Strategic Energy Management is Free Money

Better Buildings Summit

Paul Scheihing, Advanced Manufacturing Office

May 10, 2016

Enterprise Energy Management

Schneider Energy Action

Presented by:
Wade Willatt
5/12/2016

Schneider
Electric

The global specialist in energy management

- Energy Efficiency is in our DNA
- Offer many energy efficiency products and services
 - Square D (VFDs and Automated Controls)
 - APC (Data Center Power and Cooling)
 - Energy and Sustainability Services
- Le Hive (Global Headquarters) was first ever ISO 50001 certified EnMS



Life Is On

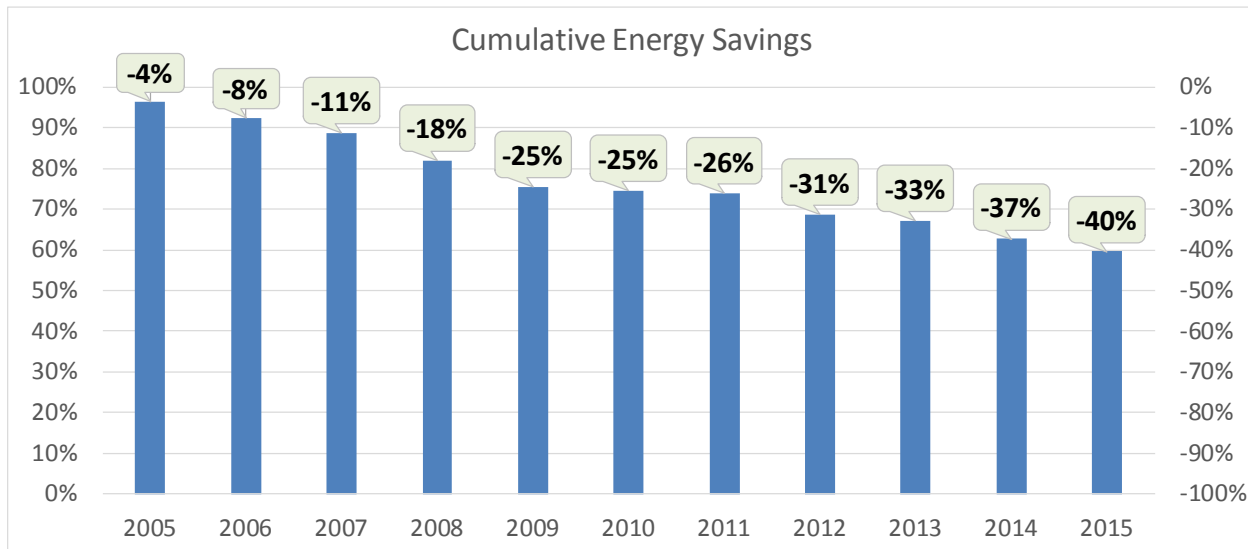
Schneider
Electric

North American Energy Program

- > Inception in 2005 with 26 locations
- > Partnership with Energy and Sustainability Services initialized in 2006
- > Supply side partnership with ESS (Summit Energy) beginning Q4 2011
- > Currently managing 64 facilities from various Business Units and Global Supply Chain Clusters



Historical Performance



- > Achieved and exceeded corporate energy goals by reducing the total energy consumption by over 14% from 2011 to 2014 (10% Goal) by using Schneider Electric products & services
- > Increased scope from 26 facilities to 64 by 2015
- > More than **749 million kWh** of cumulative energy (electricity & natural gas) saved through the end of 2015
- > Equivalent cost savings of over \$70 million
- > Over **35% reduction** in greenhouse gas emissions since 2004

Key Elements of Schneider Energy Action



Identify Goals

Develop a Team

Create Energy Models

Track Energy Performance

Identify Projects

Share Best Practices

Track Projects

Sustain Success

Energy Policy

Make the Most of Your Energy



Schneider Electric is committed to continuous improvement in the efficiency with which energy is used and the avoidance of energy waste.

Our objective is to reduce our total energy consumption each year after normalizing for significant changes in levels of activity, weather, and other relevant factors.

We are committed to conserving natural resources so future generations can prosper

We set annual objectives and targets for energy performance improvement to drive continual improvement. Schneider Electric is committed to providing the necessary resources and information in order to achieve our objectives and targets.

We want to limit our risks related to energy

We will comply with all legal requirements related to our energy use, consumption, and efficiency. In addition, we will meet all other requirements that we choose to pledge to including ISO 50001 and Superior Energy Performance.

We want to be an example for our customers through Schneider Energy Action

Schneider Energy Action provides a platform for sharing best practices enabling improved process design for energy efficiency and the purchase of energy-efficient product and services.



Laurent Vermeey
Executive Vice President
North America Operations



3.5% Annual Reduction Goal

Schneider Energy Action Team

Core Energy Team

- Drive Energy Performance
- Prioritize Projects based on:
 - Payback
 - Schneider Electric Products
- Develop Capital Plan

Facilities Managers

Energy Experts

- Create Energy Models
- Provide technical expertise for quantifying
- Verify Energy Performance

Energy and Sustainability Group

Local Energy Champions

- Implement projects
 - Obtain Quotes
 - Manage Contractors

Local Personnel – Facilities technicians, SH&E Manager, Plant Manager, etc.

Experts from Energy and Sustainability Services

A partnership between Energy and Sustainability Services and the SENA Global Supply Chain organization is at the core of the program

Energy & Sustainability Services

- Accurate billing: invoices checked for accuracy and compared to historical averages (EMPS)
- Competitive procurement and negotiation, risk management and hedging (EMPS)
- Monthly performance insight: energy reports normalized for production, weather, and/or occupancy (GEMC)
- Facility profile analysis to provide a first view of likely EE opportunities
- Industrial energy efficiency site assessments (GEMC)
- On-call energy consulting on control schemes, process changes, supply-side issues, etc. (GEMC & EMPS)

Global Supply Chain North America

- Strong upper management support ensures top-down cooperation
- Commitment by facility managers to manage change at the grassroots level
- Intelligent risk taking: challenging old assumptions, trying new ideas
- Investment in and optimization of compressed air systems, lighting, process heating/cooling, HVAC, water
- Continuous Improvement: APP goals to supplement corporate goals
- Utilizing Schneider Products: drives, lighting and lighting control, building automation, metering & monitoring

Energy Modeling

Use Standard Model

- Utilize free DOE EnPI tool

Normalize Energy Consumption

- Weather
- Production/Occupancy

Review Model Monthly

EnPI Tool v3.02 SE 17, © 2011 Georgia Tech Research Corporation

1000 Data Points Max

Date	Utilities			Independent Variables						
	Electricity (kWh)	Natural Gas (MMBtu)	None (kWh)	CDD 60	HDD 60	CDD ²	HDD ²	OT + DOT	Fab Parts	BMS Parts
01/01/13	6			6	431	37	106,725			
02/01/13	20			20	265	408	81,544			
03/01/13	152			152	57	22,990	9,289			
04/01/13	269			269	45	72,451	2,040			
05/01/13	416			416	10	173,195	103			
06/01/13	633			633	1	401,269	1			
07/01/13	818			818	0	689,124	0			
08/01/13	697			697	0	486,332	0			
09/01/13	622			622	6	272,354	33			
10/01/13	226			226	51	51,227	2,571			
11/01/13	70			70	146	4,964	21,413			
12/01/13	9			9	419	89	176,945			
01/01/14	1,123,786	3,971		41	288	1,657	82,968	27,976	403,568	109,000
02/01/14	1,006,352	2,801		52	160	2,691	25,587	23,066	271,734	91,797
03/01/14	1,100,250	2,638		139	84	19,414	7,021	18,164	202,868	100,349
04/01/14	1,163,256	2,032		267	54	65,921	2,921	16,309	265,127	101,580
05/01/14	1,252,583	2,030		453	10	204,945	96	16,160	196,664	74,564
06/01/14	1,288,655	1,746		640	0	409,387	0	16,579	219,391	81,253
07/01/14	1,450,458	1,495		820	0	672,805	0	14,346	237,717	82,013
08/01/14	1,423,110	1,473		747	0	558,009	0	18,364	208,157	83,748
09/01/14	1,327,904	1,616		599	1	368,302	0	12,216	213,569	88,607
10/01/14	1,269,884	1,813		363	17	132,132	276	21,329	238,735	103,272
11/01/14	1,050,376	2,045		67	151	3,249	22,763	13,294	210,841	88,696
12/01/14	979,255	2,602		16	284	255	80,396	10,559	233,555	101,938
01/01/15	1,041,727	3,036		7	380	42	144,461	12,189	280,626	122,214
02/01/15	912,702	1,822		95	163	3,948	26,569	10,097	209,027	91,142
03/01/15	971,007	1,315		197	79	30,726	5,181	5,544	215,748	101,135
04/01/15	966,294	834		204	75	41,751	5,688	4,697	171,340	81,587
05/01/15	969,005	847		293	33	85,580	1,117	4,844	128,926	66,788
06/01/15	1,087,769	735		666	1	443,449	1	7,268	135,275	85,079
07/01/15	1,213,741	771		695	0	465,021	0	10,444	132,249	94,728
08/01/15	1,223,369	977		664	0	441,055	0		222,693	93,883
09/01/15							0			
10/01/15							0			
11/01/15							0			
12/01/15							0			
01/01/16							0			
02/01/16							0			
03/01/16							0			
04/01/16							0			

Introduction Step 1 - Energy Utilities **Step 2 - Data Entry** Step 3 - Data Review Step 3 - Data Review (Graph) Step 4 - Y1 Regression Step 4 - Y2 Regress

Select destination and press ENTER or choose Paste

Energy Performance

Region	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	'15 vs '14 Baseline
Central I Total	5%	-6%	7%	3%	0%	-5%	0%	2%	-7%	-4%	-2%	-7%	-1%
Central II Total	-1%	-6%	6%	-5%	-5%	-11%	-9%	-1%	-7%	-13%	-8%	8%	-4%
Northeast Total	-10%	-18%	4%	19%	-5%	-9%	-15%	-13%	-15%	6%	8%	19%	-3%
South Total	3%	-6%	-5%	-17%	-16%	-16%	-13%	-15%	-13%	-13%	-13%	-18%	-12%
Southeast Total	2%	-5%	13%	1%	-1%	-4%	-1%	-3%	-4%	2%	1%	5%	0%
West Total	-2%	-7%	-3%	-9%	-6%	-6%	-9%	-7%	-12%	-10%	-13%	-9%	-8%
Grand Total	-1%	-9%	4%	-2%	-6%	-9%	-8%	-6%	-10%	-7%	-5%	0%	-5%

> 4.9% reduction in total energy consumption ('15 vs. '14)

- 3.9% savings in electrical energy
- 6.5% savings in natural gas

Identify Projects

Schneider Electric uses the ISO 50001 Energy Review Process

Total Energy Breakdown

Figure 11 shows the breakdown of the facility's total energy consumption. The table in the table below is a breakdown of the facility's energy consumption by source. The table below is a breakdown of the facility's energy consumption by source. The table below is a breakdown of the facility's energy consumption by source.

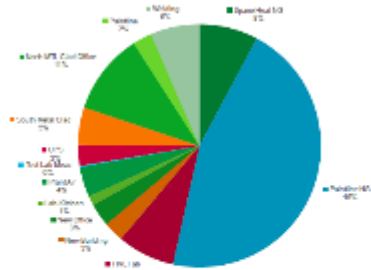


Figure 11 – Total Energy Breakdown

Superior Energy Performance Indicator (SEnPI)

Seymour plant is SEP Platinum certified. The facility determined their SEnPI using the OT EnPI Tool V3.14. The SEnPI tool converts electricity and natural gas consumptions to source consumptions in MMBtu. Other energy sources are less than 5% and therefore excluded. The tool uses a linear regression model to compare actual energy consumption to a baseline.

The input variables analyzed include:

- Heating Degree Days
- Cooling Degree Days
- Safety Hours
- Plant Operator Hours
 - Regular
 - Overtime
 - Double Overtime
 - Overtime + Double Overtime

Figure 12 below shows the results of the analysis. The SEnPI for 2011-2013 was 20.6%. The SEnPI will be updated semi-annually.

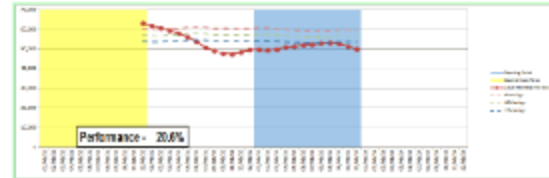


Figure 12 – Superior Energy Performance Indicator

Table 8 – Detailed Summary of Recommendations

#201 #	Project Name	Private Savings (\$/yr)	Monthly Cost (\$/month)	Payback (Months)	Total Cost (\$/yr)	Annual Cost (\$/yr)	Simple Payback (Years)	EOD Savings (\$/yr)
1	Replace the 200-watt LED in production area	10,000	0	0	0	0	0	10,000
2	Commission an 1-year agreement	10,000	0	0	0	0	0	10,000
3	Replace the 200-watt LED in production area	10,000	0	0	0	0	0	10,000
4	Install an energy cap in waste treatment and food storage areas	4,000	0	0	0	0	0	4,000
5	Replace the 200-watt LED in production area	1,000	0	0	0	0	0	1,000
6	Replace the 200-watt LED in production area	1,000	0	0	0	0	0	1,000
7	Replace the 200-watt LED in production area	1,000	0	0	0	0	0	1,000
8	Replace the 200-watt LED in production area	1,000	0	0	0	0	0	1,000
9	Replace the 200-watt LED in production area	1,000	0	0	0	0	0	1,000
10	Replace the 200-watt LED in production area	1,000	0	0	0	0	0	1,000
Total		40,000	0	0	0	0	0	40,000

Comprehensive energy assessment of the facility including detailed utility analysis and energy load breakdown

ISO50001 and SEP Certification readiness

Energy conservation measures with cost savings and simple payback analysis

Showcase Schneider Electric Products

> Automation and Control

- Building Management System
- Variable Frequency Drives
- Power and Energy Monitoring
- Telemetry and Remote SCADA Systems

> Data Center Cooling Systems

> Solar

> Energy and Sustainability Services

- Energy Consulting
- Strategic Energy Sourcing Services

Project Tracking

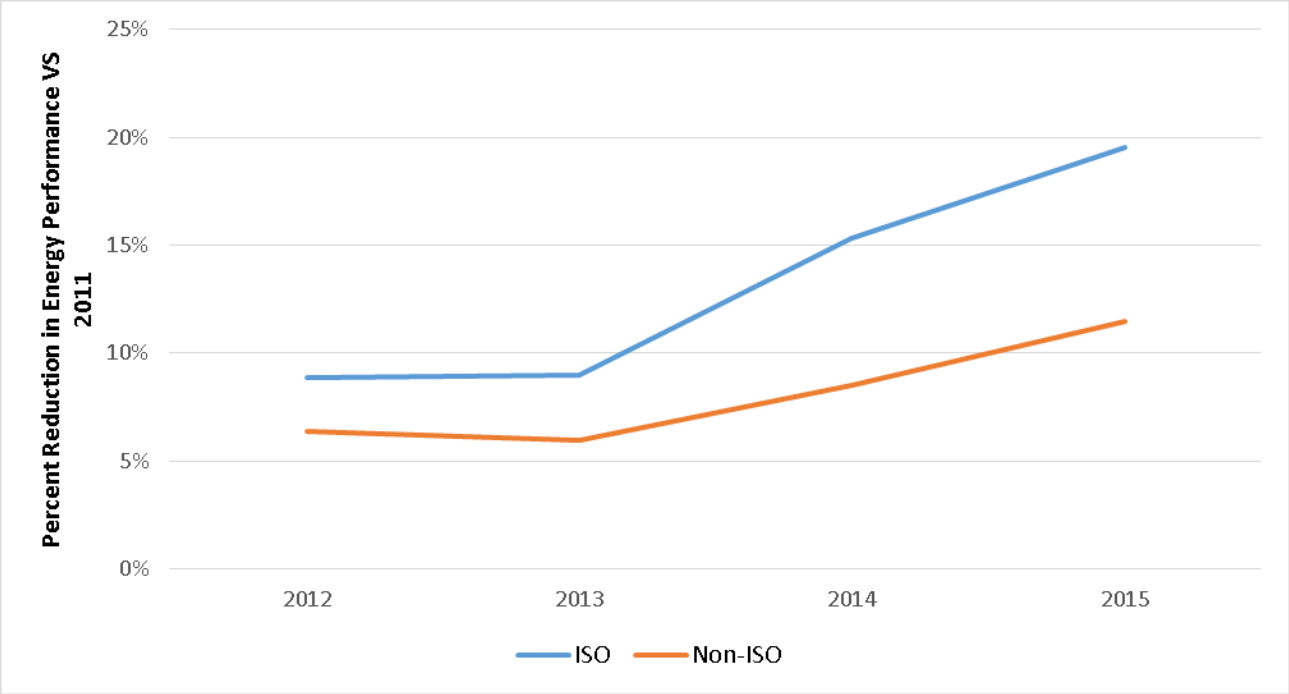
Location	Region	2012				2013				2014				3-year total		
		Projected Savings (kWh)	2011 Total Energy Usage (kWh)	Projected % Difference	Actual % Difference (YoY Model)	Projected Savings (kWh)	2012 Total Energy Usage (kWh)	Projected % Difference	Actual % Difference (YoY Model)	Projected Savings (kWh)	2013 Total Energy Usage (kWh)	Projected % Difference	Actual % Difference (YoY Model)	Projected Savings (kWh)	% Diff. vs. 2011	Actual % Difference (Connect Model)
	Central 1 Total	3,099,715	83,844,217	-3.7%	-7.3%	3,885,887	76,336,281	-5.1%	-3.8%	2,885,934	78,119,982	-3.7%	-7.5%	9,871,536	-11.8%	-12.3%
	Central 2 Total	2,475,323	77,114,822	-3.2%	-4.0%	1,501,422	76,171,307	-2.0%	-1.4%	3,519,113	81,018,115	-4.3%	-3.1%	7,495,858	-9.7%	-7.8%
	Northeast Total	1,856,691	40,794,230	-4.6%	-5.4%	1,402,063	36,602,252	-3.8%	-1.9%	1,194,576	35,385,949	-3.4%	-4.2%	4,453,329	-10.9%	-12.4%
	South Total	1,892,839	39,386,045	-4.8%	-8.5%	1,886,318	47,716,458	-4.0%	-3.5%	1,462,265	48,884,705	-3.0%	-1.3%	5,241,421	-13.3%	-7.5%
Columbia	Southeast	1,073,765	13,649,517	-7.9%	-5.5%	831,379	12,867,554	-6.5%	3.2%	858,145	13,571,923	-6.3%	-14.6%	2,763,289	-20.2%	-17.1%
Greensboro	Southeast	7,985	1,559,886	-0.5%	-3.0%	114,059	1,486,695	-7.7%	-4.6%	56,051	1,534,710	-3.7%	-6.0%	178,094	-11.4%	-10.1%
LaVerque LifeSpace	Southeast	907	737,744	-0.1%	-3.1%	24,732	775,063	-3.2%	-0.8%	4,768	861,028	-0.6%	-26.8%	30,407	-4.1%	-18.1%
LaVerque PMO	Southeast	3,487	2,950,107	-0.1%	-16.5%	-	2,394,750	0.0%	-6.1%	-	2,302,164	0.0%	9.0%	3,487	-0.1%	-0.6%
Nashville	Southeast	21,283	1,575,840	-1.4%	1.4%	-	1,546,562	0.0%	-5.3%	-	1,587,509	0.0%	-7.8%	21,283	-1.4%	-1.7%
Raleigh	Southeast	974,763	5,834,079	-16.7%	-1.4%	156,684	5,563,471	-2.8%	-5.3%	50,196	5,511,077	-0.9%	-11.8%	1,181,643	-20.3%	-12.9%
Salisbury	Southeast	206,095	1,252,991	-16.4%	-6.6%	43,320	1,074,221	-4.0%	8.0%	7,054	1,316,392	-0.5%	-14.4%	256,468	-20.5%	-14.5%
Seneca	Southeast	2,064,116	17,536,193	-11.8%	-11.0%	999,944	15,172,337	-6.6%	-7.0%	855,158	14,957,818	-5.7%	-10.4%	3,919,218	-22.3%	-22.2%
Smyrna	Southeast	2,508,783	9,658,729	-26.0%	-25.7%	435,670	8,802,758	-4.9%	-11.2%	1,203,360	8,007,993	-15.0%	-22.7%	4,147,813	-42.9%	-37.4%
	Southeast Total	6,861,184	54,755,087	-12.5%	-9.1%	2,605,788	49,683,411	-5.2%	-4.3%	3,034,731	49,650,813	-6.1%	-13.1%	12,501,703	-22.8%	-20.5%
	West Total	3,535,724	55,724,409	-6.3%	-7.5%	1,212,235	49,724,099	-2.4%	-2.8%	3,028,904	51,018,044	-5.9%	-13.4%	7,776,862	-14.0%	-27.3%
	Grand Total	19,721,475	351,618,810	-5.6%	-7.1%	12,493,713	336,233,808	-3.7%	-2.2%	15,125,523	344,077,408	-4.4%	-7.0%	47,340,710	-13.5%	-14.6%

- > Reconciliation of projected savings versus actual energy reduction (from energy model)
- > Monthly discussions with all regions/sites
- > Clear visibility to current performance on regional and site level, by GSC Cluster and Business Unit
- > Tool to determine significant deviation for ISO 50001 certified sites
 - Easily done with conditional formatting

Using ISO 50001 and SEP to Sustain Success

- > ISO 50001 Builds on Existing Energy Program
 - Have reduced normalized energy consumption by 40% over last 10 years
 - Goal is to reduce by another 10 % from 2015-2017
- > Superior Energy Performance
 - External recognition for energy reduction
 - 3rd party validation of Schneider Energy Action
 - Improves internal recognition of energy performance
- > Verify Results with Enterprise-wide Action Plan
 - Consistent method for tracking projects
 - Allows for best practice sharing and ROI lookup for similar projects

Impact of ISO 50001 Implementation



Life Is On



Schneider
Electric



3M Approach to Strategic Energy Management

Steve Schultz
Corporate Energy Manager
May 10, 2016

Our fundamental strengths are the foundation of 3M's performance

Leveraging these assets creates value; strengthening them ensures our future



Technology

Ability to share and combine elements of 3M's broad technology portfolio to produce unique, differentiated products, translating to premium margins.



Manufacturing

Utilization of 3M manufacturing footprint and technology, including process trade secrets, leading to higher-performing products and lower unit cost.



Global capabilities

Subsidiary front- and back-office footprint that allows for effective development, adaptation and commercialization of products.



Brand

Brand equity in the 3M brand and in authority brands that are shared across business groups.

3M facts

3M is one of 30 companies in the Dow Jones Industrial Average and is a component of the Standard & Poor's 500 Index

Year-end 2015

Sales

Worldwide	\$30.274B
International	\$18.225B
60% of company's total	

Net Income

Net income – reported	\$4.833B
Percent to sales	16.0%
Earnings per share – diluted – reported	\$7.58

Taxes

Income tax expense	\$1.982B
--------------------	----------

Dividends

(Paid every quarter since 1916)
Cash dividends paid per share
One original share, if held, is now shares

\$4.10
3,072

R&D and Related Investments

For 2015	\$1.763B
Total for last five years	\$8.452B

Capital Investments

For 2015	\$1.461B
Total for last five years	\$7.482B

Employees

Worldwide	89,446
United States	35,973
International	53,473

Patents awarded

In 2015	US 565; total 3,128
In company history	105,000+

Organization

26 business units, managed under these five business groups:

- Consumer
- Health Care
- Safety & Graphics
- Electronics & Energy
- Industrial

Operations in about 29 US states and 70 countries around the world.

Laboratories in 36 countries.

Technology

46 technology platforms, including:

- Abrasives
- Adhesives
- Electronics & Software
- Light Management
- Microreplication
- Nanotechnology
- Nonwoven Materials
- Surface Modification

8,300 researchers worldwide: 4,500 in the United States.

Sustainability results

Prevented the generation of more than 4 billion pounds of pollutants since 1975 through completion of nearly 13,000 Pollution Prevention Pays (3P) projects.

Listed on Dow Jones Sustainability Index for 16 consecutive years.

Announced sustainability-related platform and goals, reflecting increasing focus on supporting the environmental and social goals of 3M's customers and the communities in which it operates.

Community citizenship/3Mgives

Cash and product donations to education, community and environmental programs topped \$65 million in 2015; 3Mgives has contributed \$1.45 billion since its inception.

3M employees and retirees volunteered more than 300,000 hours improving lives around the world.

Driving Progress Around the World



3M Has Aggressive Energy-Efficiency Goals

- Challenge '95
- Year 2000 Environmental Targets
- Environmental Targets 2005
- Environmental Targets 2010
- 2015 Sustainability Goals
- **2025 Sustainability Goals**



3M 2025 Sustainability Goals

2015 is Baseline Year



- Reduce mfg waste additional 10%, indexed to sales
- Achieve “zero landfill” status at more than 30% of mfg sites

Energy

- Ensure GHG emissions at least 50% below our 2002 baseline, while growing our business

- Increase renewable energy to 25% of total electricity use

Water

- Reduce global water use by 10%, indexed to sales
- Engage 100% of water-stressed/scarce communities where 3M manufactures or

Suppliers

- Drive supply chain Sustainability through targeted raw material traceability and supplier performance assurance.

Education&Developmen

- Invest cash and products for education, community and environmental programs
- 100% participation in employee development programs to advance individual and organizational capabilities
- Double the pipeline of diverse

Customers

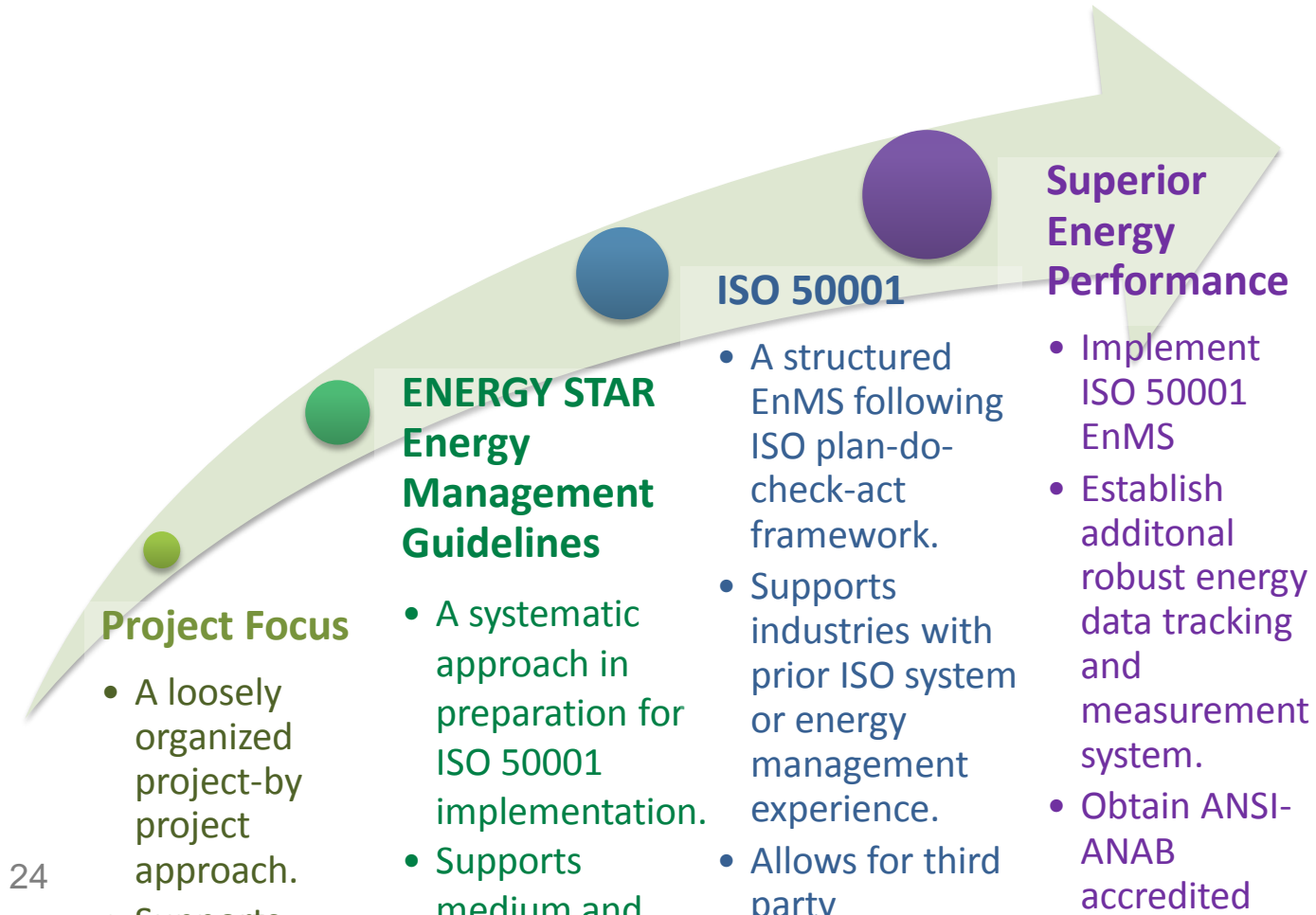
- Invest to develop more sustainable materials and products to help our customers reach their environmental goals
- Help our customers reduce their GHGs by 250 million tons of CO₂ equivalent emissions through use of 3M products
- Provide training to 5 million people on worker/patient

Long History of Participating in Voluntary Programs

- Department of Energy
 - Motor Challenge
 - Compressed air, pump, process heat Best Practice programs
 - Save Energy Now (Leader)
 - Plant Assessments
 - Better Buildings, Better Plants (Challenge partner)
 - ISO 50001 / Superior Energy Performance
- EPA
 - Green Lights
 - Climate Wise
 - Energy Star



Strategic Energy Management Continuum



Early in the continuum



Hooray! We managed energy.

Who owns the process?

How do you know the improvement will continue?

3M Energy Program Goals, Objectives and Strategies

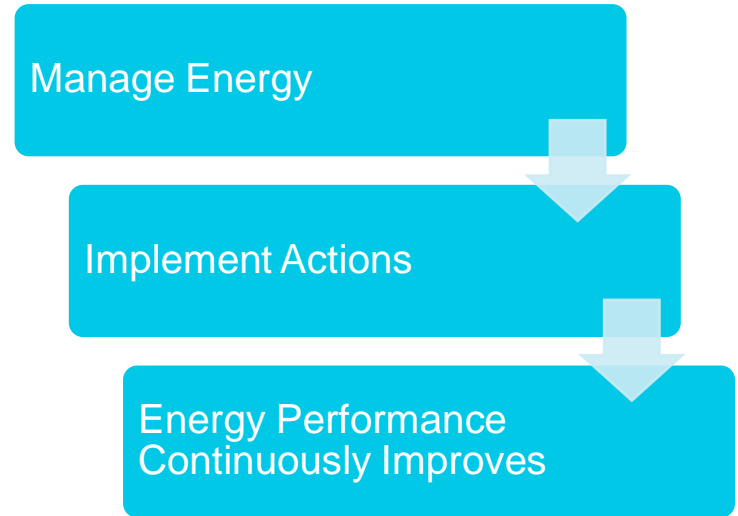
Goal: Improve energy performance

- Reduce energy costs, risks, and environmental impacts

Manage energy as you would manage other important aspects

- Quality, Environmental, Safety, etc.

Implement actions to improve energy performance



3M Facilities Implementing ISO 50001 and SEP

Country	Site	Latest Action	SEP Certified
Canada	Brockville 501 (Tape)	ISO 50001 Certified	Platinum
U.S.	Cordova	ISO 50001 Certified	Silver

2012

- Two pilot facilities implemented in 2012 with support of U.S. Department of Energy, Illinois Department of Economic Development, and Natural Resources Canada

3M Facilities Implementing ISO 50001 and SEP

Country	Site	Latest Action	SEP Certified
Canada	Brockville 501 (Tape)	ISO 50001 Certified	Platinum
Canada	London	ISO 50001 Certified	No
Canada	Perth 301	ISO 50001 Certified	No
Canada	Perth 302	ISO 50001 Certified	No
Canada	Montreal	Being ISO Certified	No
Canada	Mordon	Being ISO Certified	No
France	Tilloy	ISO 50001 Certified	No
Germany	Kempton (Ceradyne)	ISO 50001 Certified	No
Germany	Obernburg	ISO 50001 Certified	No
Germany	Wuppertal	ISO 50001 Certified	No
Germany	Neuss	ISO 50001 Certified	No
Germany	Hilden	ISO 50001 Certified	No
Germany	Kamen	ISO 50001 Certified	No
Germany	Seefeld & Landsberg	ISO 50001 Certified	No
Germany	Jüchen	ISO 50001 Certified	No
Korea	Naju	ISO 50001 Certified	Yes
Poland	Wroclaw PSD	ISO 50001 Certified	No
Poland	Wroclaw Automotive	ISO 50001 Certified	No
Taiwan	Tainan	ISO 50001 Certified	No
U.S.	Cordova	ISO 50001 Certified	Silver
U.S.	Aberdeen	Working as a group of co-horts	Enterprise-wide ISO 50001 and individual Superior Energy Performance certificates
U.S.	Cynthiana		
U.S.	Decatur		
U.S.	Hutchinson		
U.S.	Prairie du Chien		
U.S.	Cottage Grove MRD	International Program of cohorts	North American Pilot
Canada	Brockville PSD		
Mexico	San Luis Potosi		

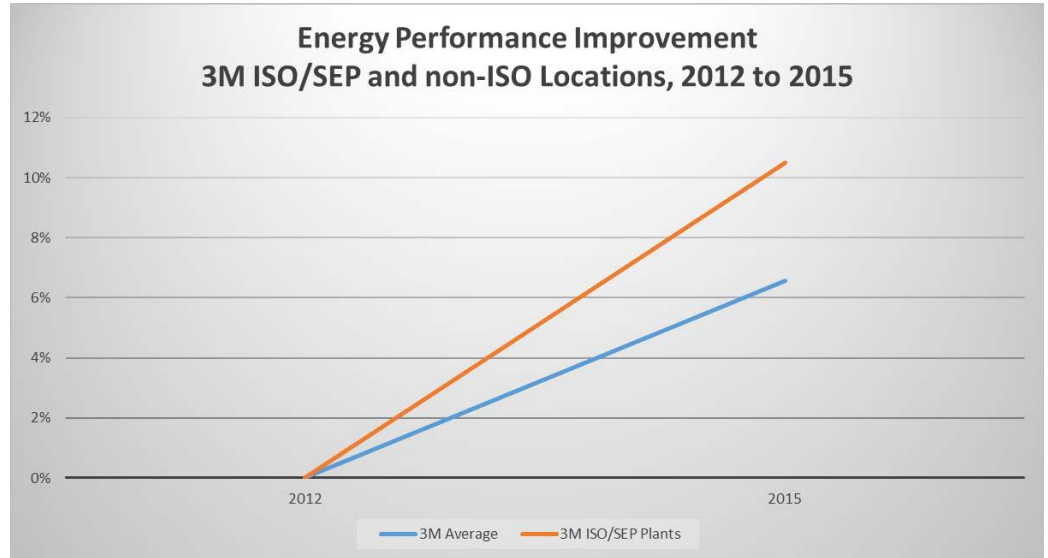
2016

- 3M Enterprise-wide ISO 50001 certification
- Twenty-eight locations in eight countries certified
- Five plants implementing as a group of cohorts
- Three plants in three countries implementing as cohorts in North American Pilot



Energy Performance Results

- 3M facilities that are implementing ISO 50001 and Superior Energy Performance are showing a 60% greater improvement than other 3M facilities.
- ISO 50001 and Superior Energy Performance are one of 3M's strategies to achieve 2025 goals



Corporate Energy Strategy

Achieve Corporate Sustainability Goals Related to Energy

Key Elements

- **Operationalize Corporate 2025 Goals**
 - **25% Renewable Electricity**
 - Wind
 - Solar
 - Alternative Sources
 - **30% Increase in Energy Efficiency**
 - Point of Use Energy Management
 - Black Belt Project
 - ISO 50001/SEP
 - Reinforce Global Network of Energy Champions
- **Quarterly CEO Report of Energy Performance**
- **Sponsorship**
 - Energy EMTC, Energy Awards
- **Communications**

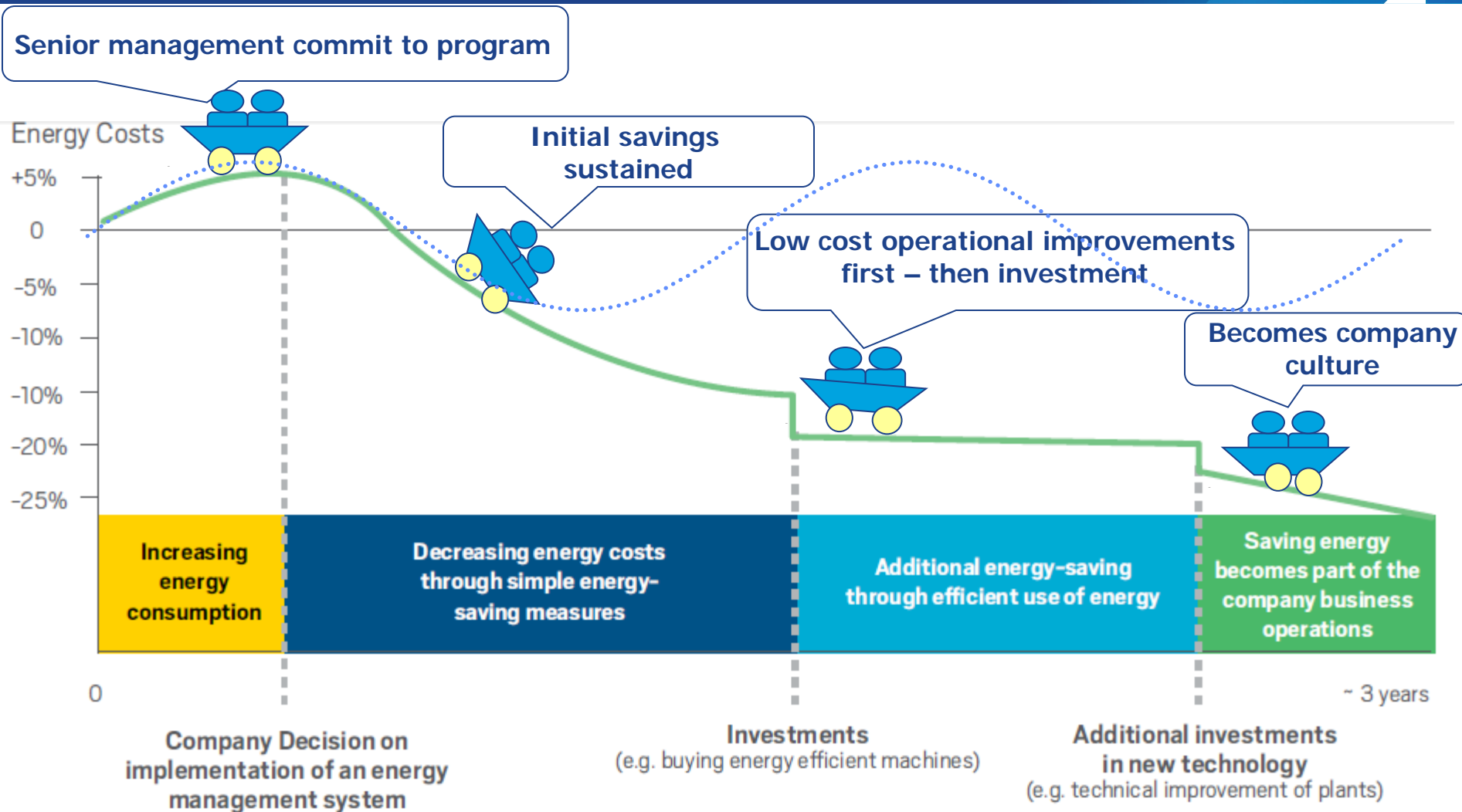
Potential Elements

- **Supply Chain Communication Plan**
- **U.S and International Energy Sourcing Strategy**
- **Use of Water**

Ad hoc Approach to Energy Management



Structured Approach to Energy Management



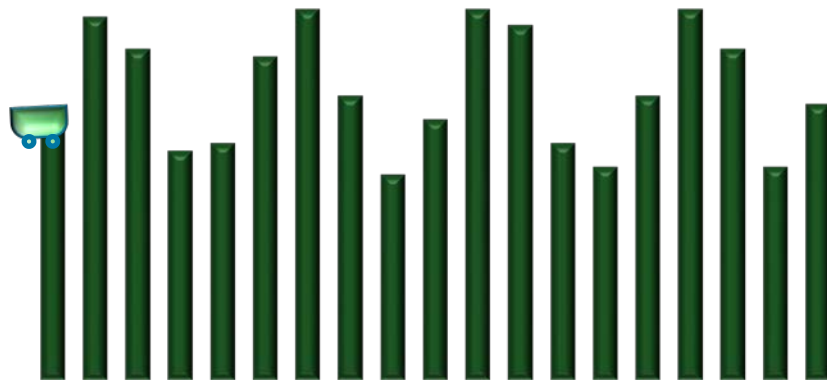
Value of ISO 50001

Embedding energy management into normal business systems helps to retain and build on the savings achieved.

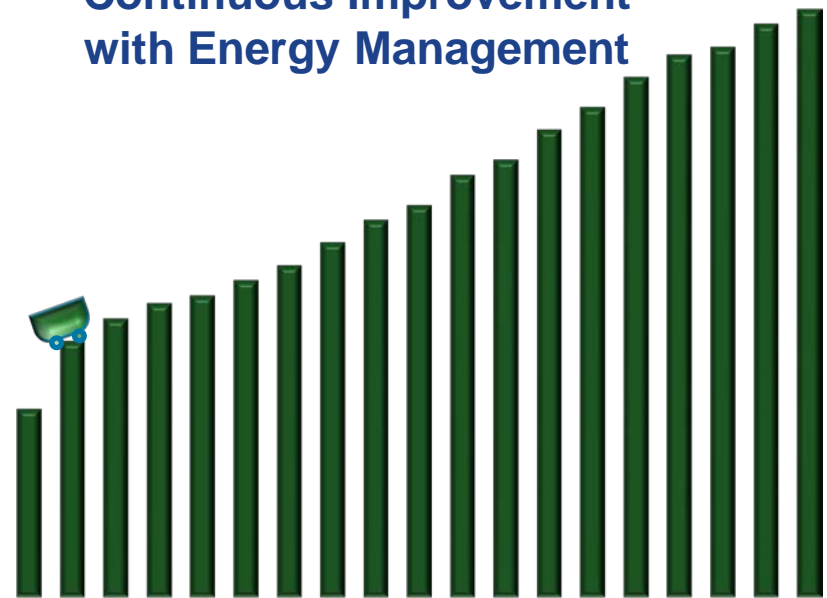
Project-By-Project Energy Improvements

vs.

Continuous Improvement with Energy Management



Energy & Cost Savings Over Time



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

Strategic Energy Management (SEM) Continuum



SEP

Verified energy performance and ISO 50001

ISO 50001

Standard Energy Management System (EnMS) framework for global operations

Foundational Energy Management

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

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

Paul Scheihing

Technology Manager, Technical Assistance

Advanced Manufacturing Office

US Department of Energy

paul.scheihing@ee.doe.gov

1-202-586-7234

energy.gov/eere/amo

energy.gov/eere/amo/ta



Learn more:

energy.gov/isosep

Subscribe on the SEP website to receive the latest SEP news & program updates:

RECEIVE SEP UPDATES

Enter your email address to receive updates about the SEP Program.

SUBSCRIBE



SEM – Delivering Elements for Effective Market Transformation

Greg Baker
Efficiency Vermont
Engineering Manager
May 10th, 2016



About VEIC

- >25yrs: Proven results, showing the value of reducing energy use for businesses and individuals
- Comprehensive Focus: energy efficiency, renewable energy & transportation
- >300 Energy Experts: Engineering, planning, data analysis, implementation, policy, capacity building, M&V
- Clients: Diverse mix of public and private sector

Efficiency
Vermont

 EFFICIENCY \$SMART

 DC
SUSTAINABLE ENERGY
UTILITY



veic.org

Efficiency
Vermont

SEM - Redefining relationships

- It's business: relationships matter
- Using a consultative engagement model
- Non-incentive non-project value



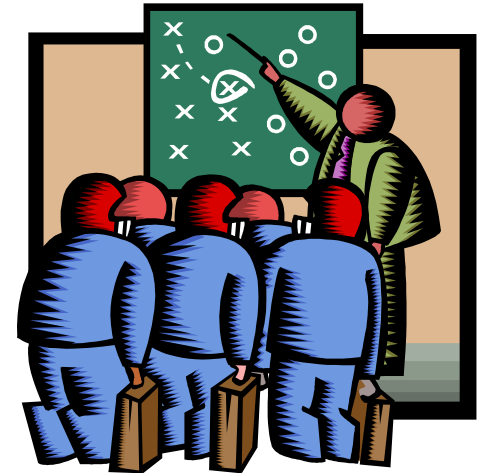
SEM Value Proposition



- ✓ **Holistic** approach to managing energy
- ✓ Address the **barriers** to energy management
- ✓ Make energy use **visible** to everyone in the company, from top management down.
- ✓ Establish energy as a **standard operating procedure**, similar to Safety, Quality and Production.

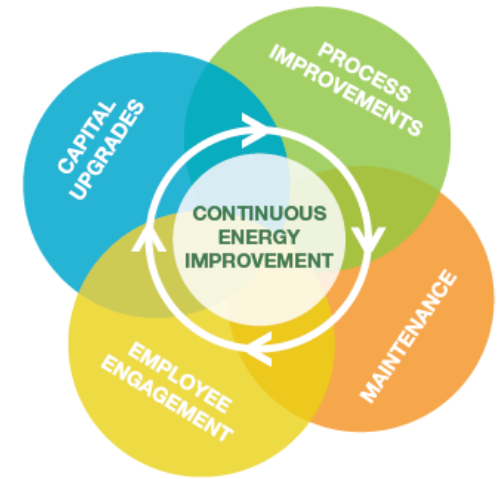
SEM Program Elements

- Outlines minimum elements of an energy management system in three major groupings
 - Customer commitment
 - Energy Management Planning & Implementation
 - System for Monitoring, Tracking & Reporting Performance

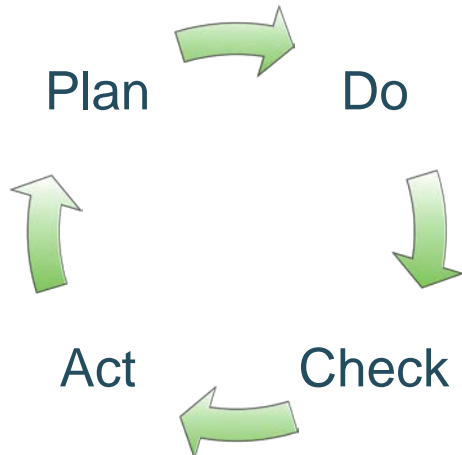


Continuous Energy Improvement (CEI) Pilot Design

- Leverage your relationships/partnerships
- Expand your organizational reach
- Expand your focus
 - ✓ Peer to peer engagement (Cohort)
 - ✓ Energy management assessment (EMA)
 - ✓ Energy management information system (EMIS)
- Low/no cost ops. via kaizens and sleeping plant tours

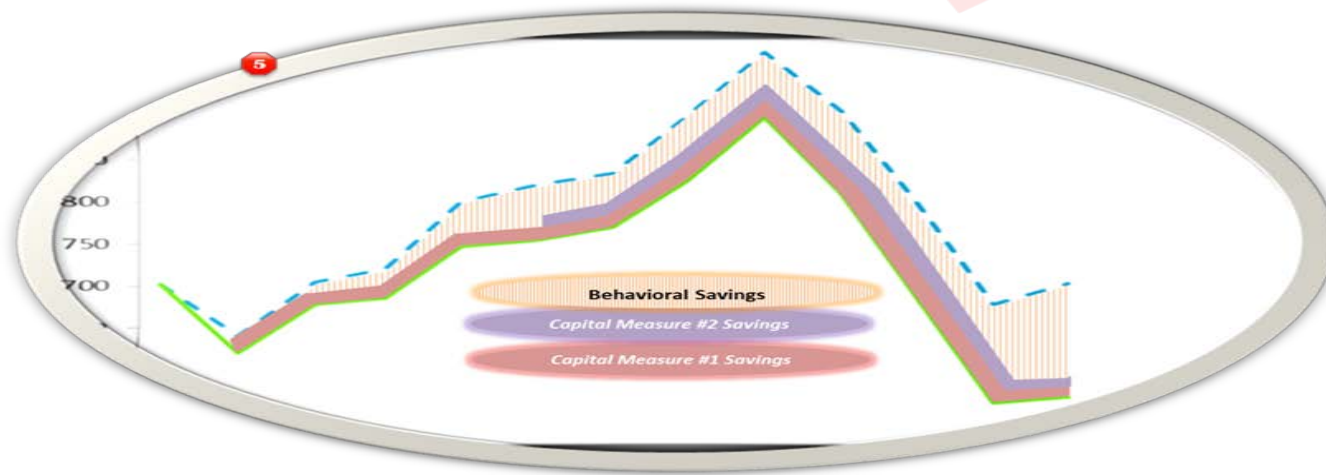
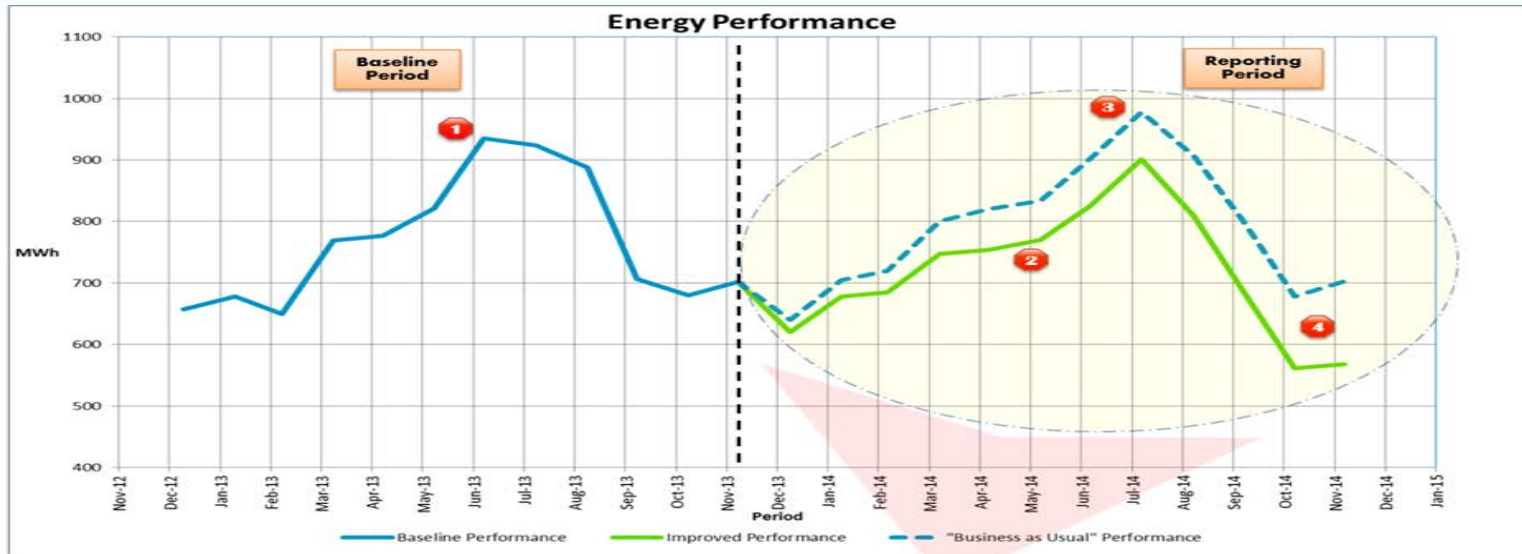


Energy Management Assessment



Process Step	Category	Milestone
Commitment	Senior Management	Corporate Sponsor Identified
		Energy Management Defined
		Resources Allocated
	Energy Policy	Culture Adopted
		Policy Written
		Procedures Defined
Energy Champion & Energy Team	Commitments Designated	
	Energy Champion Selected	
	Authority Granted	
Plan	Energy review	Reporting Executed
		Energy Review Documented
		Usage Quantified
	Action plan	Baseline Established
		EnPIs Defined
		Measurement Planned
Do	Implementation	Revisions Incorporated
		Action Plan Written
		Performance Targets Defined
	Employee Engagement	Evaluation Defined
		Milestones Achieved
		Measurement Improved
Check	Monitoring, measurement and analysis	Staff Solicited
		Training Provided
	Internal auditing	Operational Criteria Followed
		Maintenance Incorporated
Act	Management Review	Energy Considered in Design
		Energy Considered in
Check	Monitoring, measurement and analysis	Performance Evaluated
		Targets Enforced
Act	Management Review	Measurement Checked
		Audit Performed
Check	Monitoring, measurement and analysis	Issues Resolved
		Review Performed
Act	Management Review	Records Maintained

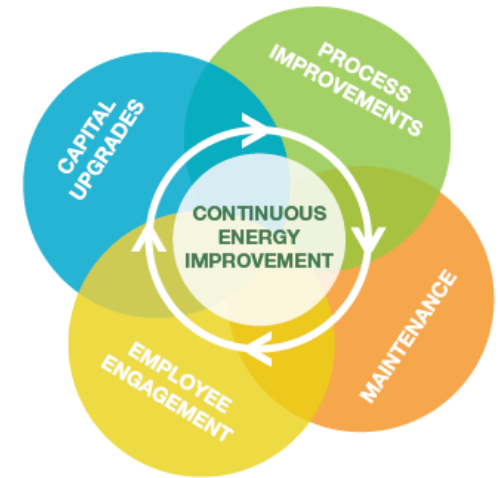
Energy Management Information System



- 1 = actual energy use performance during baseline period
- 2 = actual energy use during reporting period
- 3 = predicted energy use during reporting period, in the absence of energy efficiency actions ("Business-as-usual")
- 4 = energy savings is the gap between predicted and actual energy use

Pilot Design – part 2

- Cohort approach with a FOCUS
- Strategic Energy User
- Targeted Opportunity Identification



✓ **Dairy Industry**

✓ **Ammonia Refrigeration Systems**



A targeted approach

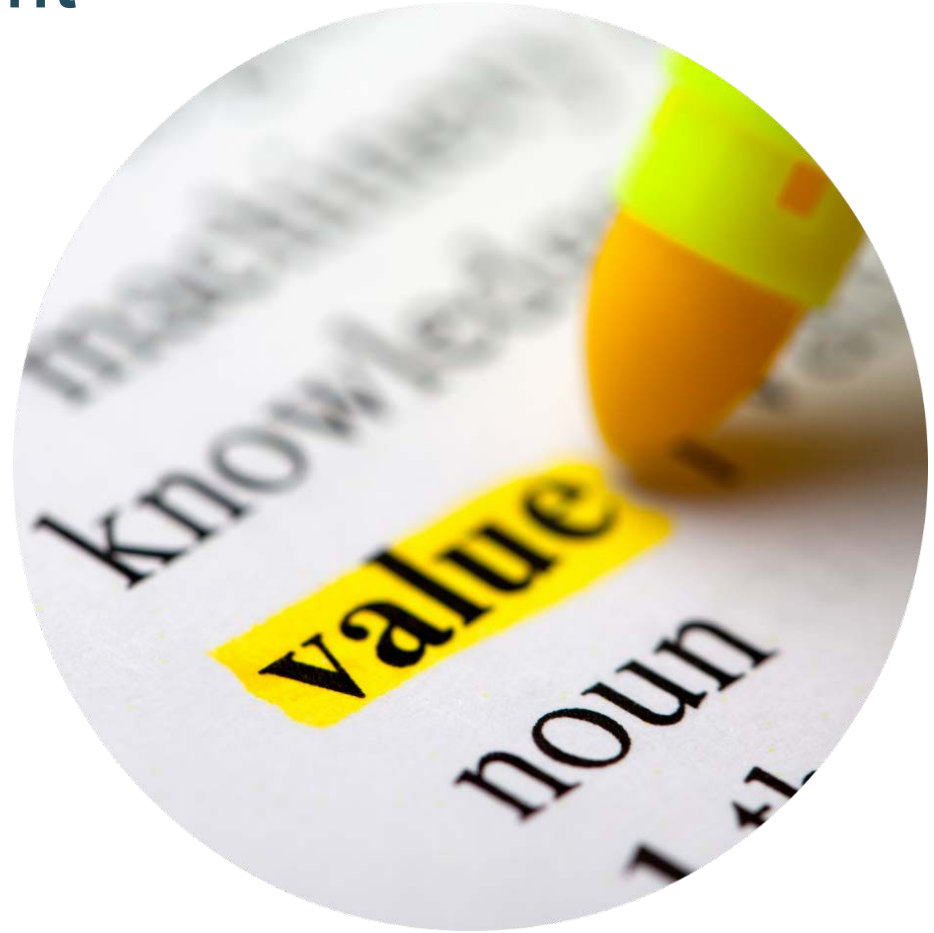
- Best Practice Training
- Facility Assessments
- System for Monitoring, Tracking & Reporting Ammonia Refrigeration Performance



Strategic Energy Management – An Ongoing Benefit

- Structure
- Comprehensive
- Measurable

VALUE ADD



Thank you

Greg Baker
gbaker@veic.org