Achieving Continuous Improvement in Energy Efficiency through Strategic Energy Management

Paul Scheihing
U.S. DOE
Ad hoc Approach to Energy Management

Source: UNIDO 2010
Structured Approach to Energy Management

Senior management commit to program

Initial savings sustained

Low cost operational improvements first - then investment

Becomes company culture

Strategic Energy Management Continuum

- Transition from project to systematic approach
- Many utility SEM programs operate at this level

ISO 50001

- Standard Energy Management System (EnMS) framework for global industrial operations
- ISO standard for Energy Management Systems - EnMS
- Similar framework to ISO 9001 and ISO 14001
- Certifiable EnMS, SEM program
- Verifies measured results – internal credibility
- Rigorous third-party measurement and verification
- External stakeholder recognition of achievement
- Marginal effort beyond ISO 50001

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

- Transition from project to systematic approach
- Many utility SEM programs operate at this level

SEP

- Verified energy performance and ISO 50001

- Rigorous third-party measurement and verification
- External stakeholder recognition of achievement
- Marginal effort beyond ISO 50001
ISO 50001: ISO management system standard

1. General requirements
   2. Management responsibility
   3. Energy policy
   4. Energy planning
      - Energy review
      - Energy baseline
      - EnPI
      - Objectives, targets & action plans

5. Implementation and operation
   - Training
   - Documents
   - Communication
   - Design
   - Operational control
   - Procurement

6. Checking
   - Measuring and monitoring
   - Legal requirements
     - Internal auditing
     - Nonconformance, corrective, preventive
     - Records

7. Management review

Light blue text represents new data-driven sections in ISO 50001 that are not in ISO 9001 & ISO 14001
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Better Buildings Summit
Strategic Energy Management
Company Overview

Hilton Worldwide is the largest hotel company in the world with 4,322 hotels and 715,000 rooms in 94 countries and territories.

- Founded in 1919
- $10.5 billion in revenue (2014)
- 157,000 employees
- 44 million Hilton HHonors members
- 230,000 rooms in the pipeline – over half under construction
Our Locations

**AMERICAS**
Rooms: 581,000
Pipeline: 112,000
Under Construction: 42,000

**EUROPE**
Rooms: 67,000
Pipeline: 29,000
Under Construction: 15,000

**MIDDLE EAST & AFRICA**
Rooms: 21,000
Pipeline: 25,000
Under Construction: 19,000

**ASIA PACIFIC**
Rooms: 46,000
Pipeline: 64,000
Under Construction: 45,000
Corporate Responsibility - Issue Alignment

TRAVEL WITH PURPOSE

Creating Opportunities
- Youth Opportunity
- Learning & Development
- Diversity & Inclusion
- Team Member Wellness

Strengthening Communities
- Local Economic Impact
- Community Hospitality
- Disaster Support
- Human Rights

Celebrating Cultures
- Global Commerce
- Welcoming Diversity in Travel
- Local Experiences

Living Sustainably
- Energy - Carbon
- Water
- Waste - RePurpose
- Supply Chain
In 2008, Hilton Worldwide announced aggressive goals to improve its global sustainability performance throughout the next 5 years:

> Reduce energy consumption by 20%
> Reduce CO2 emissions by 20%
> Reduce waste output by 20%
> Reduce water consumption by 10%

Hilton Worldwide was one of the first multi-brand hospitality company to include sustainability as a performance measure of our business.
Initial Sustainability Strategy: 2009 - 2013

LightStay – Our Measurement Framework

- 4,300 Hotels reporting on sustainability measures
- Over 15,000 projects to improve performance

Enforcement – Brand Standards & QA

- Sustainability measurement and corrective action are global brand standards for all Brands
- Enforcement done through Quality Assurance at all of our hotels

ISO Certification – Our Validation

- ISO 9001 (quality) and 14001 (environment) certifications for all corporate offices and hotels globally
- One of the first in our industry and one of the largest volume certification of commercial buildings
Initial Results
5-Year progress and results

- We achieved our 20% carbon goal on the last year from a combination of energy efficiencies (15.2%) and the purchase of 417 million kWh renewable energy (2012 EPA Green Power Partner of the Year).

- The multi-year financial crisis had a strong impact on energy efficiency which requires more capital for improvements. No cost/low cost projects could only take us so far.

- Energy and carbon were aggressive goals, based on a bold vision for Hilton Worldwide in a time when the economy was strong.

$388 Million in estimated cumulative cost savings
5-year Results by Region (Owned & Managed Hotels)

AMERICAS
Energy: 14%
Carbon: 25%
Water: 11%
Waste: 31%
Savings: $113M

EU
Energy: 16%  Carbon: 25%
Water: 11%  Waste: 38%
Savings: $57M

MEA
Energy: 22%
Carbon: 21%
Water: 21%
Waste: N/A
Savings: $35M

APAC
Energy: 11%
Carbon: 16%
Water: 9%
Waste: N/A
Savings: $40M
Footprint (Owned & Managed Hotels)

**EU**
- Total kBTU/occ room: 308.3
- Total kBTU/sq.ft: 99.6
- CO2 lbs/occ room: 67.2
- CO2 lbs/sq.ft: 21.7
- Tons of total output: 370,154

**APAC**
- Total kBTU/occ room: 534.2
- Total kBTU/sq.ft: 99.7
- CO2 lbs/occ room: 155.9
- CO2 lbs/sq.ft: 29.1
- Tons of total output: 492,987

**AMERICAS**
- Total kBTU/occ room: 362.7
- Total kBTU/sq.ft: 101.8
- CO2 lbs/occ room: 84.6
- CO2 lbs/sq.ft: 23.7
- Tons of total output: 1.2 M

**MEA**
- Total kBTU/occ room: 663.4
- Total kBTU/sq.ft: 84.2
- CO2 lbs/occ room: 207.6
- CO2 lbs/sq.ft: 26.4
- Tons of total output: 340,412
The most aggressive approach
Hotel Industry Goals Numbers

<table>
<thead>
<tr>
<th></th>
<th>Hilton 2009-2013 20%</th>
<th>Starwood 2009-2020 30%</th>
<th>Marriott 2008-2020 20%*</th>
<th>Wyndham None Reported</th>
<th>Ihg None Reported</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy</strong></td>
<td>13.6% (YE 2013)</td>
<td>11.5% (YE 2012)</td>
<td>16.5% (YE 2012)</td>
<td>None Reported</td>
<td>None Reported</td>
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<tr>
<td><strong>Carbon</strong></td>
<td>20.2% (YE 2013)</td>
<td>11.6% (YE 2012)</td>
<td>None Reported</td>
<td>2011-2020 20%</td>
<td>2013-2017 12%**</td>
</tr>
<tr>
<td><strong>Water</strong></td>
<td>13.1% (YE 2013)</td>
<td>14.8% (YE 2012)</td>
<td>11.6% (YE 2012)</td>
<td>No progress reported</td>
<td>2013-2017 12%**</td>
</tr>
<tr>
<td><strong>Waste</strong></td>
<td>None Reported</td>
<td>None Reported</td>
<td>None Reported</td>
<td>None Reported</td>
<td>None Reported</td>
</tr>
</tbody>
</table>

We are all doing similar things, with similar results, but no one has the same baseline, timeline or even methodology.
Goals for 2014 and Beyond

Hotels have measured

They have taken corrective action

Next: set individual performance goals

In addition to setting multi-year enterprise wide goals, **hotels will be required to set annual performance goals**

**Flexibility**

- This allows hotels to set goals that are right for them
- It also allows a Brand, management company or ownership group to set a goal for a specific item they wish to tackle
- Continues to satisfy all RFP requirements
ISO & Hilton Worldwide: Increased Focus on Energy

In September 2014, Hilton achieved ISO 50001 certification for Energy Management and ISO 9001 and 14001 re-certifications for quality and environmental management

ISO 9001 - Quality management
This standard is based on a number of quality management principles including a strong customer focus, the motivation and implication of top management, the process approach and continual improvement. ISO 9001 helps ensure that customers get consistent, good quality products and services, which in turn brings many business benefits.

ISO 14001 - Environmental management
This standard ensures environmental impact is being measured and improved. The benefits can include reduced cost of waste management, savings in consumption of energy and materials, lower operating costs, and improved corporate image among regulators, customers and the public.

ISO 50001 – Energy management
ISO 50001 helps organizations save money as well as helping to conserve resources and tackle climate change. ISO 50001 supports organizations in all sectors to use energy more efficiently, through the development of an energy management system (EnMS).
Benefits of adding ISO 50001

Leverage our 9001 and 14001 certifications, and add ISO 50001 to our 2014 recertification and benefit from time, effort and cost efficiencies.

Benefits:

• **Industry leadership**: After being one of the first in industry to achieve ISO 9001 and 14001 certifications at a global scale for all our hotels and offices, achieving ISO 50001 solidifies our leadership position.

• **Increase LightStay value proposition**: ISO 50001 further expands LightStay as a continuous improvement system for energy management.

• **Performance**: Results from ISO 50001 organizations show incremental performance improvement beyond even mature energy programs (deeper energy cost reduction).

• **Risk management**: These standards also act as an enhancement to risk management and due diligence programs in Energy area.

• **Staying ahead of legislation**: Growing interest by utility companies in ISO 50001 as a way to sustain energy performance improvements which could eventually result in incentives and rebates. Energy was at the forefront of Obama’s Climate Action Plan.
Benefits of “Going Through the Process”

Benefits:

• Having a documented Energy Management System is key to sustained improvement
  – Management system structure ensures sustainability of improvements
  – Effective management oversight is ensured
• Having third party oversight assures sustainability
  – Verification by a recognized protocol
  – Independent assurance statement (DEKRA)
• Looking at energy from a system perspective versus project level brings a different eye/approach
• Shifting from budget line item to a deeper analysis of energy use
• Integrating energy management into the management processes as required by ISO standards
  – Management review
  – Performance measurement
  – Individual performance metrics
Energy Management Systems – ISO 50001

Keys to Implementation

• Understand Energy Sources, Uses, Consumption: start with significant energy users
  – Essential to be identified and managed – even if not the source of initial improvements

• Move on to other uses, consumption – more opportunities for improvement

• Create action plans for improvements

• Leverage Existing Management System Processes
  – Integrate or Copy ISO 9001/14001 foundation processes
  – Internal Auditing, Management Review, Document Control, Records Management, etc.

• Focus on energy planning: how will I manage my energy performance?
  – Objectives, Targets and Action Plans – Improvements
  – EnPI’s, Measurement Plan – Sustained performance
  – Management Review – Reinforce Improvement
Define Energy Review Processes

ORGANIZATION

Scope

Boundaries

Exceptions

Legal Requirements

ENERGY REVIEW PROCESS

Identify energy sources

Identify areas of significant energy use

Identify variables affecting the above

Identify, prioritize and record opportunities for improvement
Data Capture, Baseline and Deviations

Requirements

1. Hotels must establish, maintain and record an energy baseline
2. Hotels must investigate and respond to significant deviations in energy performance
3. Hotels must record these activities

Impact to LightStay

1. Establishing a normalized baseline with 2013 consumption data
2. Defining a significant deviation and how to flag them
3. Defining response mechanism from hotels to these deviations
4. Defining additional needs for data captures to meet the above
Significant Energy Users And Relevant Variables

The significant energy users at hotels:

- HVAC system
- Lighting
- Water heating

The main variables affecting these significant energy users are:

- Weather
- Occupancy
- Meeting room occupancy and food covers in some cases are also variables affecting the significant energy users

Determine Energy Performance And Future Use

Energy performance and future energy are estimated on a monthly basis through a linear regression model as defined by Superior Energy Performance’s measurement and verification protocols for industry.
**Annual surveillance audits**

- Every year, hotels are randomly selected for an ISO audit. Hotel audits include review of overall operations, communications, utilization of technology, recycling, security, facilities, housekeeping, F&B, front desk/guest relations, hiring and training, hazardous waste and chemical storage/handling/disposal, purchasing, maintenance, improvement and corrective action processes, LightStay...

- Corporate offices are also audited every year. These audits include review of QA systems, LightStay, internal audits, legal compliance, customer focus processes, improvement processes, internal policies, communications, management involvement, HR, supply management, etc...

- Reports highlighting strengths, opportunities, findings and requests are generated for every audit (hotel and corporate)

- Corrective action plans are required for every finding
Working with Great Partners
Energy Performance

Goal

5-8% Reduction in Energy Intensity by 2016

Commitment

91 Million Square Feet

Showcase Project

Hilton Columbus Downtown

Columbus, OH
Schneider Electric
Enterprise Energy Management System

May 2015
Wade Willatt
Facilities Manager
The global specialist in energy management

> €24 billion sales (last 12 months)

> 140 000+ employees in 100+ countries

> Brands such as Square D, APC, and Pelco

> Recently acquired Invensys

> Le Hive was first ever ISO 50001 certified EnMS
Creating a global enterprise, close to our customers

North America
- 33,700 Employees
- 38 Factories

Western Europe
- 47,600 Employees
- 92 Factories

Rest of World
- 34,100 Employees
- 53 Factories

Asia Pacific
- 47,500 Employees
- 69 Factories

1: Published figures in billion € restated to reflect country-market view
2: Billion € pro forma basis including LTM Sept. 2013 revenue for Invensys
3: Including Invensys, excluding Delixi™ and Fuji™
Schneider Energy Action

• ISO 50001 Builds on Existing Energy Program
  o Have reduce normalized energy consumption by 40% over last 10 years

• Normalized Model for Each Site
  o Model Year over Year performance
  o Account for changes in weather using Telvent
  o Account for changes in production and production mix

• Standard Utility Bill Database
  o Resource Advisor houses all utility bills
  o Easily accessible during audits

• Verify Results with Enterprise Wide Action Plan
SE ISO 50001 Certified Sites

> 100 total for Schneider Electric

> 11 for Schneider Electric North America
  > Smyrna, TN – SEP Platinum
  > Seneca, SC – SEP Platinum
  > Lincoln, NE – SEP Silver
  > Tlaxcala, MX
  > Lexington, KY – SEP Silver
  > Cedar Rapids, IA – SEP Gold
  > Peru, IN – SEP Gold
  > Columbia, SC – SEP Gold
  > Rojo Gomez, MX – SEP Silver
  > Victoria, BC – SEP Platinum
  > Clovis, CA – SEP Platinum
ISO 50001 Implementations

• 6 Months from Start to Certification Audit

• Workforce Requirements
  o Internal Consulting Team
    ➢ Provide expertise in modeling
    ➢ 5 CP-EnMS’s
    ➢ 1 SEP Performance Verifier
  o Plant Resources
    ➢ Drive new procedures
    ➢ Host external auditors and performance verifiers
  o Implementation Costs
    ➢ First Site was twice the cost of each of the next 10
    ➢ Future Sites will be reduced by a further 50%
Energy Performance Indicators
2014 SENA Energy Model for North America – 56 Sites

Year to Date Energy Performance

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>Performance</th>
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<tbody>
<tr>
<td>Combined</td>
<td>-7%</td>
</tr>
<tr>
<td>Electric</td>
<td>-6%</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>-7%</td>
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</table>

Monthly Energy Performance

<table>
<thead>
<tr>
<th>Month</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan-14</td>
<td>-7%</td>
</tr>
<tr>
<td>Feb-14</td>
<td>-10%</td>
</tr>
<tr>
<td>Mar-14</td>
<td>-6%</td>
</tr>
<tr>
<td>Apr-14</td>
<td>-5%</td>
</tr>
<tr>
<td>May-14</td>
<td>-5%</td>
</tr>
<tr>
<td>Jun-14</td>
<td>-6%</td>
</tr>
<tr>
<td>Jul-14</td>
<td>-5%</td>
</tr>
<tr>
<td>Aug-14</td>
<td>-6%</td>
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<tr>
<td>Sep-14</td>
<td>-7%</td>
</tr>
<tr>
<td>Oct-14</td>
<td>-6%</td>
</tr>
<tr>
<td>Nov-14</td>
<td>-11%</td>
</tr>
<tr>
<td>Dec-14</td>
<td>-3%</td>
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Negative is a reduction in Energy Consumption
Transition to Enterprise EnMS

<table>
<thead>
<tr>
<th>Target Date(s)</th>
<th>Event/Task</th>
<th>Personnel Involved</th>
<th>Sites Involved</th>
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</thead>
<tbody>
<tr>
<td>01 January 2015</td>
<td>Appoint Energy Management Designee</td>
<td>Plant Management</td>
<td>Group B</td>
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<tr>
<td>01 January 2015</td>
<td>Purchase Copy of ISO 50001 and MSE 50021</td>
<td>Energy Designee</td>
<td>Group B</td>
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<tr>
<td>01 February 2015</td>
<td>Communicate Energy Policy</td>
<td>All</td>
<td>Groups A and B</td>
</tr>
<tr>
<td>15 February 2015</td>
<td>Adopt New Procedures</td>
<td>Energy Designee</td>
<td>Groups A and B</td>
</tr>
<tr>
<td>31 March 2015</td>
<td>Complete Energy Review</td>
<td>ESS; Energy Designee</td>
<td>Group B</td>
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<tr>
<td>31 March 2015</td>
<td>Conduct Energy Basics Training</td>
<td>All</td>
<td>Groups A and B</td>
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<tr>
<td>17 April 2015</td>
<td>Conduct Internal Audits and Management Review</td>
<td>ESS; Energy Designee</td>
<td>Group A</td>
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<tr>
<td>15 May 2015</td>
<td>Conduct Internal Audits and Management Review</td>
<td>ESS; Energy Designee</td>
<td>Group B</td>
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<tr>
<td>15 May 2015</td>
<td>Complete Central Office Audit</td>
<td>Energy Team; Enterprise Team</td>
<td>Smyrna</td>
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<td>31 May 2015</td>
<td>Complete Surveillance Audits</td>
<td>ESS; Energy Team</td>
<td>Group A</td>
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<tr>
<td>31 July 2015</td>
<td>Complete Certification Audits</td>
<td>ESS; Energy Team</td>
<td>Group B</td>
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</tbody>
</table>

Group A - Sites already ISO 50001 certified
Group B - Sites without ISO 50001 certification
# Transition to Enterprise EnMS

<table>
<thead>
<tr>
<th>ISO/OHSAS Elements</th>
<th>ISO/OHSAS Elements</th>
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<tr>
<td>General Requirements (Scope)</td>
<td>4.1</td>
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<tr>
<td>Policy</td>
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<tr>
<td>Resources, Roles, Responsibility, and Authority</td>
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<td>Legal and Other Requirements</td>
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<td>Objectives, Targets, and Programs</td>
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<td>Competence, Training, and Awareness</td>
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<td>4.4.3, 4.4.3</td>
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<td>Design of New/Modified Equipment and Processes</td>
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<td>Energy Related Procurement</td>
<td>4.5.6, 4.5.7</td>
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<tr>
<td>Monitoring, Measurement, and Analysis</td>
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<td>Evaluation of Compliance</td>
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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 products and services.
Energy Reduction Programs

● Better Buildings Better Plants Challenge (25% reduction over 10 years)
  ● On Pace to exceed target
  ● 20.8% reduction from 2009 through 2014 for US Plants

● Company Program
  ● Exceeded Target with 14% (10% target from 2011-2014)
  ● Target is another 10% from 2014-2017
Recent Superior Energy Performance Results

> Smyrna
  > Platinum with 23.1% from 2011-2014

> West Kingston
  > Platinum with 20.3% from 2011-2014

> Costa Mesa
  > Platinum with 16.8% from 2011-2014

> Columbia, MO
  > Gold with 13.3% from 2013-2014

> Monterrey Plant 2
  > Gold with 12.1% from 2011-2014

> Pacifico
  > Gold with 10.2% from 2011-2014

> Monterrey Plant 3
  > Silver with 7.7% from 2012-2014

> Not qualified at this time
  > Tlaxcala
  > McLaughlin
  > Portland
  > Oxford
Superior Energy Performance Interim Results

> Seneca, SC – 17.8% from 2012 to 2014

> Columbia, SC – 6.9% 2013 to 2014

> Lexington, KY – 6.7% from 2013 to 2014

> Cedar Rapids, IA – 3.6% from 2013 to 2014

> Lincoln, NE – 1.8% Increase from 2012 to 2014
  > Have increased cooling capability causing increased consumption

> Clovis, Victoria, and Rojo Gomez do not yet have data for next period
Future Improvements

> Continue Integration with Safety and Environmental
  > Create integrated internal audit checklists
  > Utilize same certification body and audit at same time

> Add Invensys sites
  > Invensys is implementing ISO 14001 and OHSAS 18001
  > Invensys has recently joined SEA, but should be a focus for additions to the certified EnMS in 2016

> Increase Engagement of Smaller Sites
  > Continue to add sites to the certified EnMS as it drives commitment to improvement
Make the most of your energy SM
Strategic Energy Management

Mark Dhennin
May 28, 2015
Cummins, Inc.

2014 Revenue: $19.2 billion

55,000 employees, 190+ countries & territories

Engines

Power Generation

Components

Distribution
Cummins Environmental Sustainability Plan

**PRIORITY AREAS**

- **Materials & Fuel Efficiency**
  Innovative design for efficient use of fuel and raw materials

- **Facilities / Operations**
  Reduce energy, water, and waste footprint

- **Transportation**
  Use most efficient method and mode to move goods across Cummins network

- **Products In-Use**
  Partner with customers to improve fuel efficiency of our products in use

**GOALS**

1. Reduce energy use and greenhouse gas emissions by 25% and 27%, respectively, by 2015 against a 2005 baseline

2. Reduce direct water use by 33% and achieve water neutrality at 15 sites by 2020

3. Increase recycling rate from 88% to 95% and achieve zero disposal at 30 sites by 2020

**EMPLOYEE AND COMMUNITY ENGAGEMENT AND COMMUNICATE ACTIONS**
2014 footprint – global operations

- 903,000,000 kWh electricity
- 12,600,000 gallons diesel fuel
- 1,600,000,000 cubic feet natural gas
- 789,000 metric tons CO₂e emissions

- $150 million total energy spend
- 98% GHGs associated with energy use
- 34% energy intensity reduction since 2005
- 268,000 metric tons CO₂e emissions avoided
- 56,000 equivalent number of cars removed from road

903,000,000 kWh electricity
12,600,000 gallons diesel fuel
1,600,000,000 cubic feet natural gas
789,000 metric tons CO₂e emissions
$150 million total energy spend
98% GHGs associated with energy use
34% energy intensity reduction since 2005
268,000 metric tons CO₂e emissions avoided
56,000 equivalent number of cars removed from road
Cummins Energy Strategy
Cummins ISO 50001 plan

- Pilot ISO 50001 & Superior Energy Performance
- Develop corporate program
- Ramp up implementation, priority sites first

- **2013**
  - 3 pilot sites
  - 1 SEP pilot

- **2015**
  - Next top 11
  - Next 3 SEP

- **2020**
  - Next top 40

20% of footprint

60% of footprint
Enterprise approach to ISO 50001

- Enterprise vs. individual site certification
- Integrate into existing Cummins HSEMS* Enterprise
- Corporate policies & procedures
- Centrally managed; global program manager
- Common tools, templates & best practices ➔ toolkit

*HSEMS = Health, Safety & Environmental Management System (14001 & 18001)
# ISO 50001 & SEP Implementation Costs

<table>
<thead>
<tr>
<th>Metric</th>
<th>US DOE Pilot Avg.</th>
<th>Cummins Pilot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual energy bill</td>
<td>$9.8M</td>
<td>$5.0M</td>
</tr>
<tr>
<td>Staff time cost</td>
<td>$224K</td>
<td>$140K*</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt; party audit cost</td>
<td>$18K</td>
<td>$20K</td>
</tr>
<tr>
<td>External tech assistance cost</td>
<td>$47K</td>
<td>$0K*</td>
</tr>
<tr>
<td>Monitoring &amp; metering equipment</td>
<td>$36K</td>
<td>$100K</td>
</tr>
<tr>
<td>Annual cost savings ($)</td>
<td>$810K</td>
<td>$606K</td>
</tr>
<tr>
<td>Annual cost savings (%)</td>
<td>8%</td>
<td>12%</td>
</tr>
<tr>
<td>Simple payback</td>
<td>1.5 yrs</td>
<td>0.5 yrs</td>
</tr>
</tbody>
</table>

*Building on existing HSEMS*
Implementation toolkit – Cummins

4.4.5 EnPls  Procedures / Tools / Templates

- CORP 08-04-03-02: Energy Review
- Corporate Energy Review Tool
- Pilot Sites EnPls
- DOE Checklist of potential EnPls
- DOE Checklist of Other Factors Affecting EnPls

Back to Main Menu
An Energy Review shall be conducted to analyze the Site's energy uses and consumption, identify the Significant Energy Users (SEUs) and opportunities to improve the energy performance. This tool uses a Step by Step approach to help you conducting your Site's Energy Review. Additional explanations and examples are available in the "Energy Planning Guidelines".

[Note: Please save this tool to your local folder before using]

Step 1: Energy Sources Identification

Step 2 & 3: Energy Users and Important Energy Users Identification

Step 4: Energy Users’ Consumption

Step 5: Energy Users’ Significance

Step 6: Relevant Variables

Step 7: Significant Energy Users

Step 8: Future Energy Use and Consumption

Step 9: Opportunities for Energy Performance Improvement

Step 10: Energy Baseline

Energy Usage Estimating Tool

Unit Conversion Calculator

Pivot Data
Enterprise auditing

- Enterprise audit sampling
- Over $5M in audit savings to date
- Internal audit program
# Challenges & solutions

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management support</td>
<td>Multi-year energy/GHG plan; leadership scorecard</td>
</tr>
<tr>
<td>Site bandwidth</td>
<td>Team approach; common tools &amp; templates; global program manager</td>
</tr>
<tr>
<td>Energy technical support</td>
<td>BU energy managers (CP EnMS)</td>
</tr>
<tr>
<td>Energy data</td>
<td>Sub-metering included in plan; central capital fund</td>
</tr>
</tbody>
</table>
Mark Dhennin
Director, Energy & Environment
mark.h.dhennin@cummins.com
**Energy Performance**

**Goal**
- 25% Reduction in Energy Intensity by 2016 from a 2005 baseline

**Commitment**
- 104 Facilities, including 19 plants, covering 8 million square feet

**Progress**  ✓ Goal Achieved
- 34% Cumulative (vs Baseline)
- -3% Annual (2013)

**Data**
- View Details on Cummins Inc.'s Progress to Date

**Showcase Project**
- Jamestown Engine Plant, Lakewood, NY

**Implementation Model**
- Cummins' Playbook, Energy Champion Program

**Water Performance - Pilot Partner**

**Goal**
- 40% Reduction by 2020

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https://www4.eere.energy.gov/challenge/partners/better-buildings-better-plants/cummins-inc