MODELS FOR DRIVING ENERGY EFFICIENCY NATIONALLY USING ENERGY MANAGEMENT

eceee Industrial Summer Study, Arnhem

Paper 1-070-14

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CLEAN ENERGY MINISTERIAL
Accelerating the Transition to Clean Energy Technologies

ipeec

AGENDA

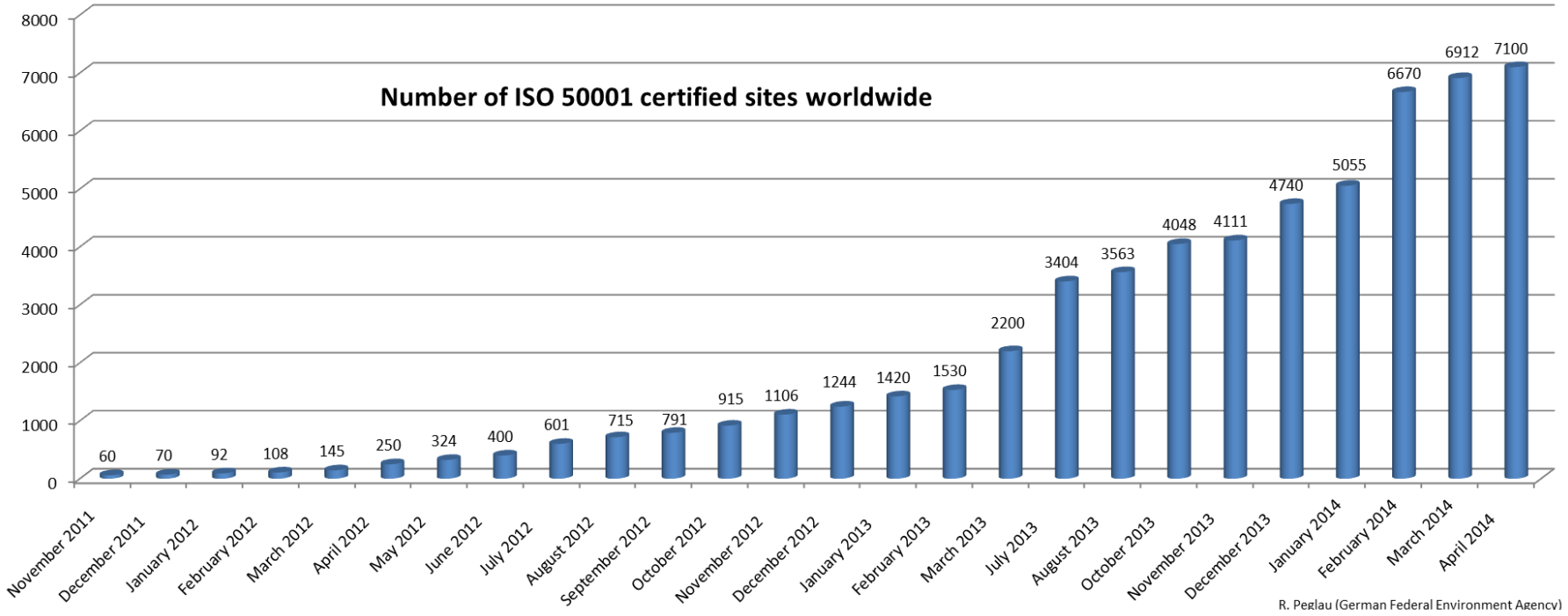
- What is GSEP?
- Importance of Energy Management Programs

3 different approaches:

- Mandatory Energy Management, Japan
  - EMAK Cooperation
- Voluntary program, tax incentive, Sweden
- Market-Based Certification Program, United States
- Discussion

ISO 50001 CERTIFICATIONS WORLDWIDE

Nov. 2011 through April 2014

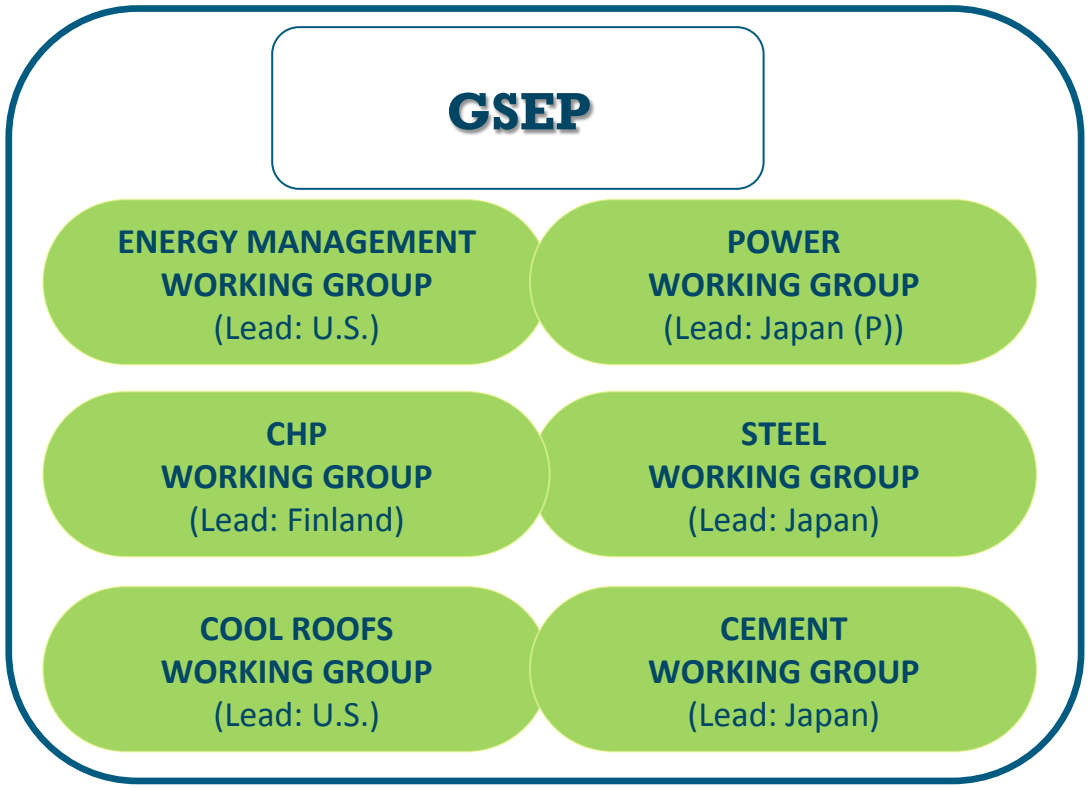


R. Peglau (German Federal Environment Agency)

7,100 certified sites worldwide as of April 23, 2014

Number of global ISO 50001 certified sites have increased by 214% over the past year (March 2013 to March 2014).

GLOBAL SUPERIOR ENERGY PERFORMANCE PARTNERSHIP (GSEP)



One of 13 ongoing initiatives of the **(CEM)**, a global forum with 23 participating countries,

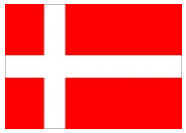
and a task group of the **International Partnership for Energy Efficiency Cooperation (IPEEC)**, an intergovernmental entity with 16 countries.

GSEP ENERGY MANAGEMENT WORKING GROUP

The GSEP Energy Management Working Group (EMWG) leverages the extensive expertise of its 11 member countries to **accelerate the adoption and use of energy management systems** in industry and in commercial buildings worldwide.


Australia


Canada


Denmark


European Commission

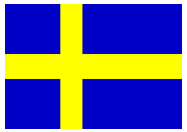

India


Japan


Korea


Mexico


South Africa


Sweden


United States

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GSEP ENERGY MANAGEMENT WORKING GROUP

EXAMPLE ACTIVITIES

Build the Business Case

- EnMS Case Studies
- Energy Performance Database

Provide Support and Resources

- EnMS Toolbox
- Workforce Development
- Measurement and Verification Resources

Set Policy

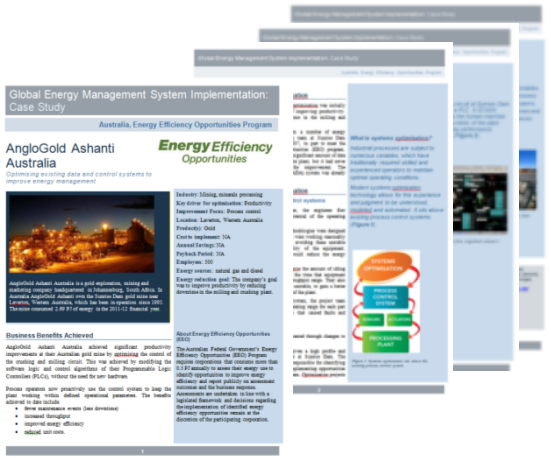
- EnMS Pilot Projects
- Auditor Certification Scheme

www.cleanenergyministerial.org/energymanagement

BUILD THE BUSINESS CASE
ENMS CASE STUDIES

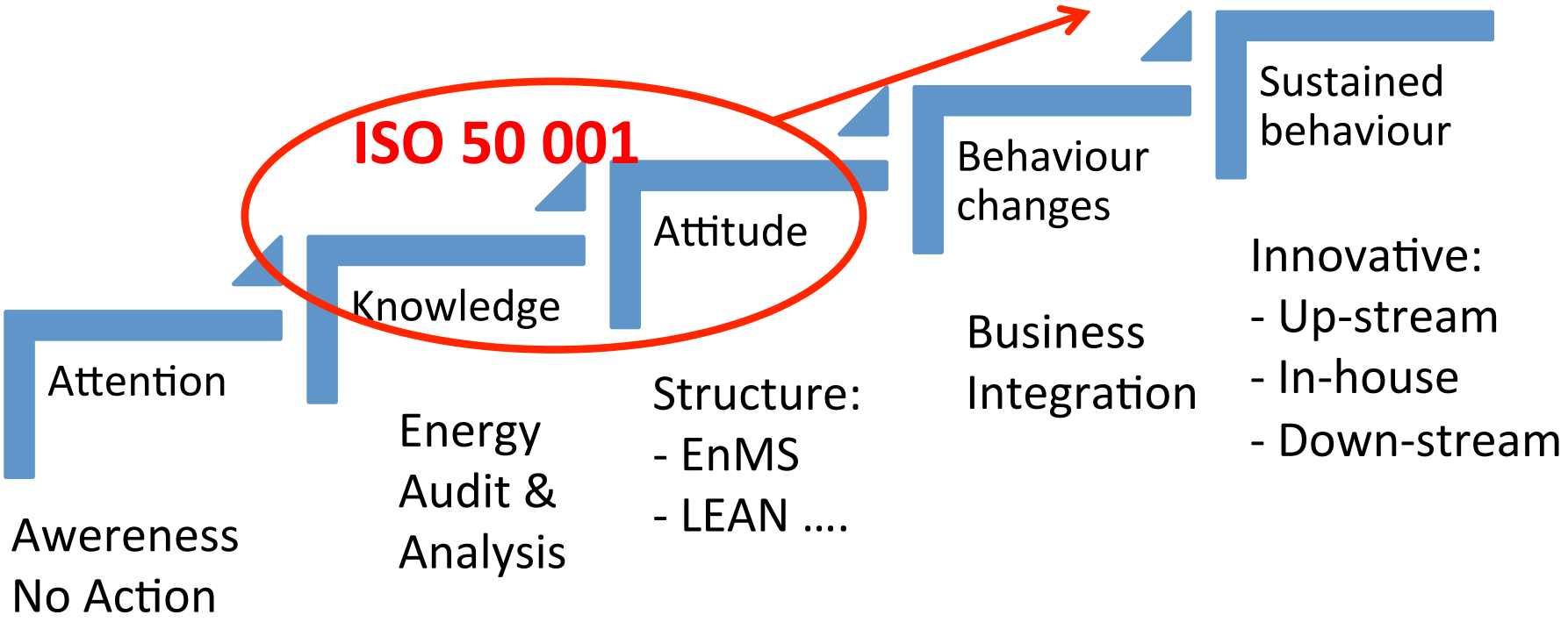
Members are producing a suite of energy management system case studies to ***showcase early adopters*** and help to ***develop a compelling business case*** based on real-world data and experiences.

- **6 GSEP EMWG case studies published**: 4 from Australia; 2 from United States
- **Additional case studies under development** in Canada, Republic of Korea, and the United States



CLEAN ENERGY MINISTERIAL
Accelerating the Transition to Clean Energy Technologies

THE ENERGY EFFICIENCY LADDER



PROGRAM SUPPORT TO ISO 50001

Policy intervention

- Incentive/mandatory
- Taxes, Legislation, Environmental code
- Performance requirements, reporting

Technology Push Methodology

- ESCOs, EPC
- Suppliers
- Consultants

ISO 50 001

- Energy audit & analysis
- Energy management system
- Procurement & new projects
- Reporting

Management leadership

- Integration
- Long term targets/strategy
- Report/follow-up
- Financing

Institutional Support

- Accreditation& Certification bodies
- Tools, Build up skills programme
- Agreement structure, Report system
- Dissemination of good practices
- Networking

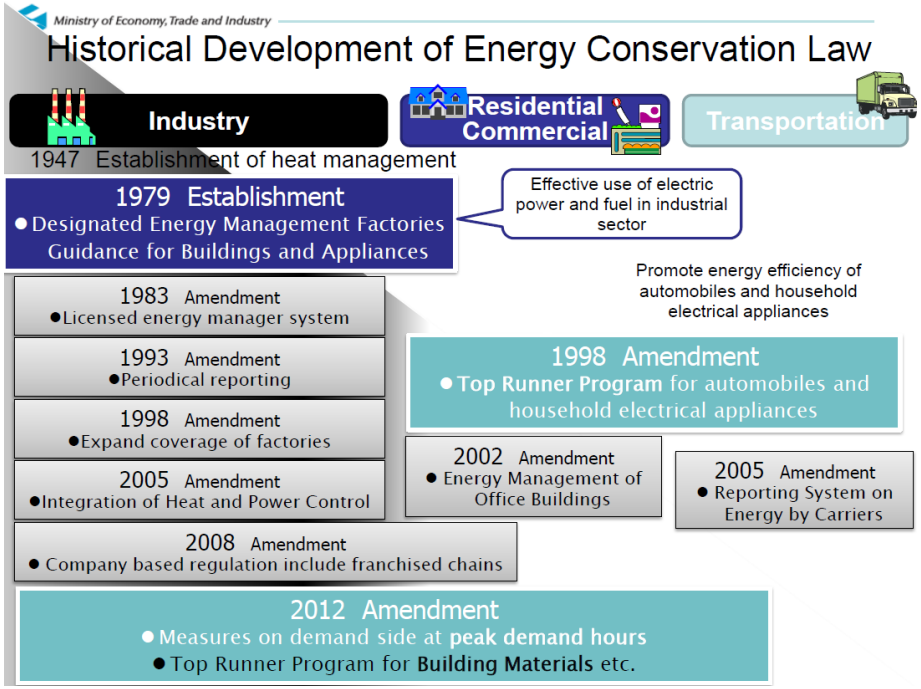
Japan:
Mandatory Energy Management
-Back Ground & Present Status

Japan's Energy Efficiency Policy

1. Regulation
Energy Conservation Law : Enacted in 1979
→ Upgraded and improved several times responding to social needs

2. Promotion
- Tax incentives
- Subsidies (including for R&D)
- Preferential interest rate

3. Voluntary action (by private sector)



Source: Nishiyama 2013

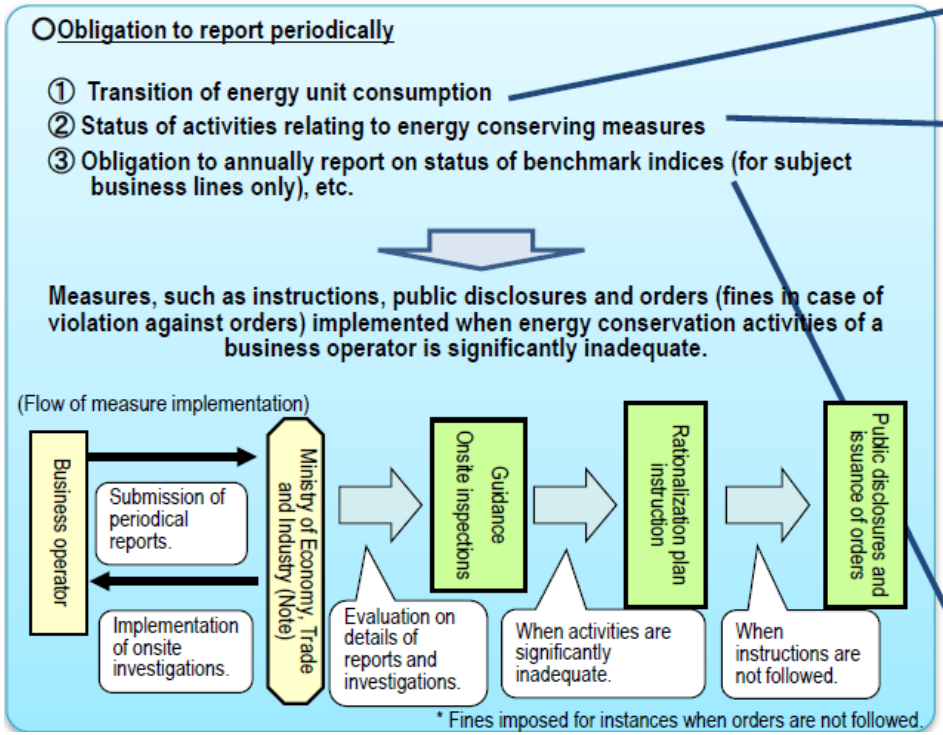
Global Launch
(Incl. Under development)

China, India, South Korea, Viet Nam, Thailand, Indonesia, and Malaysia

JAPAN: CURRENT REGULATORY SCHEME

- Business operators with overall annual energy consumption (head office, manufacturing plants, branch offices, sales offices, etc.) of **at least 1,500kl** in crude oil equivalent are subject to regulations.
- Business modes, such as franchized chain of stores, are also considered single business operators and those consuming at least 1,500kl for the whole chain are subject to regulations.

On the basis of energy consumption, about 90% of the industrial sector and about 50% (estimated) of the commercial sector are covered, as they are subject to regulations.



Numerical targets: Reduction of annual average by at least 1%.

Guidelines pertaining to energy conservation measures:
Stipulation of judgment standards (guidelines) based on the Energy Conservation Law as observance items for energy management.

- Energy conservation measures for business operators overall
  - Maintenance of energy management organization.
  - Allocation of persons in charge.
  - Formulation of policies for activities pertaining to energy conservation targets, etc.
- Energy conservation measures at individual manufacturing plants and business establishments

(Example: Air conditioning systems.)
Preparation and implementation of management standards (manuals) pertaining to the following measures:

- Operational management (operating time, set temperature, etc.).
- Periodical measurement and recording of temperature, humidity, etc.
- Periodical maintenance and inspection of facilities.

New numerical targets to include in addition to existing targets
Benchmark indices and standards to be targeted
Currently set business lines: Iron and steel, electric power, cement, paper manufacturing, petroleum refining and chemical.
Standards to be aimed for: Levels satisfied by most superior business operators in respective industries (10 to 20%).

Source: METI 2011

Energy Management Action Network(EMAK)

■ Japan launched information sharing platform so called “EMAK” under IPEEC in cooperation with China, to disseminate the good practices to other countries.

Mission: *to promote awareness and demonstrate the importance of energy management and to enhance energy management activities in both factory and enterprise level.*

Action: *to establish an information sharing platform that would promote the uptake of energy management in industry and the commercial sector.*

- *Information Sharing*

  Through workshops/training programs, discuss and share information: Efforts taken and best practices on energy management
- *Network building*

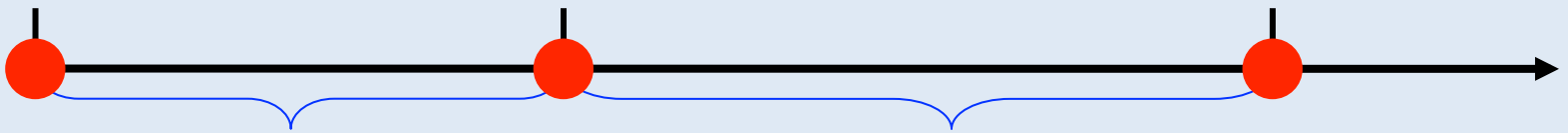
  Identifying and building relevant EMAK audience, to enhance network through key communication channels, such as conferences.
- *Supporting Measures*

  Portal-Site: Publications, manuals and methodologies. Support successful planning, implementation and monitoring.

Member Countries : Japan, China, Australia, and the United States

SWEDEN: TAX INCENTIVE VOLUNTARY PROGRAM, PFE

A five year program for participating companies



- Energy audit and analysis
- Implement and certify ISO 50 001
- Find measures
- Implement routines for procurement & planning

- Continuously improve the EnMS
- Realize measures
- Apply routines
- Effects of routines

We measure and follow-up

"Programme for Improving Energy Efficiency Act" (2004:1196)

Results, first 5 years

- Improvement: - 1,45 TWh electricity use (5%)
- 1247 measures + routines
- Investments: ~75 M€
- Voluntary reports of other measures:
  - increased use of renewables,
  - efficient use of heat,
  - increased production of electricity
- 2 enterprises excluded

PFE Success factors

"Easiest way is to consider energy aspects in new projects"

- Backbone: ISO 50 001
- Focus/Motivation/Strategy
- Status to energy responsible
- Network for dissemination
- Builds business case, lowers risks
- Suppliers engaged
- Flexibility

UNITED STATES: MARKET BASED PROGRAM - SUPERIOR ENERGY PERFORMANCE™

SUPERIOR ENERGY PERFORMANCE (SEP)

Certification program to recognize industrial facilities that demonstrate energy management excellence and sustained energy savings. Facilities use ISO 50001 and undergo third-party audit to verify energy performance improvement.

- Rigorous, data-driven approach
  - New insights & opportunities
- Includes ISO 50001 certification
- Third-party verification by ANSI-ANAB accredited entity
- Savings persist and grow, even as operations change
- High-level credibility and DOE recognition

http://superiorenergyperformance.energy.gov

Global Superior Energy Performance

SEP CERTIFIED PLANTS

- 17 facilities SEP certified; 7 more in progress
- Cumulative energy savings of 3 trillion Btu for 17 certified facilities with little or no associated capital cost expenditures

Energy Performance Improvement Achievement Period

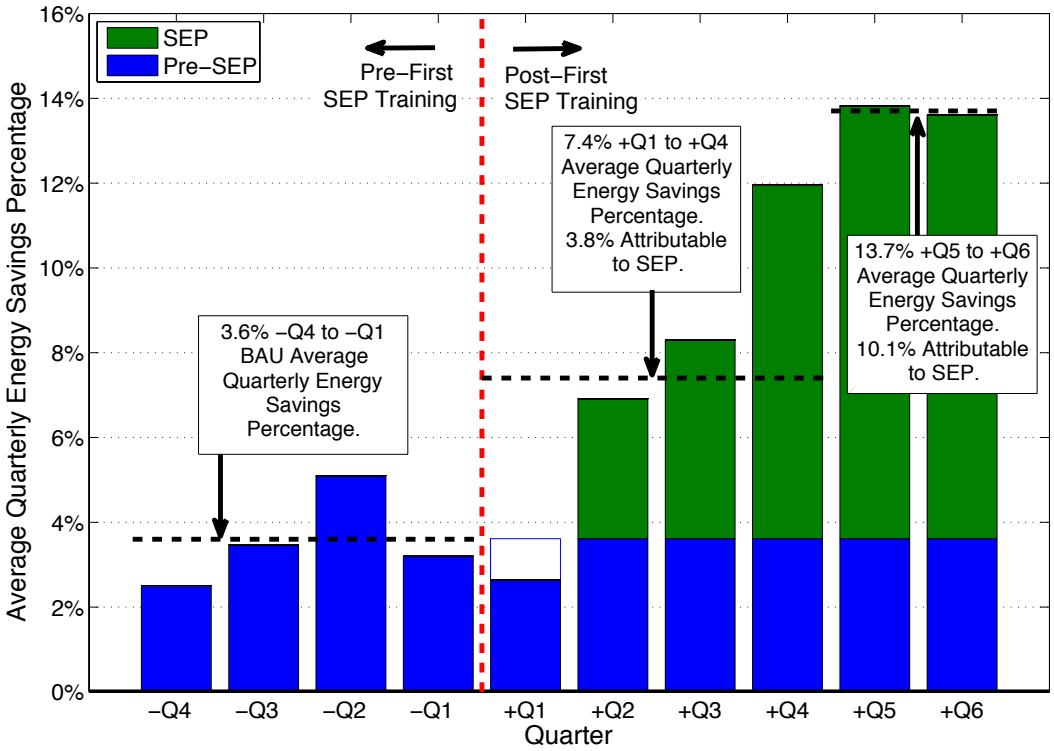
	Facility Name	Improvement*
3 years	**Volvo Trucks, NA** *Dublin, VA*	**25.8%**
	Dow Chemical Company *Texas City, TX:*	**17.1%**
	Harbec Plastics *Ontario, NY*	**16.4%**
	3M Canada Company *Brockville, Ontario*	**15.2%**
	CCP Composites US LLC *Houston, TX*	**14.9%**
	Cummins *Rocky Point, NC*	**12.6%**
	General Dynamics *Scranton, PA*	**11.9%**
	Allsteel *Muscatine, IA*	**10.2%**
	Cooper Tire *Texarkana, AR*	**10.1%**
	Olam Spices *Gilroy, CA*	**9.8%**
	Owens Corning *Waxahachie, TX*	**9.6%**
	Dow Chemical Company *Texas City, TX: Energy sys.*	**8.1%**
	Nissan, NA *Smyrna, TN*	**7.2%**
	Freescale Semiconductor, Inc. *West Austin, TX*	**6.5%**
10 yrs	**3M Company** *Cordova, IL*	**6.2%**
	Mack Trucks *Macungie, PA* **	**41.9%**
	Bridgestone Americas Tire *Wilson, NC* **	**16.8 %**

DATA AND METRICS: MAKING THE BUSINESS CASE

Recently published study:

Nine industrial facilities certified to Superior Energy Performance:

- Improved their energy performance by an average of 10% and over $500,000 per year over business-as-usual in the first 18 months of SEP implementation.
- Saved on average $503,000 per year from *operational improvements* (low/no cost investment) attributable to SEP.



View full study at: http://eetd.lbl.gov/sites/all/files/aceee_sep_paper.pdf

Average quarterly percentage energy savings as a function of average quarterly baseline energy consumption for all nine facilities. Results are aligned across facilities so that the first quarter starts when the facilities received their first SEP training. Subtracting the BAU quarterly energy savings percentage from quarterly post-first training energy savings percentages reveals savings attributable to SEP.

PROS & CONS

- Japan:
  - Substantial energy savings at large regulated corporations, exceeded government expectations
  - SMEs have not integrated EnMS in their business practices
  - Support and financial measures added
- Sweden:
  - Tax incentive and program resulted in early adoption (70%)
  - Very small administrative burden for enterprises and SEA
  - Focus on support measures & Networking
- USA:
  - More effort needed for participation in the program
  - Focus on showing compelling business case to companies
  - Support infrastructure as certification bodies, training & credential programmes
  - Third-party verification is valuable to companies

CONCLUSIONS

- Cooperations as EMAK, GSEP and IPEEC between countries with generically different energy management policies give the government bodies a possibility to learn from each other
- Market-Based, Mandatory and Voluntary approaches all have different advantages

THANK YOU!

DISCUSSION

- More info: www.cleanenergyministerial.org/energymanagement
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KEY TYPES OF ENMS PROGRAMS ACROSS GSEP GOVERNMENTS

Mandatory Energy Management and Savings Programs with Specified Targets

- Require energy management and savings
- Require companies to meet specified targets
- Often focused on large energy users
- Often pertain to energy-intensive industrial sectors but can pertain to buildings, especially large buildings

Other Mandatory Programs for Identification of Savings Opportunities

- Require companies to take actions to understand their energy use
- Do not require targets
- Often pertain to industry and buildings

Labeling or Rating Programs

- Require energy efficiency disclosure upon sale, lease, or sublease
- Use a standardized methodology to report performance
- Often provide recommendations for energy saving measures
- Often labels or ratings are publicly available
- Typically pertain to new and existing buildings

Voluntary Agreements and Programs

- Incentivize energy savings through tax credits and/or other resources
- Often require participants to manage energy or implement an energy management standard
- Often provide resources to enable companies to save energy
- Often pertain to industry and buildings