Energy Management in Industry: Issues & Opportunities

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Overview

Context

- Issues
- Opportunities

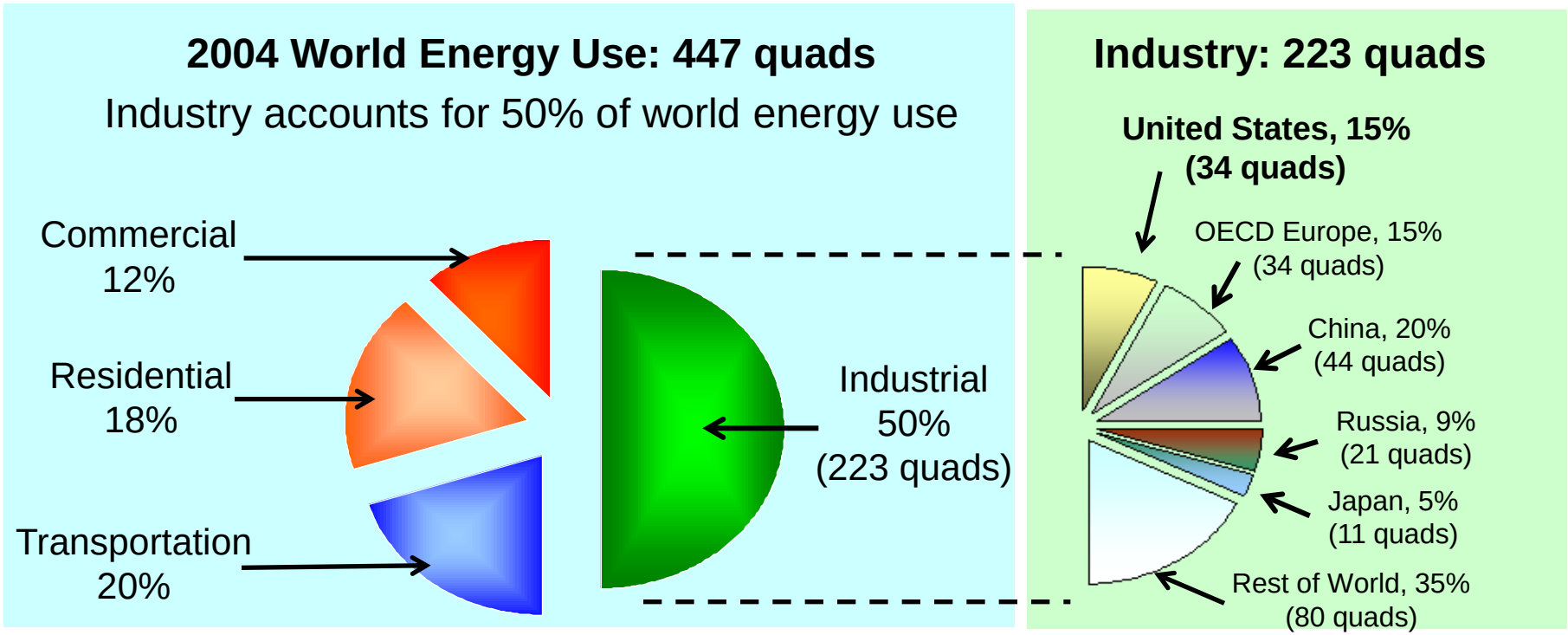
Industrial Energy Management

- Energy Management Systems (EnMS)
- ISO 50001
- Culture and Operations
- Benefits and costs
- System Optimisation

Supports

- Regulation & Resources
- UNIDO - GEF

World Industrial Energy Use



Source: EIA/International Energy Outlook 2007

Developing countries & Emerging Economies

Industrial energy use can be up to 50% of the total use and can produce supply problems → energy security

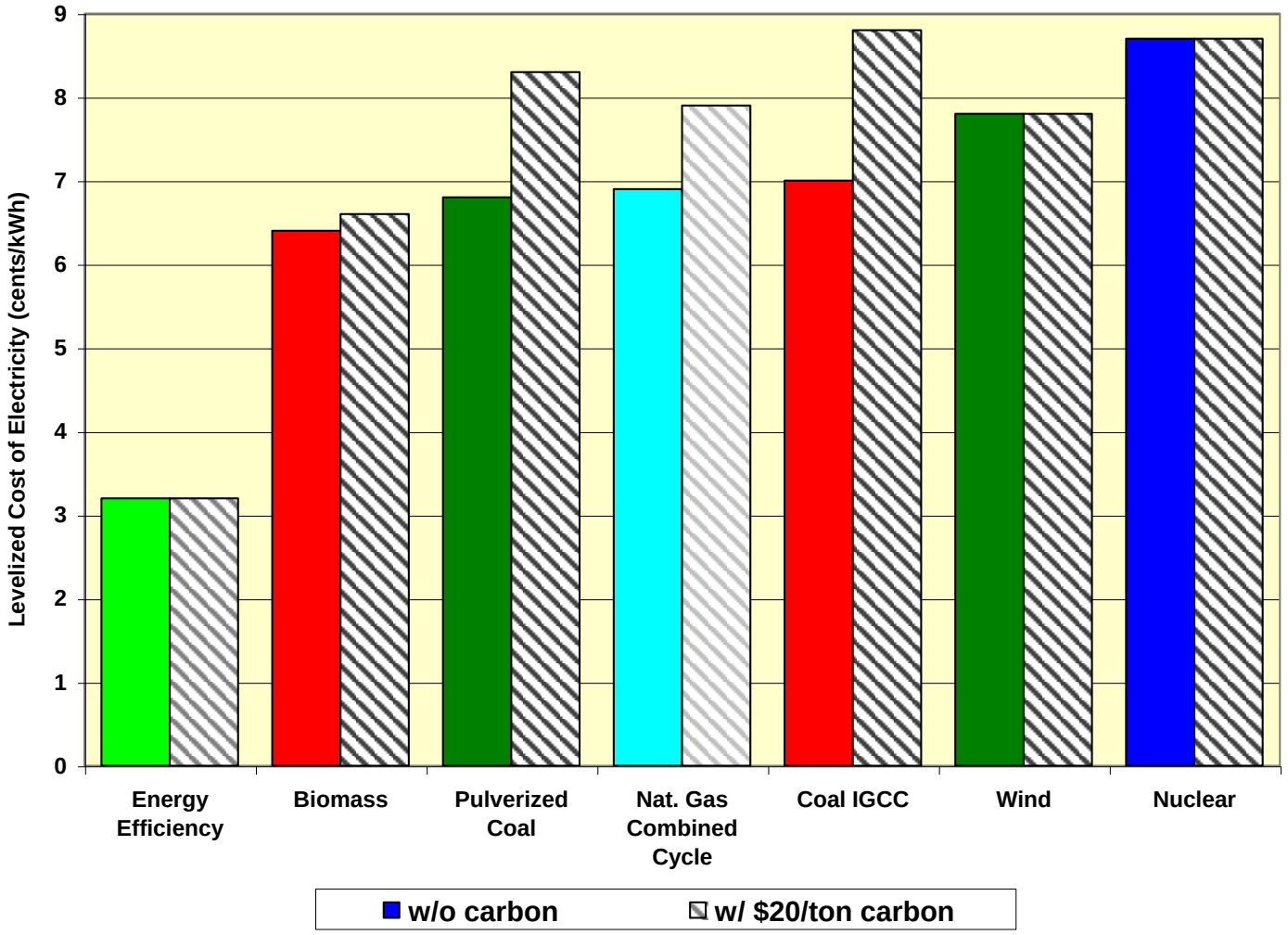
Non-OECD countries will continue to lead global growth of energy demand (87% until 2030 according to the IEA) with industry being the biggest user

Industrial sector growth requires many new facilities, rapidly built and expanded; including substantial growth in energy intensive sectors

Building in energy efficiency the first time is much more cost-effective than retrofitting it later

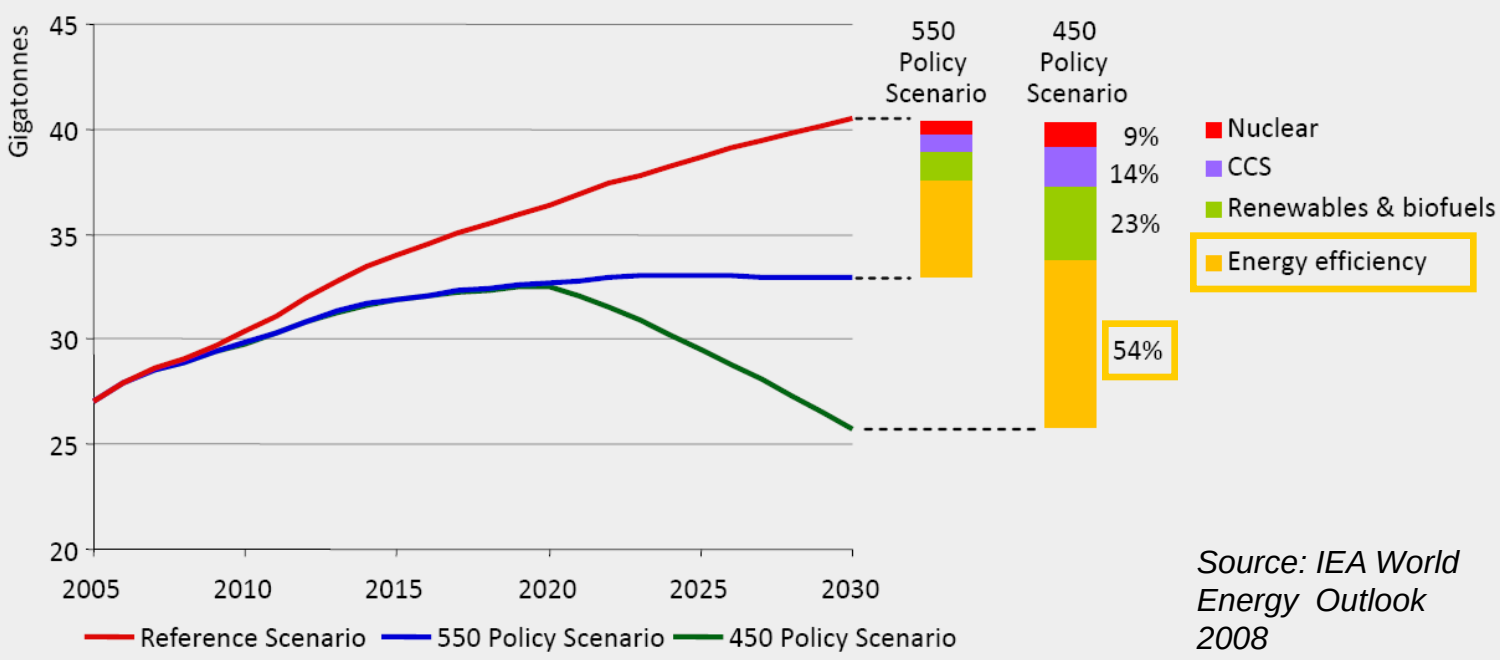
Governments are increasingly aware, and concerned about, both energy security, industry competitiveness **and climate change**

Cost of New Electricity Resources



Climate Change - What needs to be done

Reduction in energy-related CO_2 emissions in the climate-policy scenarios



Source: IEA World Energy Outlook 2008

While technological progress is needed to achieve some emissions reductions, efficiency gains and deployment of existing low-carbon energy account for most of the savings

Energy Efficiency a Major Opportunity

Existing technologies *with an attractive internal rate of return* can cut the growth in global energy demand by half or more within 15 years.

-- *Curbing Global Energy Demand Growth*, McKinsey & Co., May 2007

Industries around the globe can cut CO_2 emissions 19 to 31% using *proven* technologies and practices.

-- International Energy Agency, 2007

"Energy Efficiency is the most promising means to reduce greenhouse gases in the short term."

-Yvo de Boer, Exec. Secretary UNFCC

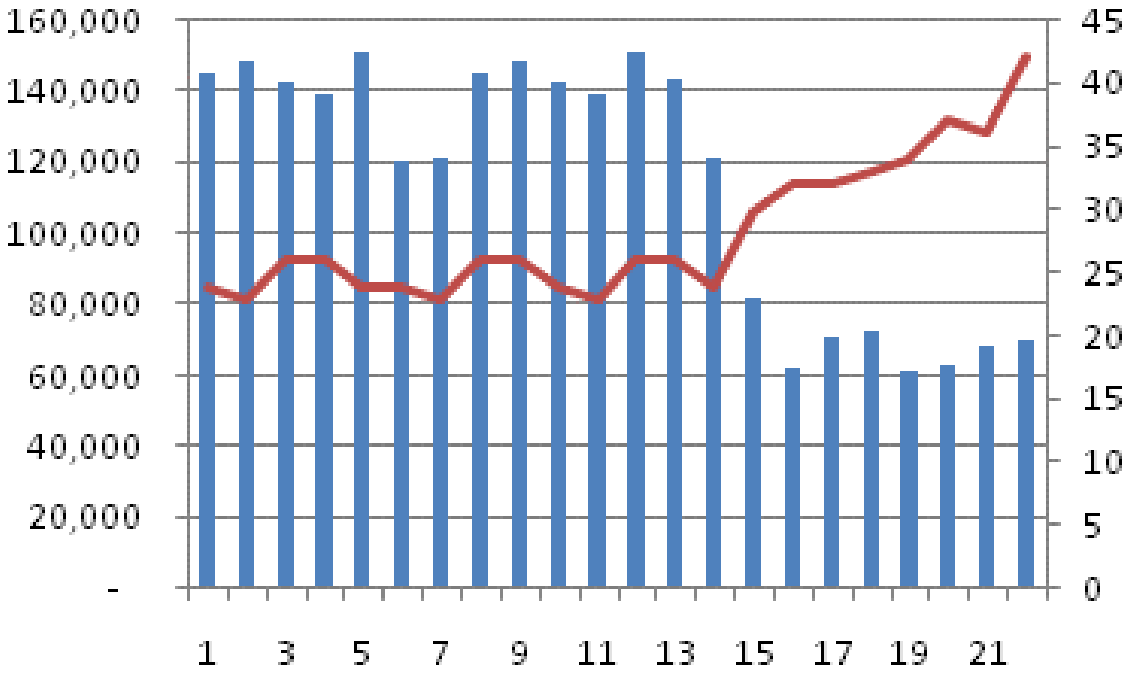
Energy Management Results

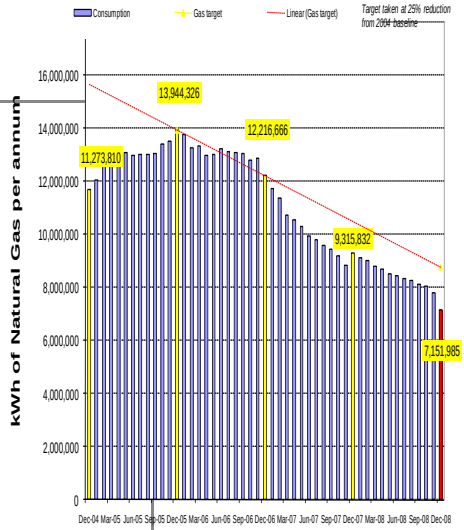
Companies who have used energy management to achieve major energy intensity* improvements include:

- **Dow Chemical** achieved 22% improvement ($4B US savings) between 1994 and 2005, and is now seeking another 25% from 2005 to 2015
- **United Technologies Corp** reduced global GHG emissions by 46% per dollar of revenue from 2001 to 2006, and is now seeking an additional 12% reduction from 2006 to 2010
- **Toyota's** North American (NA) Energy Management Organization has reduced energy use per unit by 23% since 2002; company-wide energy-saving efforts have saved $9.2 million in NA since 1999.

*** 1 Btu/lb of product**

Energy Performance





Industrial Energy Efficiency Benefits

- Energy efficiency has demonstrated, time and again, that
  - ✓ It saves industrial firms money
  - ✓ It increases reliability of operations
  - ✓ It has a positive effect on productivity and competitiveness
  - ✓ It can offer attractive financial and economic returns
  - ✓ Improved security of supply
  - ✓ ….

Then

Why it is not happening?

Barriers to Industrial Energy Efficiency

- Management focus is on production and not on energy efficiency
- Lack of information and understanding of financial and qualitative benefits
- Lack of adequate technical skills to assess performance, developing and implementing EE measures and projects
- First costs more important than recurring costs → disconnection between capital and operating budgets
- When EE knowledge exists it very often resides with individuals rather than with the company/organization → sustainability risk
- Poor realization among senior management of the scale of the opportunity
- ……

Energy Management System Standards – Why?

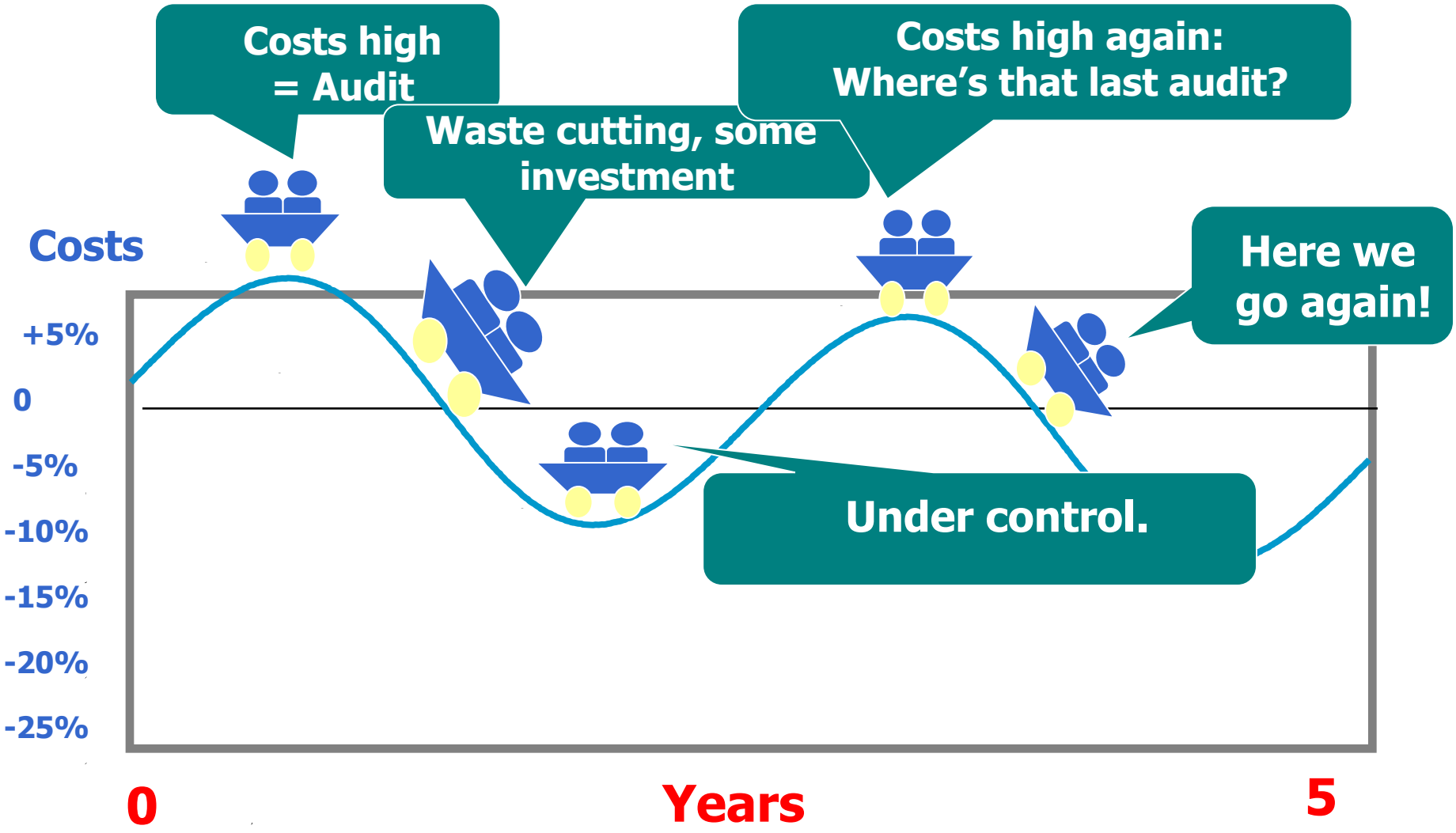
Most energy efficiency in industry is achieved through changes in ***how energy is managed*** in an industrial facility, rather than through installation of new technologies.

Energy Management Systems (EnMS) provide:

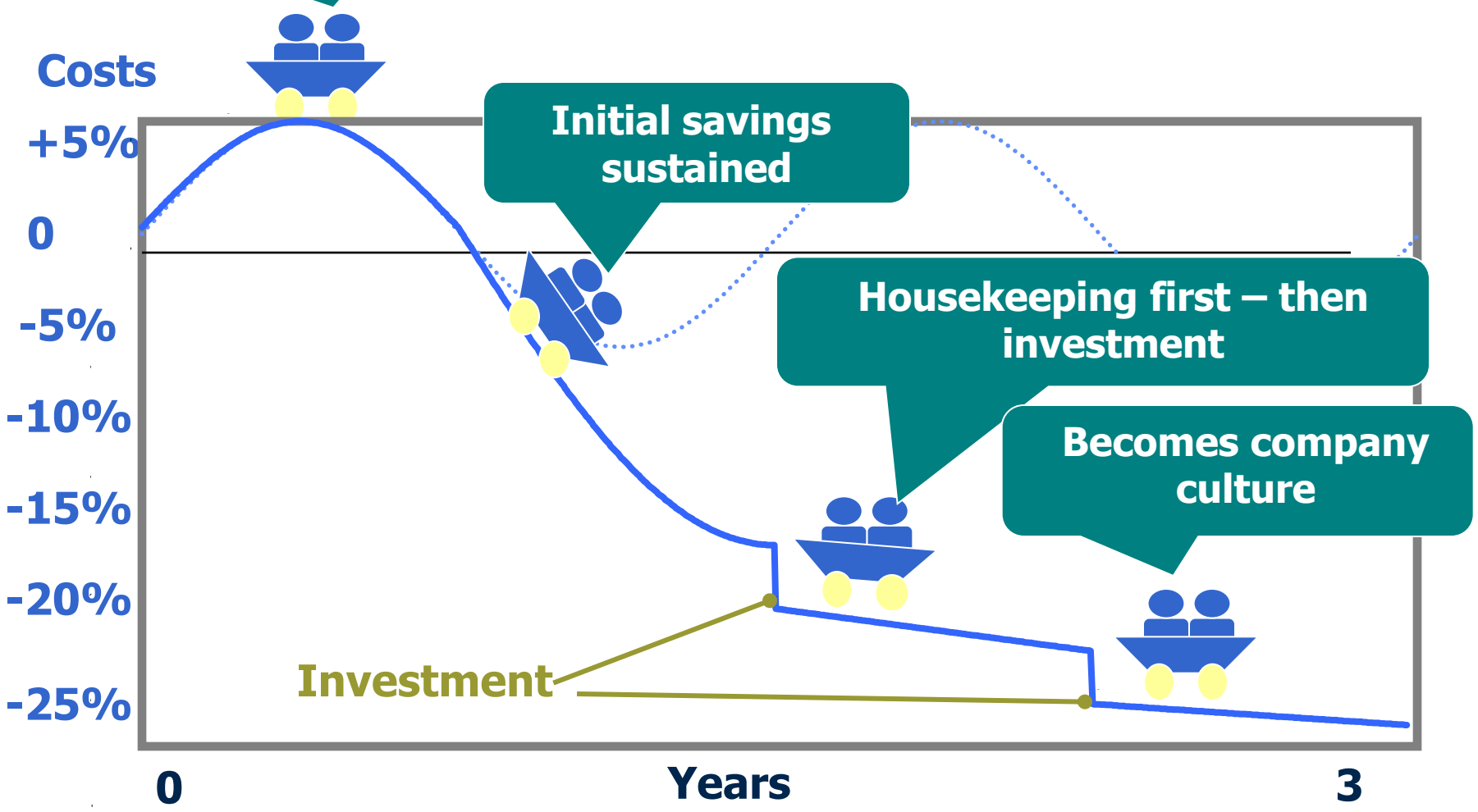
- A framework for understanding significant energy uses
- Action plans for continually improve energy performance
- Structure and organizational framework to sustain energy performance improvements over time and change of personnel

Energy Management System **Standards** provide a market-based framework and best-practice methodologies to **integrate EE into industry corporate culture** and daily management practices.

Ad hoc approach to energy management…



Structured Approach



Business Benefits

Implementation of an energy management plan assists a company to:

- Actively managing energy costs, reducing exposure to rising energy costs
- Reduce emissions without negative effect on operations
- Continual improvement of energy intensity (energy use/product)
- Document savings for internal and external use (e.g. emission credits)
- Utilize company personnel and resources wisely

What can an EnMS achieve?

- Management focus
- Systematic activity
- Prioritization of opportunities
- Obligation to train and raise awareness
- Obligation to provide resources
- Continuity through changes of personnel

What can an EnMS achieve?

- Most industrial enterprises that have implemented EnMS achieved average **annual energy intensity reductions of 2.0-3.0%** against the 1.0% reduction of business as usual (Ireland, Netherlands, Denmark, USA)
- However, for companies new to energy management, savings during the first 2 years are **10-20%**
- EnMS accelerate adoption of EE best-practices and technology upgrade, enhancing productivity and competitiveness
- **Improve enterprises' bottom line**

Energy Management Systems Standards

Energy Management Systems Standards provide policy as well as market-driven tools and mechanisms to disseminate energy management best-practices and support implementation

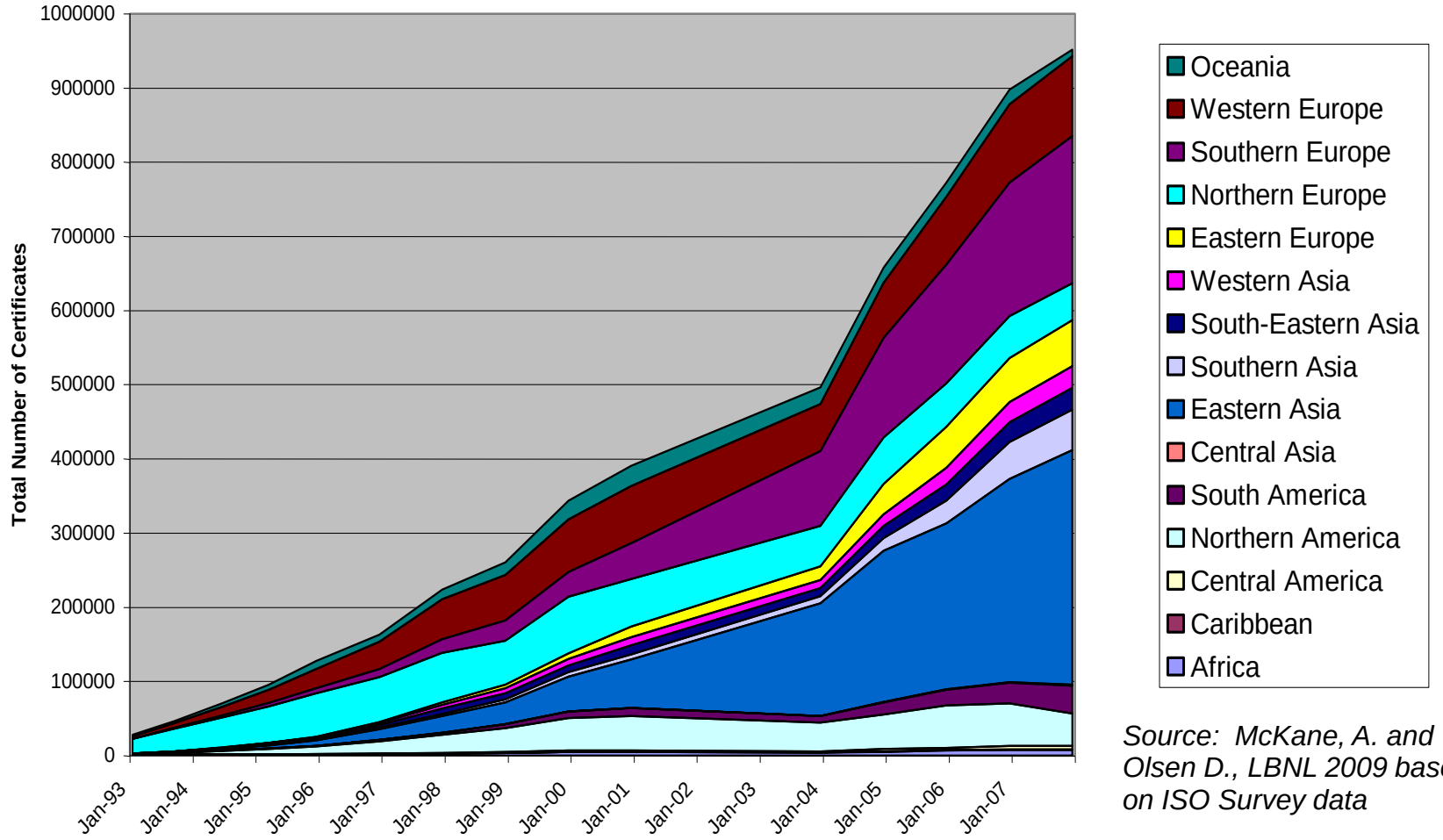
Existing standards

- Nationals: USA, Denmark, Sweden, Ireland, South Korea, Spain, Thailand, South Africa, The Netherlands*
- Regional: EN 16001 – European Energy Management Standard
- **International: ISO 50001 – Energy Management Standard**

(15 June 2011)

ISO 50001 and Trade

Adoption of ISO 9001/2/3:1994 and 9001:2000



Source: McKane, A. and Olsen D., LBNL 2009 based on ISO Survey data

ISO 50001 and Trade

- Companies will demand participation by their suppliers- this is already happening for environmental and lean manufacturing (i.e.--Wal-Mart, Toyota)
- Uptake of ISO 9001 in the supply chain was driven largely by Western European countries and Japan
- Uptake of ISO 50001 will be driven by the US, Canada, the expanded EU, Japan, Korea, China, Brazil, and probably India
- Exporters that position themselves now will be at a competitive advantage

Thank you for your attention