

**Industrial Energy Efficiency:
Opportunities and challenges for government policy**

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International
Energy Agency

Topics

- **Importance of industrial energy efficiency**
- **IEA's industrial energy efficiency policy recommendations**
- **Industrial energy efficiency policies in action**
 - **Voluntary agreements**
 - **Public-private partnerships**
 - **Regulation**
 - **Self-regulation through energy management standards**

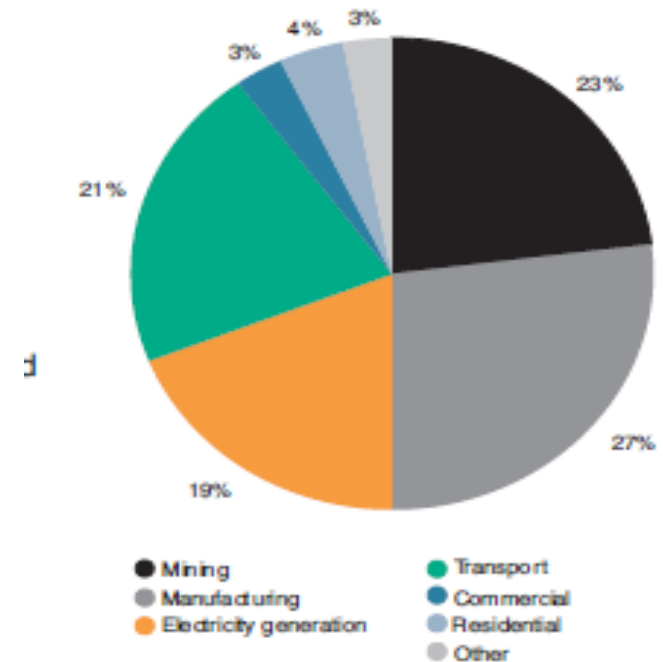


Importance of industrial energy efficiency

Why focus on industrial energy users

- Industry is often the dominant consumer
- Industrial energy savings potential is huge
- Industry requires well-thought out policies and interventions
- Energy efficiency faces many barriers

Primary energy demand WA (2008)

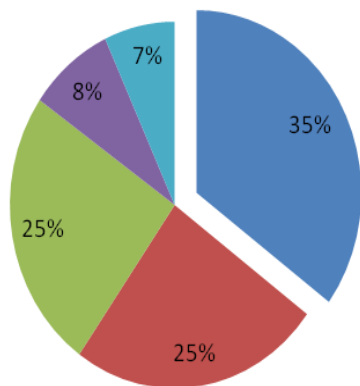


Source: ABARE 2010

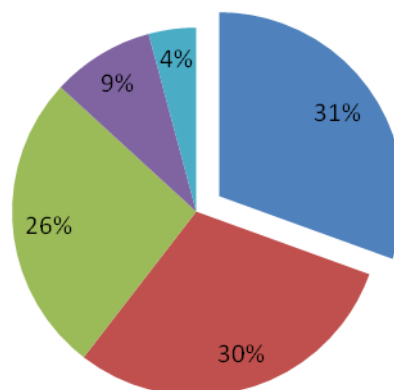
From: *Energy 2031*

The industrial sector accounts for a third global total final consumption. This share has remained quite stable.

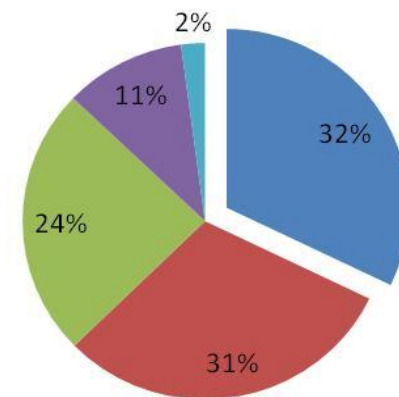
1973



2008



2035



■ Industry

■ Transport

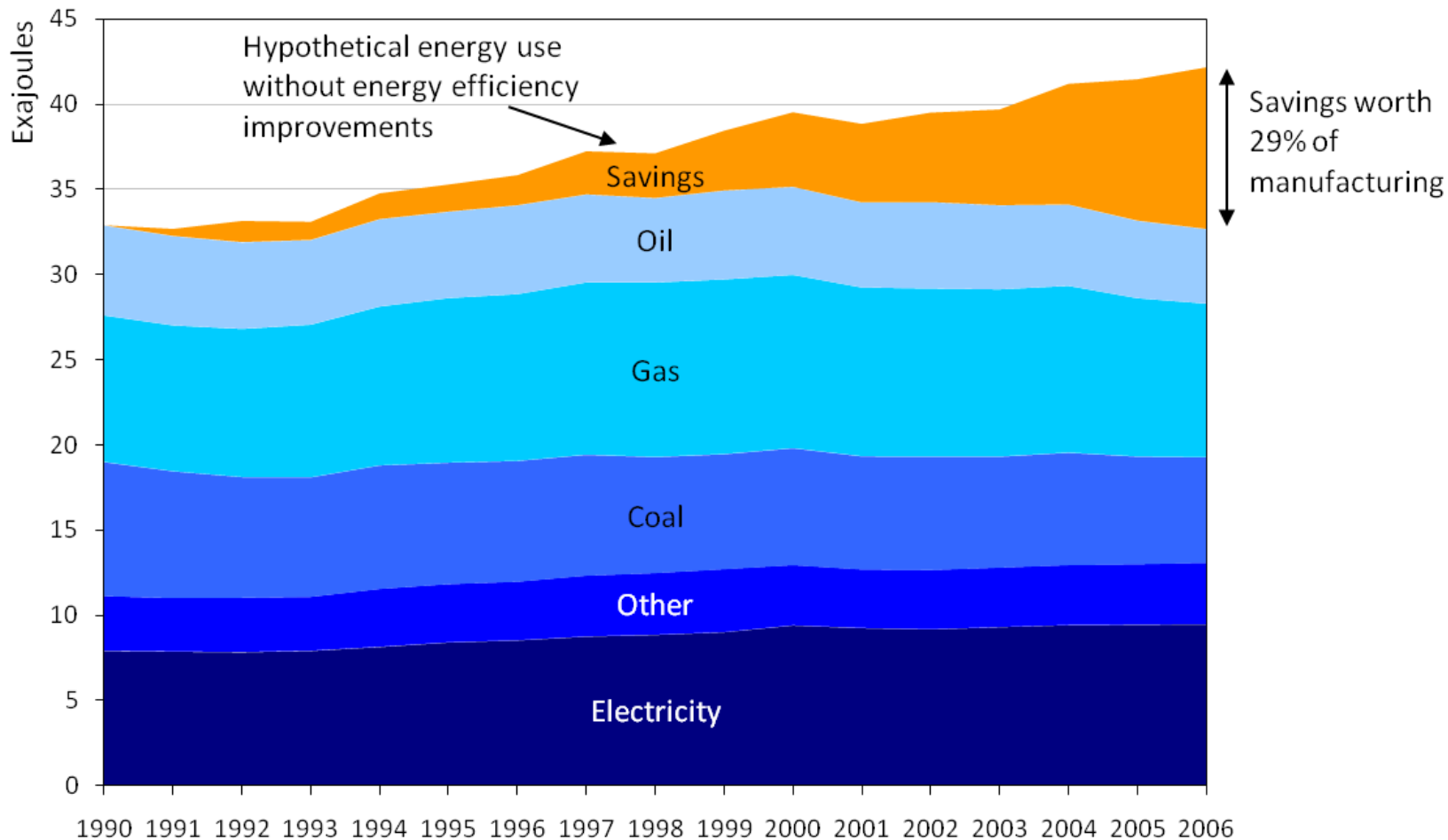
■ Residential

■ Services

■ Other

Industry will continue to be the largest energy consuming sector

In fact energy efficiency has already helped restrain the growth in industrial energy consumption



With energy savings increasing in the last decade

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IEA's industrial energy efficiency recommendations



25

Energy Efficiency Recommendations across **7** Sectors

Worldwide Implementation Now

Cross-sectoral



Buildings



Appliances and
equipment



Lighting



Transport



Industry



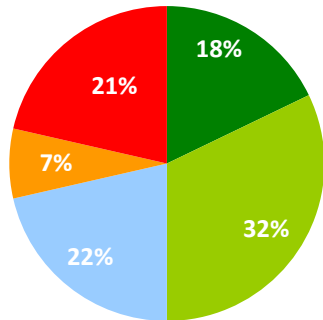
Energy utilities



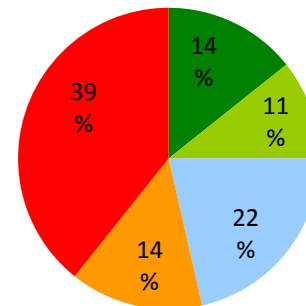
Industry

- 21** Energy management
- 22** High-efficiency industrial equipment and systems
- 23** Energy efficiency services for SMEs
- 24** Complementary policies to support industrial energy efficiency

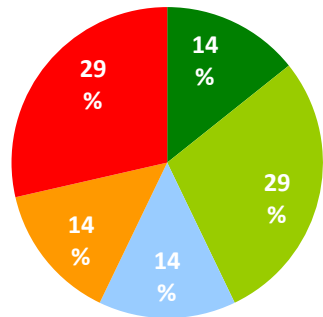
Progress in implementing all these policies is slow in IEA countries



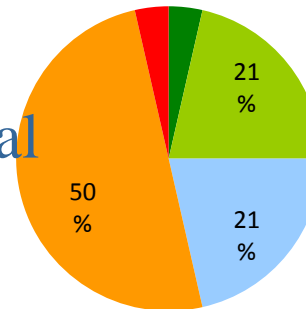
Assisting EM capacity



Appoint full time energy manager



Adopting formal EM policy



Monitor & evaluate

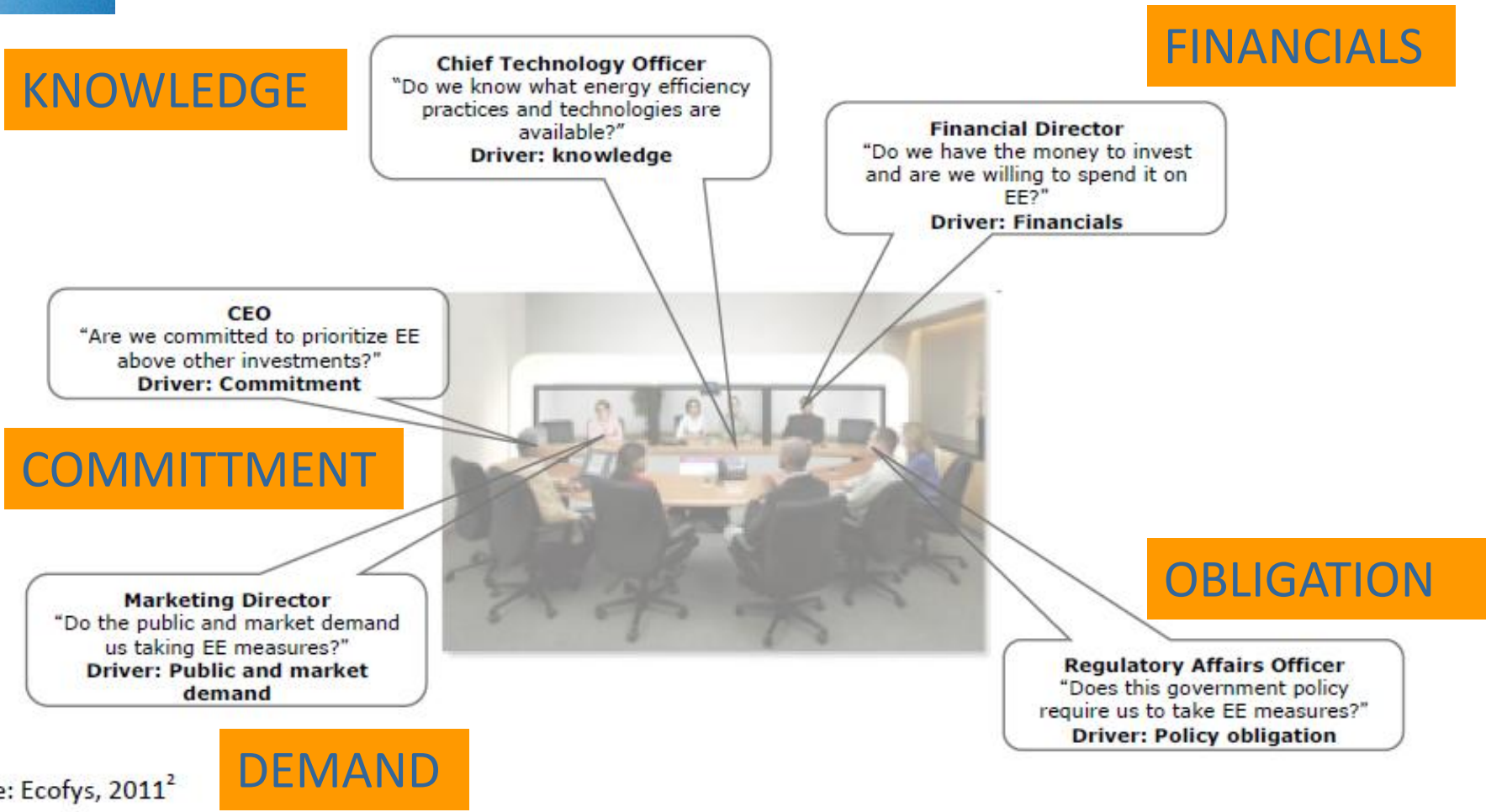
- Fully implemented
- Substantial implementation
- Implementation underway

- Plan to implement
- Not implemented
- Not applicable

Rec. 21. Promote comprehensive EM (energy management) in industry



Boardroom perspectives – understanding drivers



Source: Ecofys, 2011²

<http://www.iea.org/publications/freepublications/publication/name,20551,en.html>

Rethinking policy packages from a “board room” perspective

Driver	Policy package elements
Financials	Policy lending lines; ESCO formation; subsidies & tax incentives; carbon pricing
Knowledge & awareness	Energy management capacity building; public private partnerships on technology development
Commitment to sustainability	Public private partnerships; voluntary agreements; engagement by NGOs
Public, shareholder, market demands	Benchmarking; carbon disclosure; carbon pricing
Policy obligations	Energy management laws, targets and goals, BACT on retrofits

Overview

- **What: Definitions**
- **Why: Importance of managing energy in industry**
- **Role of energy management programmes**
- **How to design and deliver energy management programmes (plan, implement, monitor, evaluate)**

<http://www.iea.org/publications/freepublications/publication/name,28130,en.html>



Why energy management?

- **Energy savings & co-benefits**
company level / government / wider
- **Role of energy management systems**
 - Enable continuous energy performance improvement
- **Role of energy management programmes**
 - Overcome barriers and provide guidance and support for the implementation process

ISO 50001 Energy Management Standard



International
Organization for
Standardization

ISO 50001 energy management standard will contribute as a framework for industrial plants, commercial facilities, and organizations to manage energy.

Potential impacts:

- Targets the large energy-saving potential in managing energy more effectively (10 to 30%, and greater).
- Could influence up to 60% of the world's energy use across many economic sectors.

ISO 50001:

- ISO/TC 242 developed ISO 50001
(49 countries participated)
- ISO/TC 257 is working on to develop general methodologies to determine energy saving

Applications in industry, commercial buildings, and transportation fleets

Energy Management Programmes

DRIVERS AND INCENTIVES

- **Target setting policy**
- **Mandatory requirements**
- **Exemptions**
- **Subsidies/rebates**
- **Public reporting**
- **Recognition**

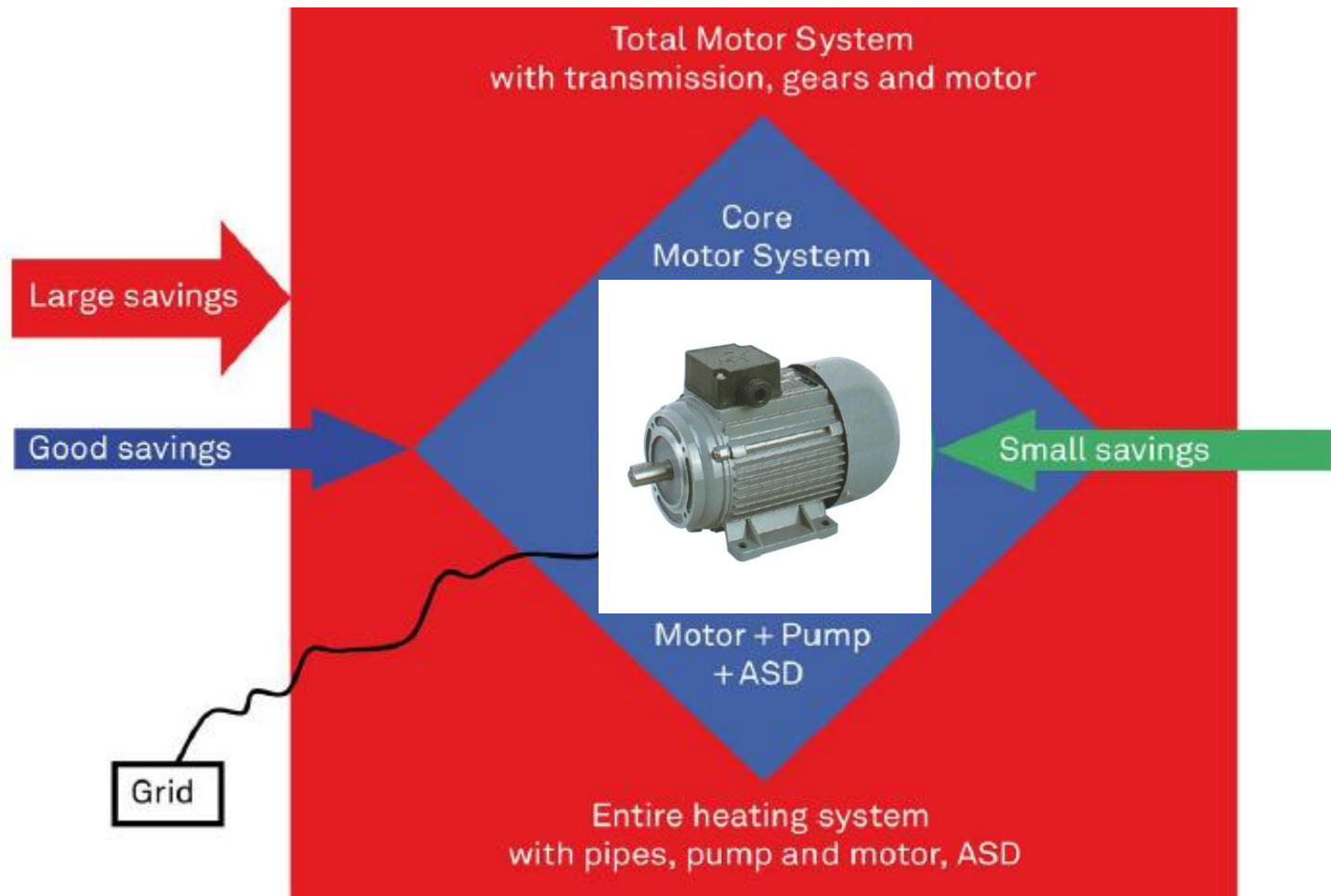
SUPPORT

- **Networks**
- **Workshops**
- **Technical assistance**
- **Information**
- **Training and capacity building**
- **Access to finance**

ENERGY MANAGEMENT SYSTEMS

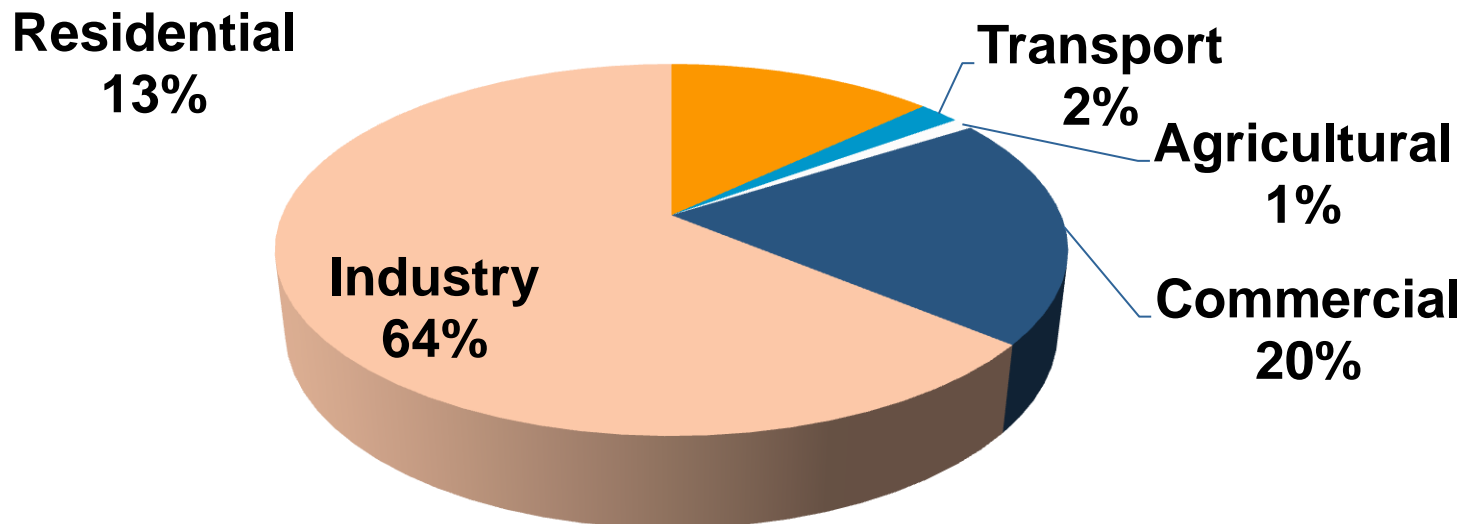
- **Standards or specification**
- **Energy review guidelines (how to implement)**
- **Certification or verification**

Rec. 22. EMDS (Electric Motor Driven Systems)



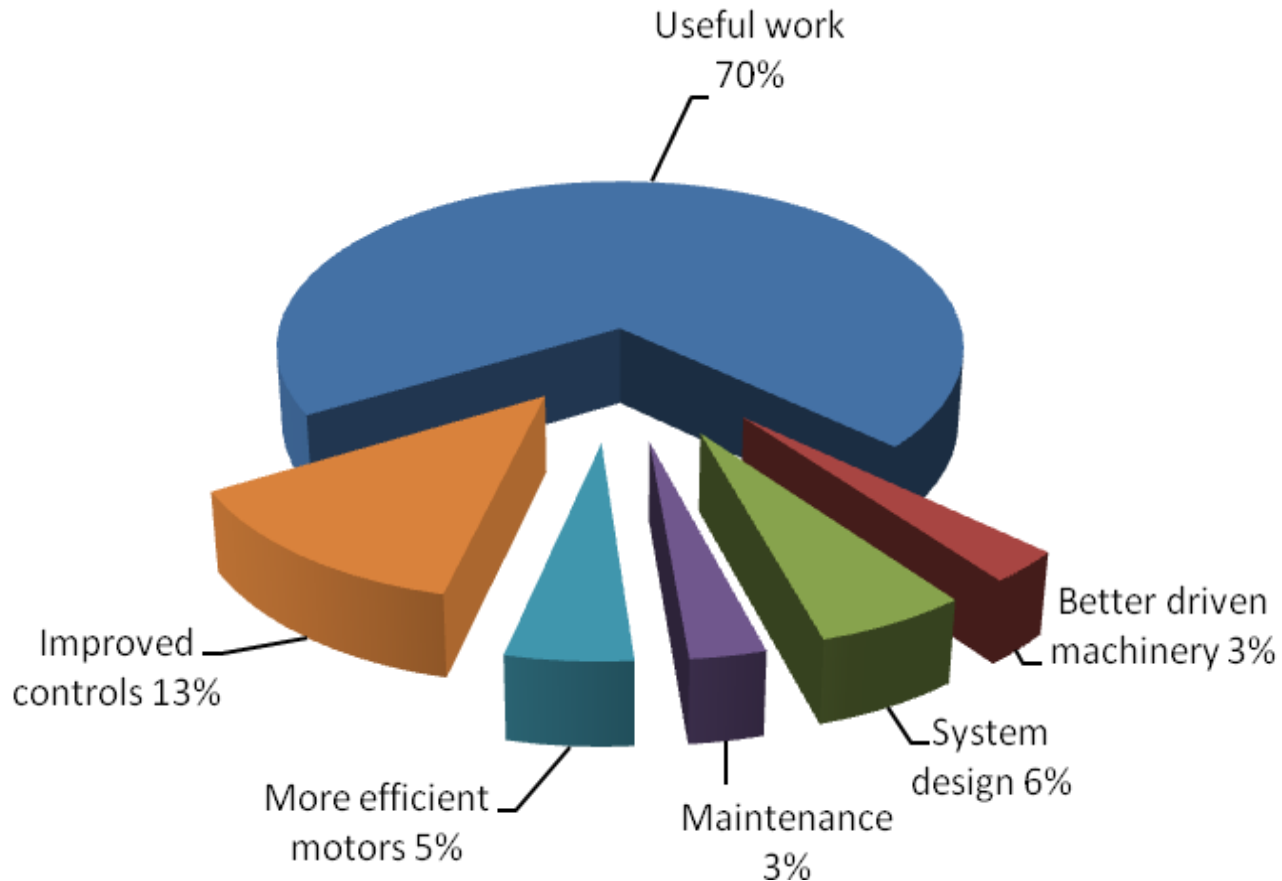
Electricity consumption of EMDS

- **Electric motor-driven systems (EMDS) consume more than 40% of global electricity consumption**
 - **Motor energy costs account for 95% of motor's life cycle costs**
- **64% of global EMDS electricity consumption is made in industrial sector**



Potential energy savings in EMDS

- **Theoretical potential savings of EMDS is around 30% of electricity used, which can reduce 10% of total global electricity demand**



Discussion

- * **What types of policies and policy combinations can be used to promote system optimisation?**
- * **What kind of incentives are needed?**
- * **Who are the stakeholders that need to be involved?**
- * **Success stories?**

Rec. 23 Small and Medium-sized Enterprises (SMEs)

- **Capacity and audits**
- **Information and tools**
- **Benchmarking**

ACCESS TO FINANCE

Rec. 24 Complementary measures

Promote investments in energy efficiency

- Energy pricing
- Financial incentives
- Financing mechanisms

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Policies in Action; Proven approaches to motivating industrial energy users

Voluntary agreements

■ What are they?

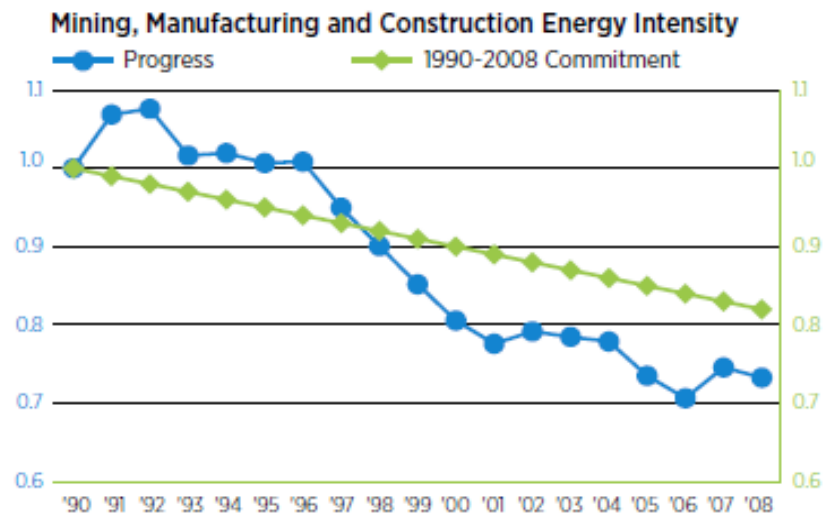
- Negotiated agreements between government and industry on energy savings programmes
- Government offers technical and financial support plus certainty on future regulations
- Industry agrees to targets and timelines for action on energy efficiency

■ Why do they work

- Provides an alternative to regulation, while allowing for a sector-wide approach
- Fosters industrial cooperation on an issue of shared concern
- A channel for cooperation and dialogue

Voluntary agreement examples

- **Canadian Industry Program for Energy Efficiency (1975)**
- **Danish Green Tax Package (1996)**
- **Japanese Keidanren Voluntary Action Plan (1997)**
- **US Climate Leaders Partnership (2002)**
- **South Africa Energy Efficiency Accord (2005)**



Source: CIPEC 2010 Annual Report

Public-private partnerships

- Voluntary public-private cooperation on policy development and implementation
- Effective in leveraging public and private investment on technology or project development.
- Provides temporary governance for problem-solving, policy development, and risk-sharing
- Examples:
 - US DOE Industrial Technology Program
 - Irish Large Energy Industry Network
 - World Bank's Global Gas Flaring Reduction Network

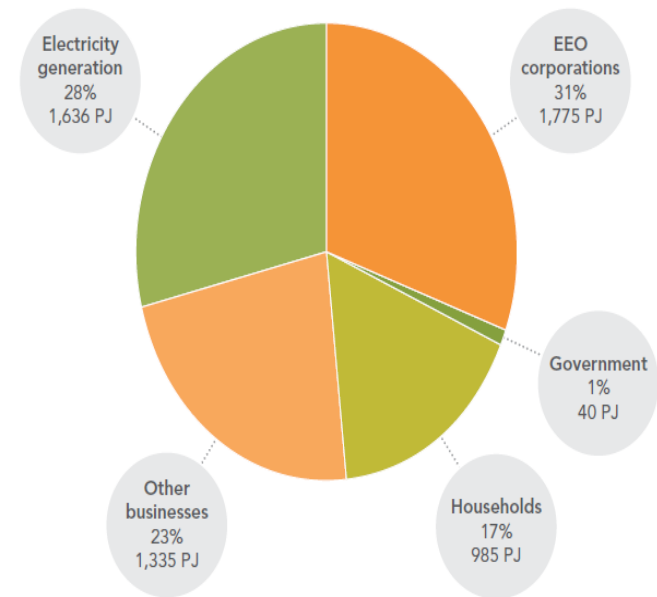
Energy reporting & management laws

- Increasingly common everywhere
- Asian examples: Japan, China, India, Thailand, Vietnam, Russia
- Typical requirements:
 - Appointment of qualified energy managers
 - Submission of annual reports on usage, energy savings actions
 - Facility and process audit requirements
 - Economical energy efficiency must be implemented
 - Minimum energy performance requirements
 - Energy intensity or savings targets
- Often provide financial support to efficiency investments

Australia's Energy Efficiency Opportunities Program

- **Obligatory for energy users ≥ 0.5 PJ annually**
- **200 energy users registered accounted for 1/3 of total primary energy use**
- **Energy savings of 6.5% identified – equivalent to 1.4 million HHs**
- **2/3 of the projects identified underway**

Figure 1: Total energy use in Australia 2007–08

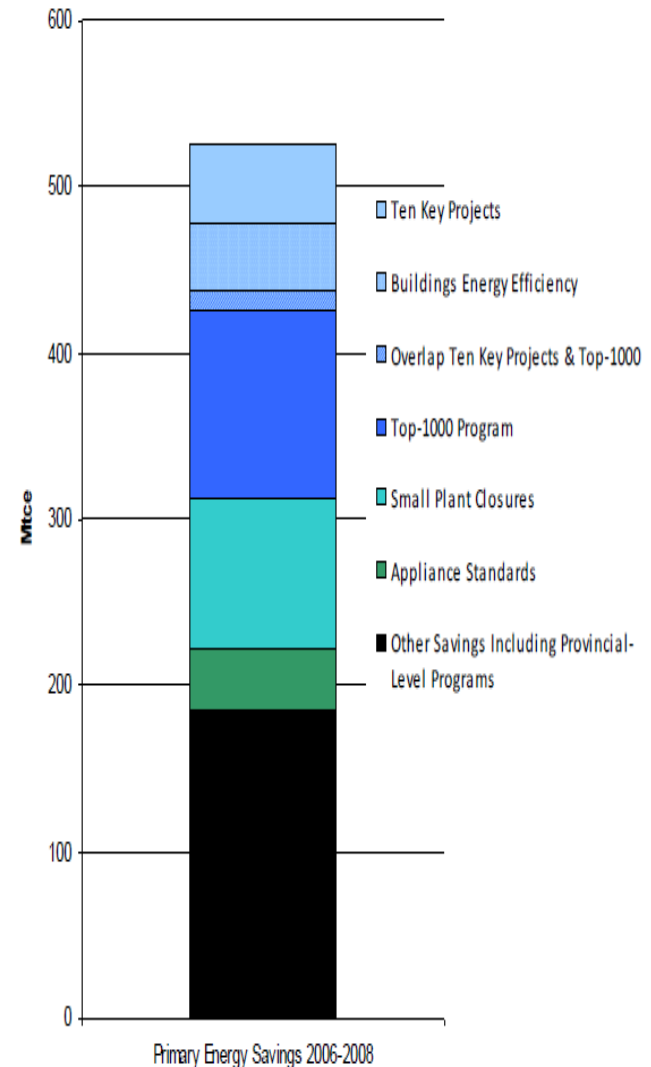


Source: *First Opportunities Report*

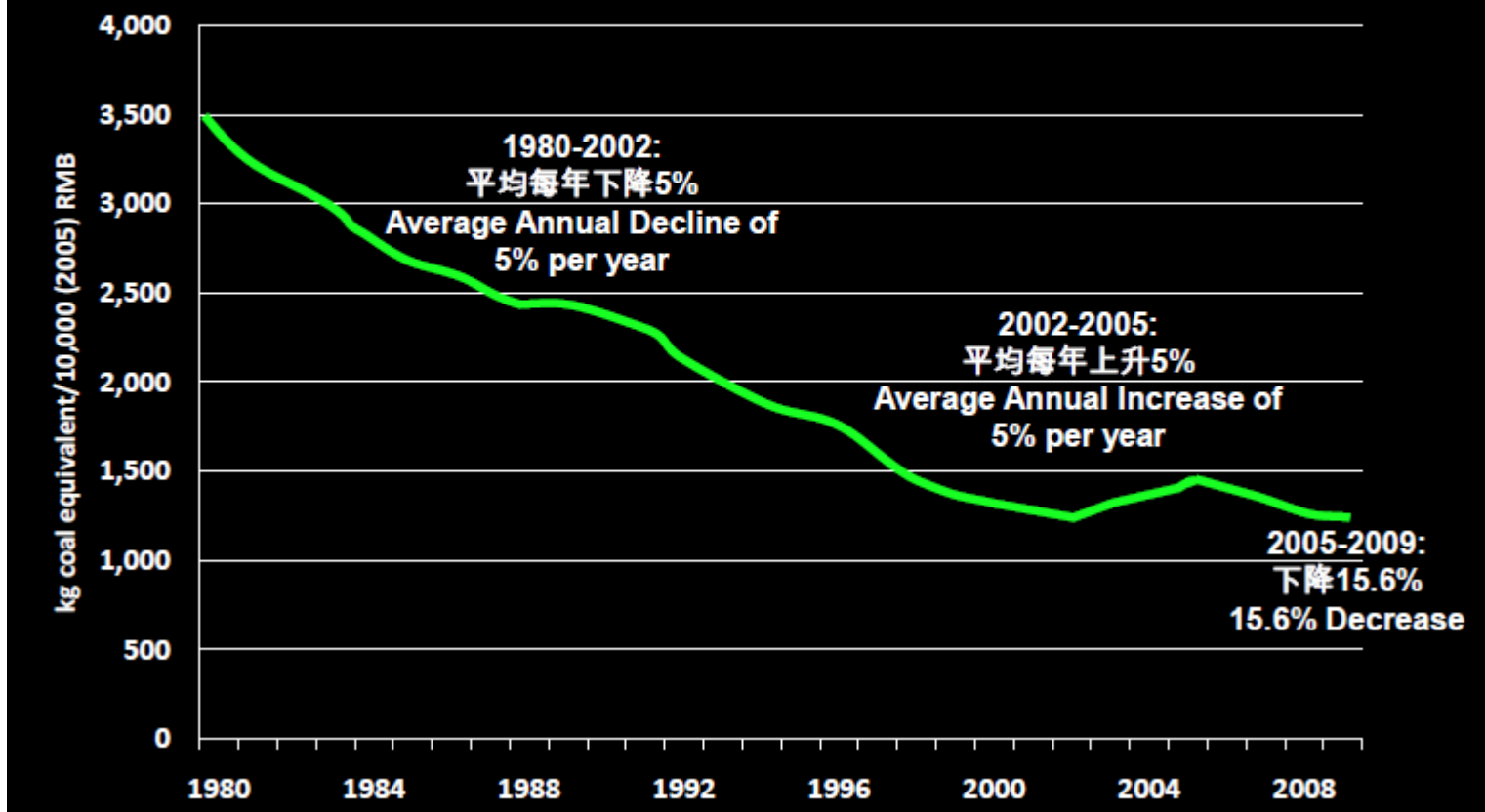
China's Energy Conservation Law

- Industry must:
 - Establish energy savings unit
 - Formulate savings goals
 - Establish a reporting system
 - Conduct audits
 - Formulate energy savings plan
 - Adopt energy savings incentives
 - Invest in energy savings projects

- Government:
 - Leads the process
 - Tracks progress



China's Energy Intensity (1980-present)



Self-regulation through industrial energy management standards

- Users cannot control prices, politics, or the global economy, but they can manage how they use energy.
- A standardized management process is needed to help users proactively assess, measure, and manage energy usage.
- ISO 50001 standard and its predecessor (ISO 16001) offer promising mechanisms to help users manage energy.
 - Uses well-established Plan-Do-Check-Act framework.
 - Broadly applicable for any large energy user seeking continuous improvement in energy management



Conclusions

- **Industrial energy efficiency is a key ingredient in any national energy efficiency programme**
- **Proven practices for motivating large energy users to save energy are emerging**
- **Voluntary and regulatory approaches both have their place, but industrial energy management standards may ultimately hold sway**
- **Large energy users need to pursue energy savings to remain globally competitive**
- **Comprehensive policy packages targeting the driving forces behind corporate decisions may prove the most effective approach**