



energy

Department:  
Energy  
REPUBLIC OF SOUTH AFRICA

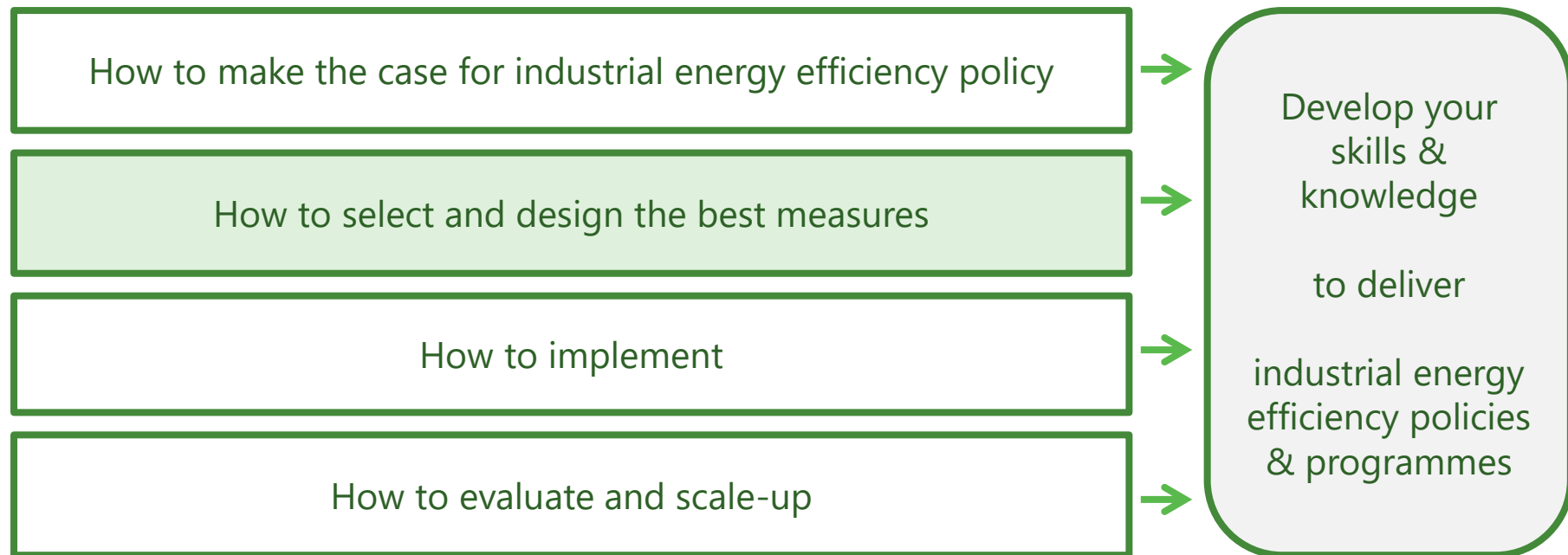


# Select energy efficiency programme measures

Patrick Crittenden and Hugo Salamanca

Energy Efficiency Training Week, Industry Stream, Pretoria, South Africa, October 2019

# Link between training content and objectives



# Learning outcomes

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This session will focus on developing your capabilities to:

- Understand the different policy and programme measures that can encourage improved energy efficiency in industry
- Explore the country and market factors that influence selection of each measure
- Consider how best to combine measures

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1. Information measures

2. Regulatory and target setting measures

3. Capacity building measures

4. Finance measures

5. Energy management measures

6. Supply chain measures

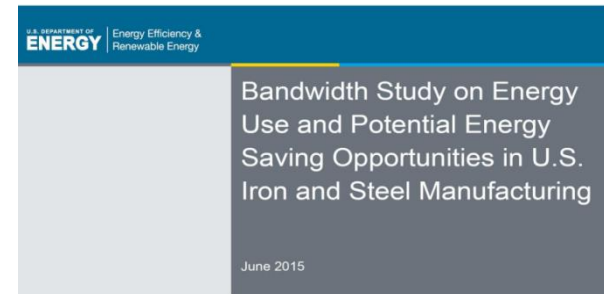
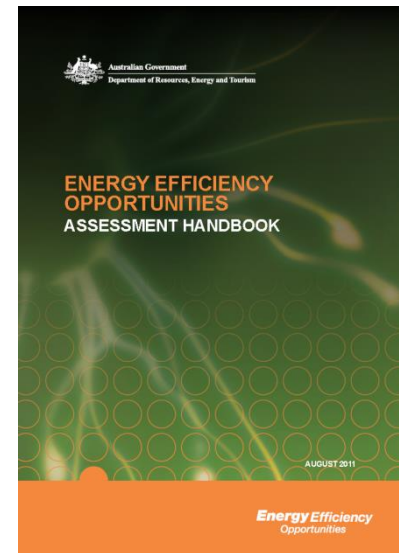


# Information measures – a range of options

- “How to” guidance materials
- Fact sheets
- Lists of typical energy efficiency projects and equipment
- Case studies
- Advice hotlines
- Workshops
- Webinars
- Energy Efficiency Networks



## Improving the efficiency of bakery ovens Case study



# Information measures

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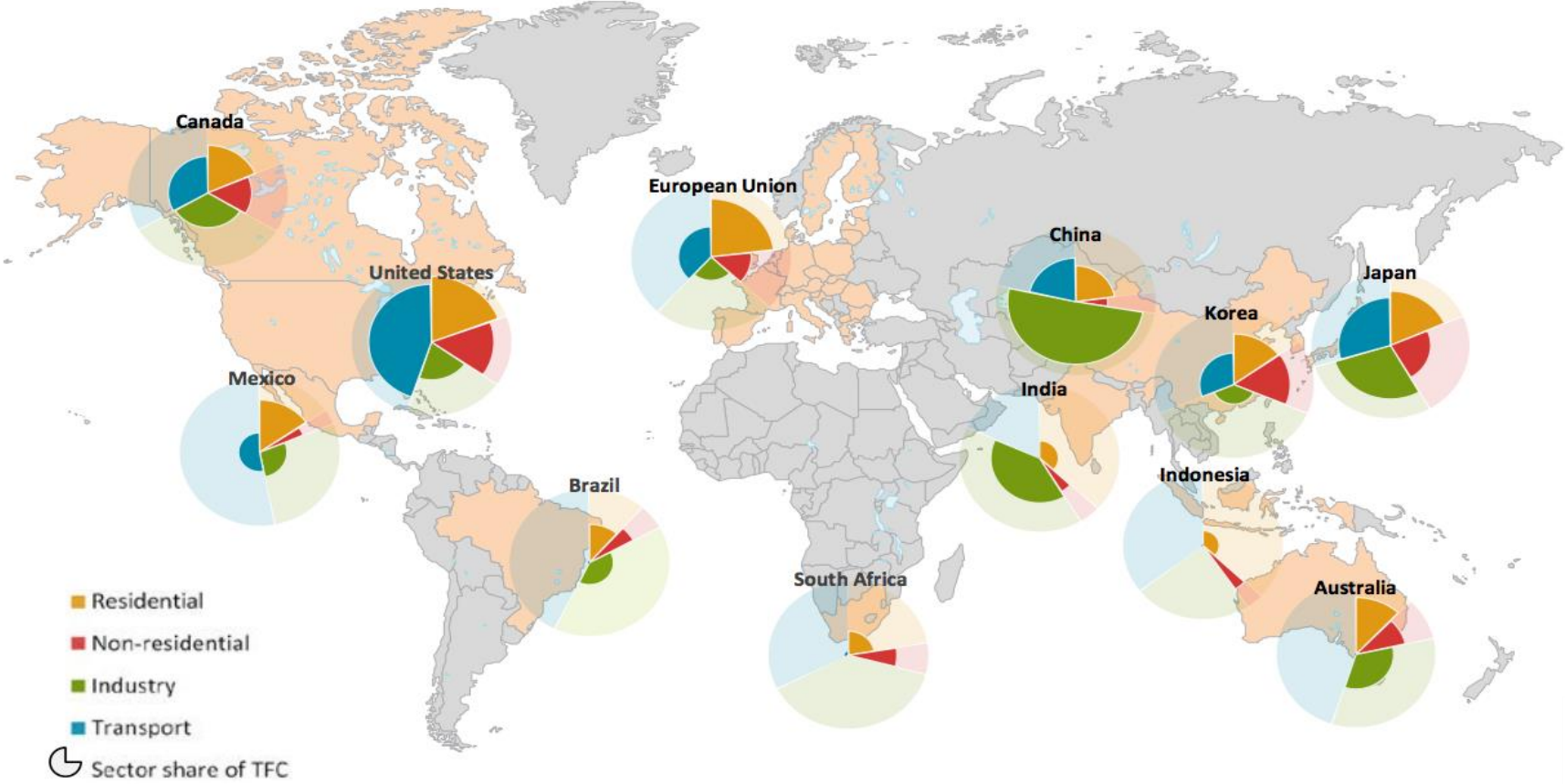
## Advantages

--->Can be cost effective for businesses and government

## Disadvantages

--->If information isn't contextualized, targeted and tailored it is unlikely to be actioned

# Regulatory and target setting measures



# Regulatory and target setting measures

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- Measures include:
  - mandatory energy efficiency targets that must be met by companies or industry sectors
  - Minimum energy performance standards (MEPS) for industrial equipment (e.g. electric motors)



# China's Top-10,000 program

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- Target set at national level and then cascaded to provincial and large city level
- Local councils set targets for individual firms and monitor progress
- Local councils may also conduct mandatory energy audits and/or mandate improvements for firms that don't meet targets
- Central government support through training and capacity building, fiscal and financial incentives



# Regulatory and target setting measures

## Advantages

- >Very high participation rate
- >High confidence to achieve quantifiable savings

## Disadvantages

- >Cost for business to implement
- >'Compliance' focus for business
- >Cost for government to enforce

# Capacity building measures

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- Training:
  - Implementation of energy management systems
  - Technical assessment
  - Opportunity identification
  - Business case development
- Online and in-person training through workshops and webinars
- Build knowledge, understanding and skills

# SME Energy Efficiency workshops in Costa Rica



# Finance measures

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1. Grants
2. ESCO funding model with shared savings
3. Preferential loans
4. Equipment leasing
5. Utility on-bill financing
7. Market based instruments
  - a. White certificate schemes
  - b. Utility obligations
  - c. Auctions and tenders
8. Tax incentives
9. Others ...

# Energy Management Programmes

- Energy Management System (EnMS):
  - Systematic and structured approach to the management of energy use
  - Standards exist (ISO 50001), but many options are possible
- Energy Management Programmes:
  - Government policy/programme to promote the uptake of energy management systems
- Types of Energy Management Programmes:
  - Information (US and Chile)
  - Incentives (Germany)
  - Regulation (Australia)

Information

Incentives

Regulation

# Role of Energy Management Programmes

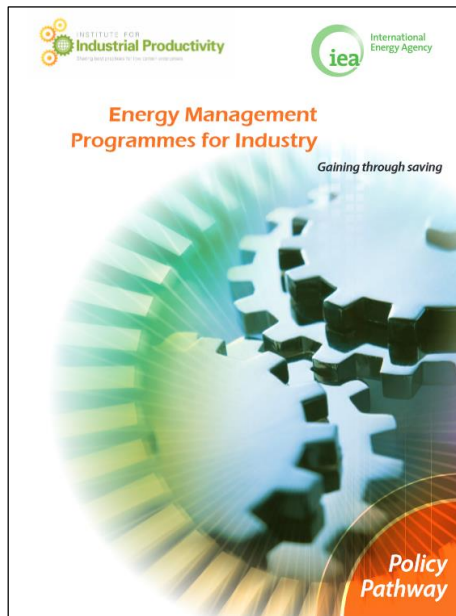
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- **What?**

- **Energy Management Systems:** is a collection of procedures and practices to ensure the systematic planning, analysis, control, monitoring and improvement of energy use (e.g. ISO 50001)
- **Energy Management Programmes:** government-led initiatives to promote the uptake of energy management systems

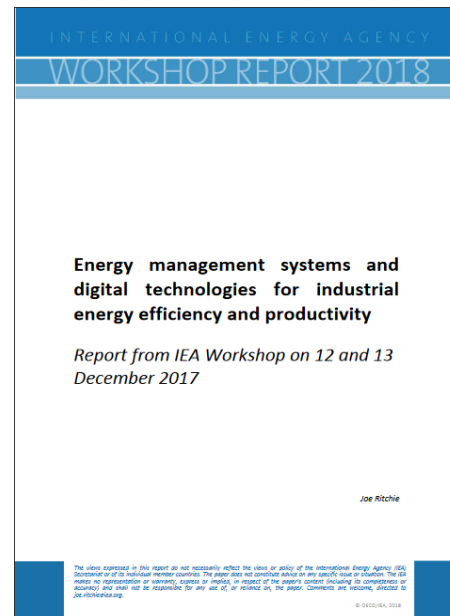
- **Why?**

- **Energy Management Systems:**
  - Sets a framework for continuous improvement of energy efficiency performance
  - Helps set targets and track progress
  - Involves energy managers and decision makers
- **Energy Management Programmes:**
  - Overcome barriers and provide guidance and support for the implementation process



Guidelines for  
policymakers

[Link](#)



More extensive  
analysis on EnMS



# Benefits of Energy Management Systems

- **Energy savings**

- Data contained in 42 ISO 50001 case studies from France, Germany, the United Kingdom and other countries show average annual **energy savings of 26%**.

- **Financial savings**

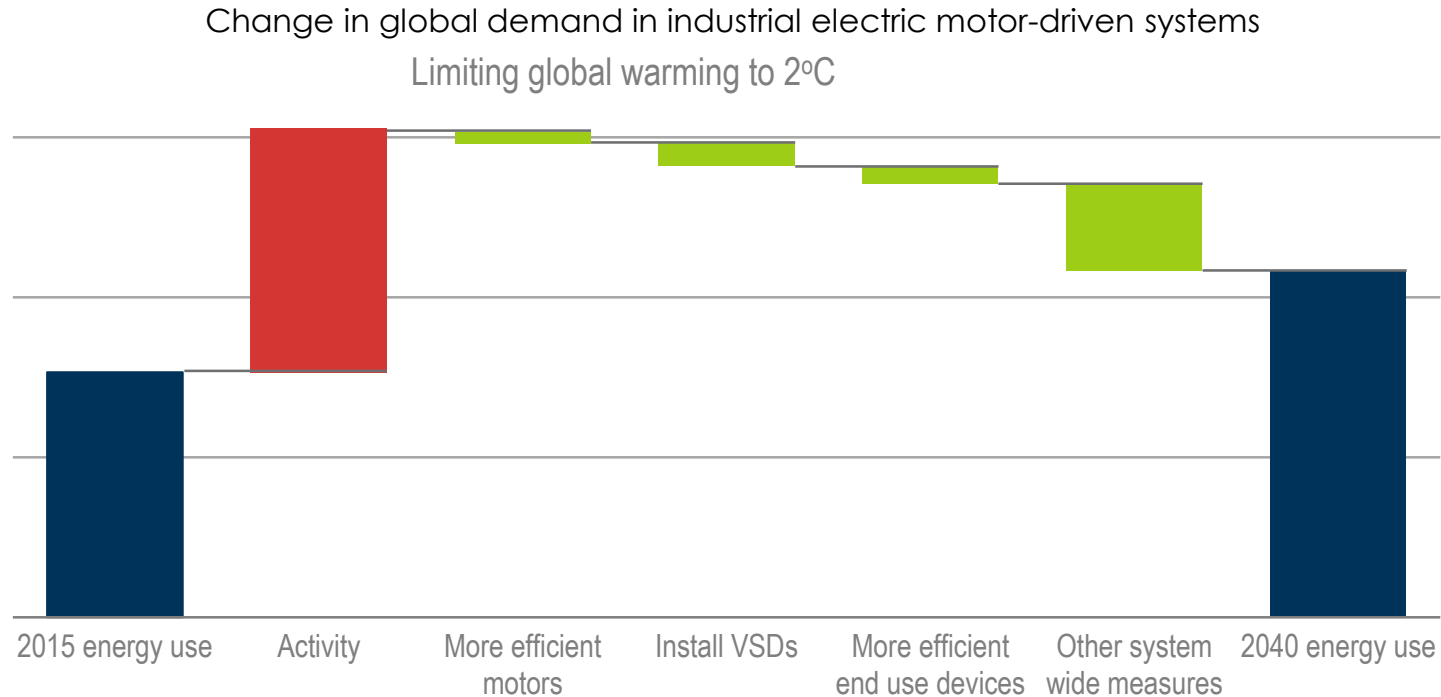
- From a financial perspective, data from 75 ISO 50001 case studies show financial savings averaging around **USD 1.2 million** per year (Waide Strategic Efficiency, 2016; CEM, 2017b).

**USD 600 billion**

Could be avoided in energy expenditure in industry following the EWS in 2040.

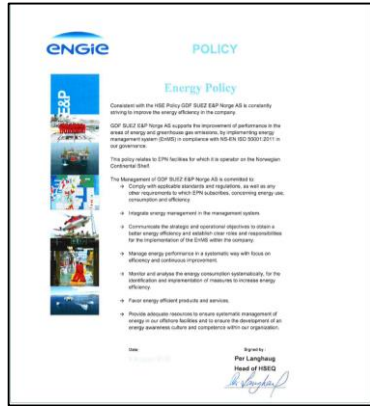
**But EnMS can provide numerous additional benefits such as improvement in workers comfort, product quality, overall flexibility and productivity as well as reduction in maintenance cost, risk, production time and waste.**

# How efficiency measures contribute to meeting climate targets

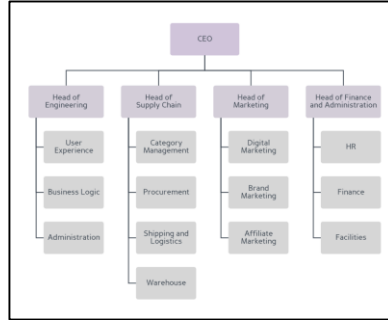


Efficiency gains are driven mainly by other system-wide measures, among which EnMS plays a central role.

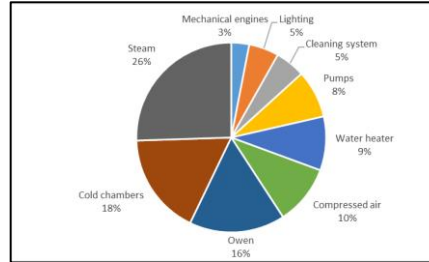
# The key steps of the ISO 50 001



Energy Policy



Dedicated team



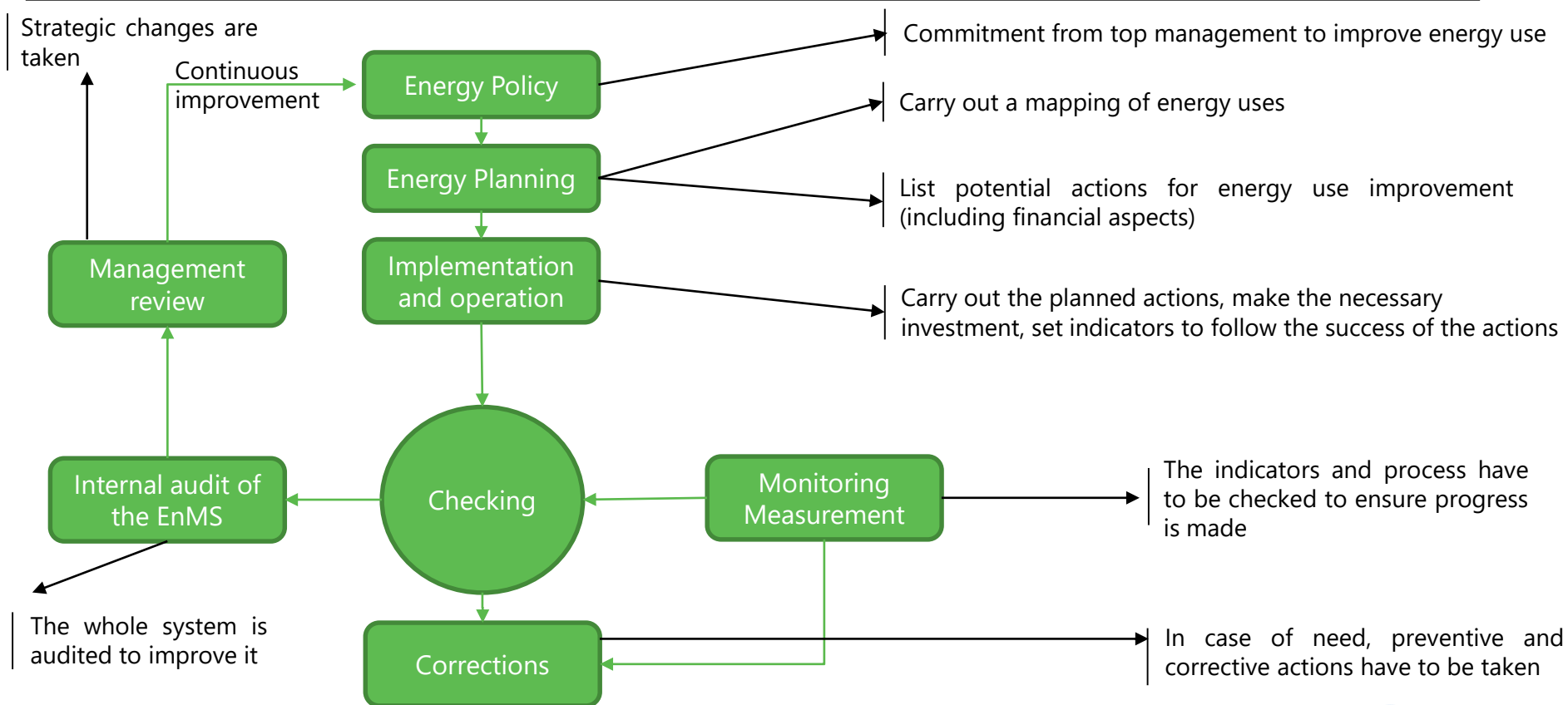
Energy use mapping

GREEN IMPROVEMENT PLAN							
Team's name:							
Secretary's name:							
Date of update:							
		Goal: Energy improvement in order to achieve your objectives + add results in all planned improvement goals achieved					
Area of Improvement / CHALLENGE	Objectives for Success	Targets	Action plan (How to reach your objectives)				
			Value (Current risk, time, cost, etc.)	Actions	Responsible (Person/Function, etc.)	Progress status (Not started, In progress, Completed)	Best Check
Energy consumed by boiler is too high	Reduce energy consumed by boiler through the use of steam	10% from current consumption + as much	Implementation of steam in the boiler to reduce to operating hours	Energy Reduction Task Force (2017) Chair: Engineer	People from the ISO 5001 Task Force	Not Started	2024/2012
				Schedule regular maintenance of the boiler.	Assigned Chief Engineer for Maintenance Dept.	Start	2024/2012

Action plan and indicators

## Monitoring and continuous improvement

# Key aspects of EnMS (ISO 50 001 framework)



# Energy Management Programmes - Types

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Information

Incentives

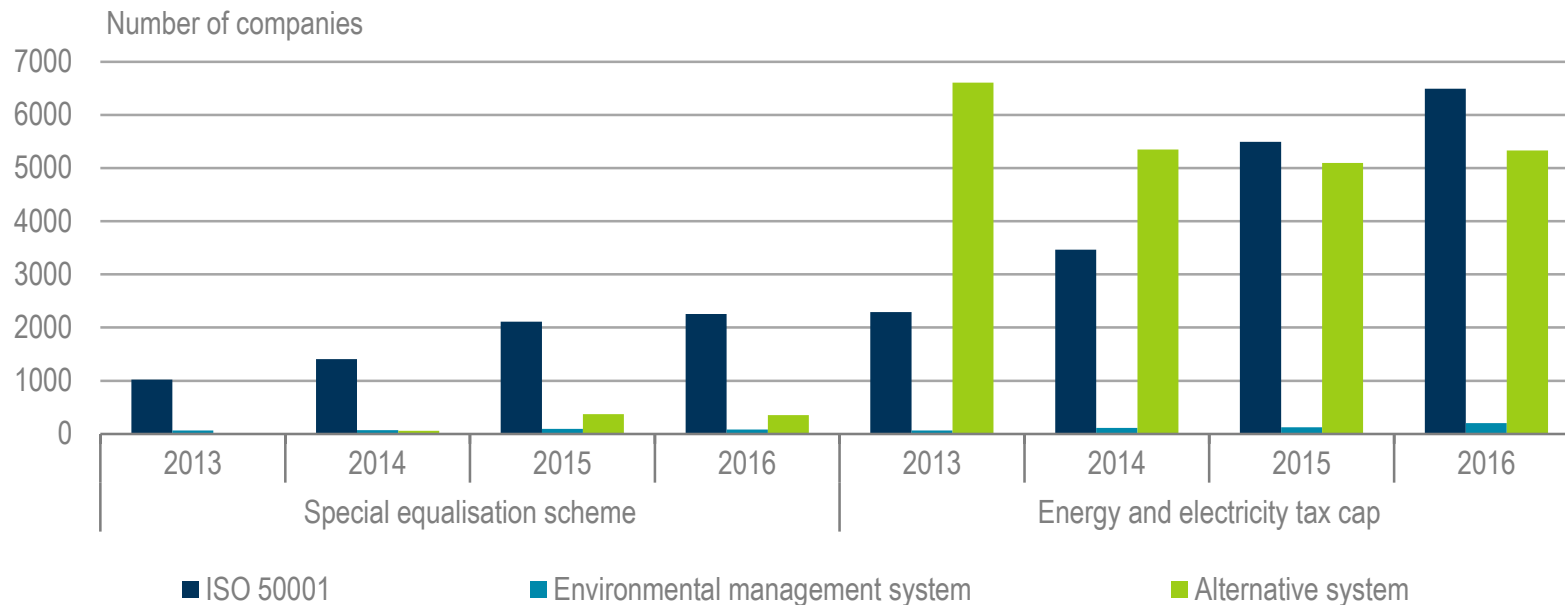
Regulation

# Examples of Energy Management Programmes

Economy	Policy	Description	Year implemented
European Union	Energy Efficiency Directive (EED)	Article 8 of the EED requires member states to ensure that large enterprises carry out regular energy audits. However, enterprises that have implemented an energy management system can be exempted from this obligation.	2012
United States	Superior Energy Performance (SEP) Program	To be SEP-certified, facilities implement ISO 50001 and an independent third party verifies energy performance improvement. The SEP certification emphasises measureable savings through a transparent process.	2012
China	Top 10 000 Enterprises programme	Enterprises are required to establish an energy management system following China's GB/T 23331 standard.	2011
Indonesia	Ministerial Regulation on Energy Management	Companies that use more than 6 000 tonnes of oil-equivalent (toe) per year are obliged to implement an energy management system, with ISO 50001 adopted as the Indonesian national standard.	2012
Germany	National Action Plan on Energy Efficiency	Large companies are required to implement an energy management system according to ISO 50001 to apply for energy and environmental tax exemptions.	2014
Portugal	Intensive Energy Consumption Management System (SGCIE)	Companies that use more than 500 toe per year are required to conduct periodic energy audits and develop Energy Consumption Rationalisation Plans that stipulate minimum energy efficiency objectives	2008

# Incentives for ISO 50001 in Germany are very high

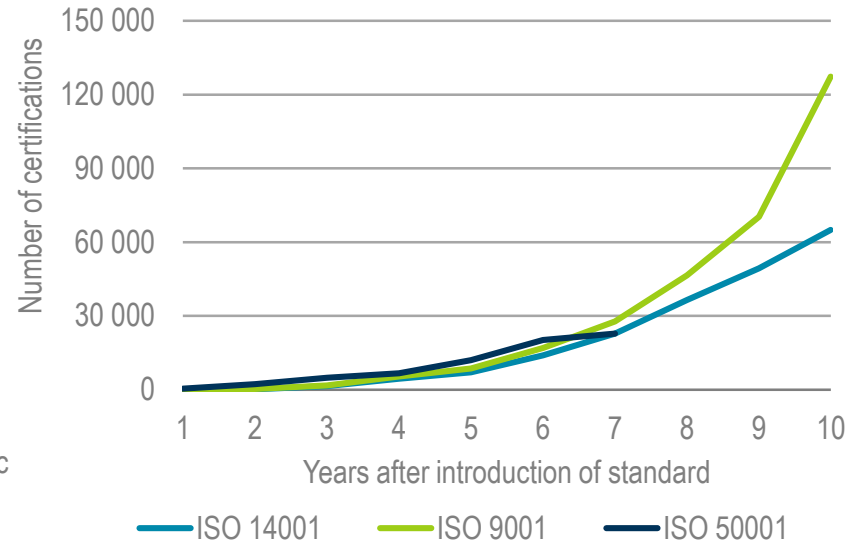
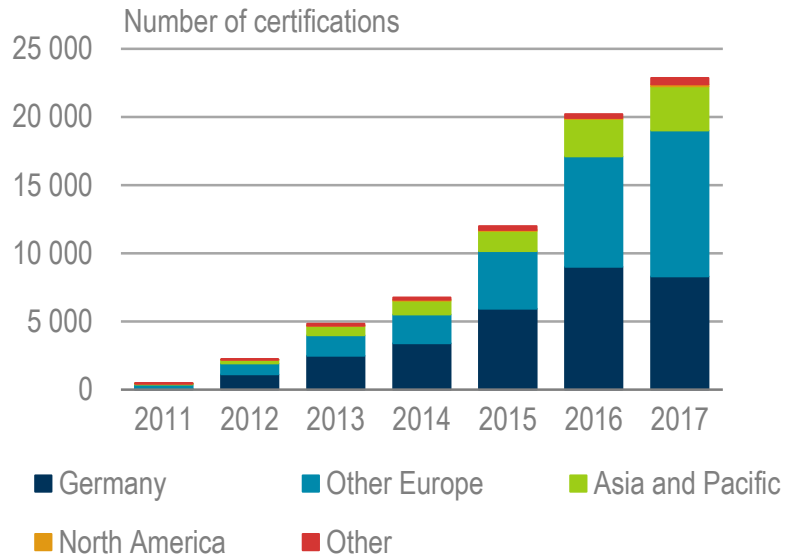
Type of action undertaken by companies obtaining incentives in Germany, 2013-16



ISO 50001 certification is the main method of meeting the energy management requirements. Sectors qualifying for the incentives are achieving energy intensity reductions of around 3% per year.

# ISO 50001 certifications are slowing

ISO 50001 certifications 2011-17 (left) and certification progress compared with other management standards (right)

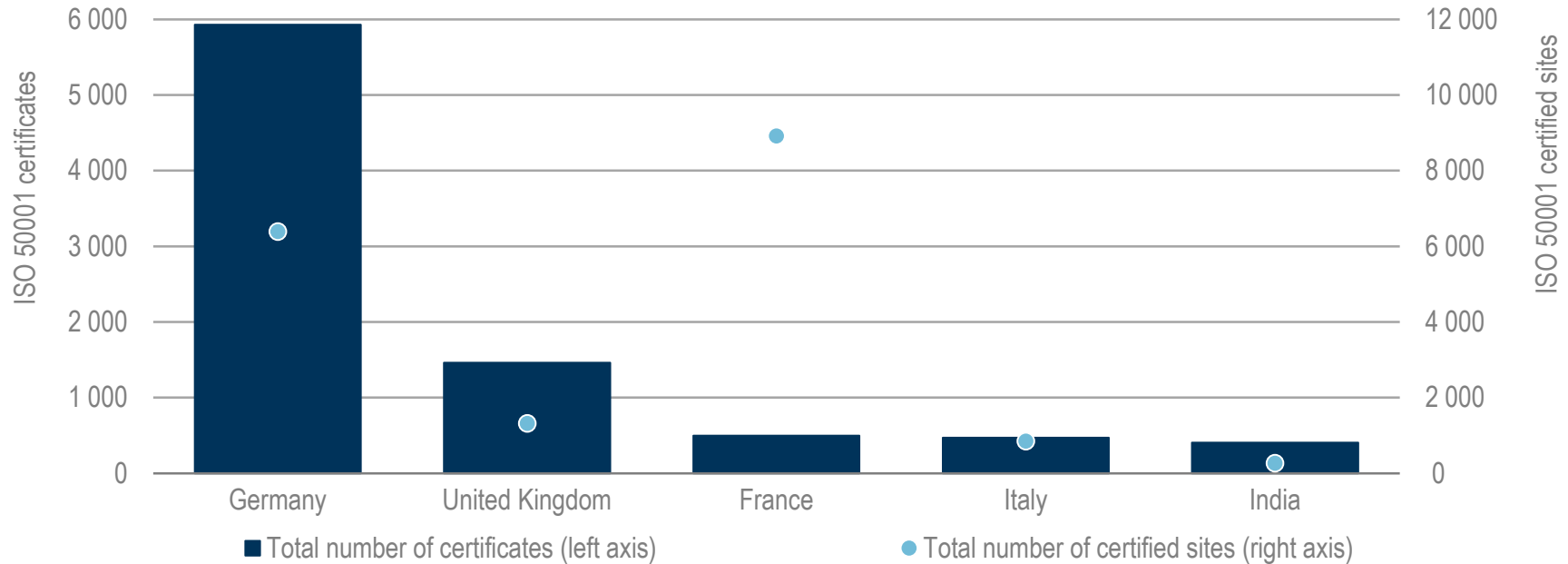


There were over 23 000 ISO 50001 certifications in 2017, a slow down in the rate of growth. Matching certifications for other management standards will depend on take-up by China.



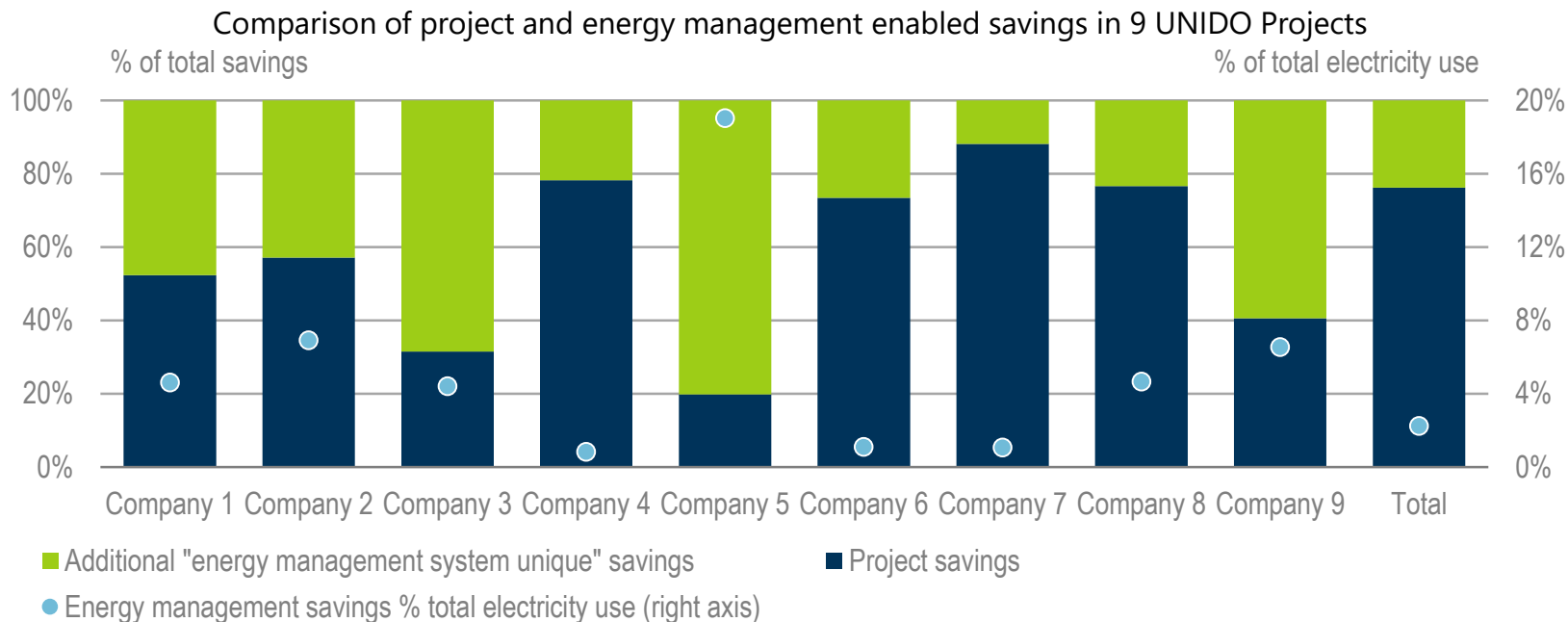
# Energy management is key to system-wide measures

ISO 50001 certifications by region and economy



France and Germany illustrate the results of different approaches in policies to promote ISO 50 001.

# Energy management systems unlock unique savings



**Implementation of an energy management system, led to projects with savings of over 26 GWh. However, there were also 8 GWh of “energy management system unique” savings.**

# ISO 50 001 Benefits

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- The number of ISO 50001 certifications is an indicator of attitudes towards energy management.
- ISO 50 001 is a standardized way to promote energy efficiency and monitor savings through a common methodology.
- Case studies show that ISO 50 001 EnMS enable companies to make substantial energy and financial savings.
- In the case studies where non-energy benefits were financially taken into account, the payback times and the savings were significantly improved.
- While the number of ISO 50001 certificates reached nearly 23 000 after six years, there is still opportunity for larger uptakes.
  - ISO 9001 exceeded 120 000 certifications and ISO 14001 certifications reached nearly 65 000.

# Energy Management Programmes

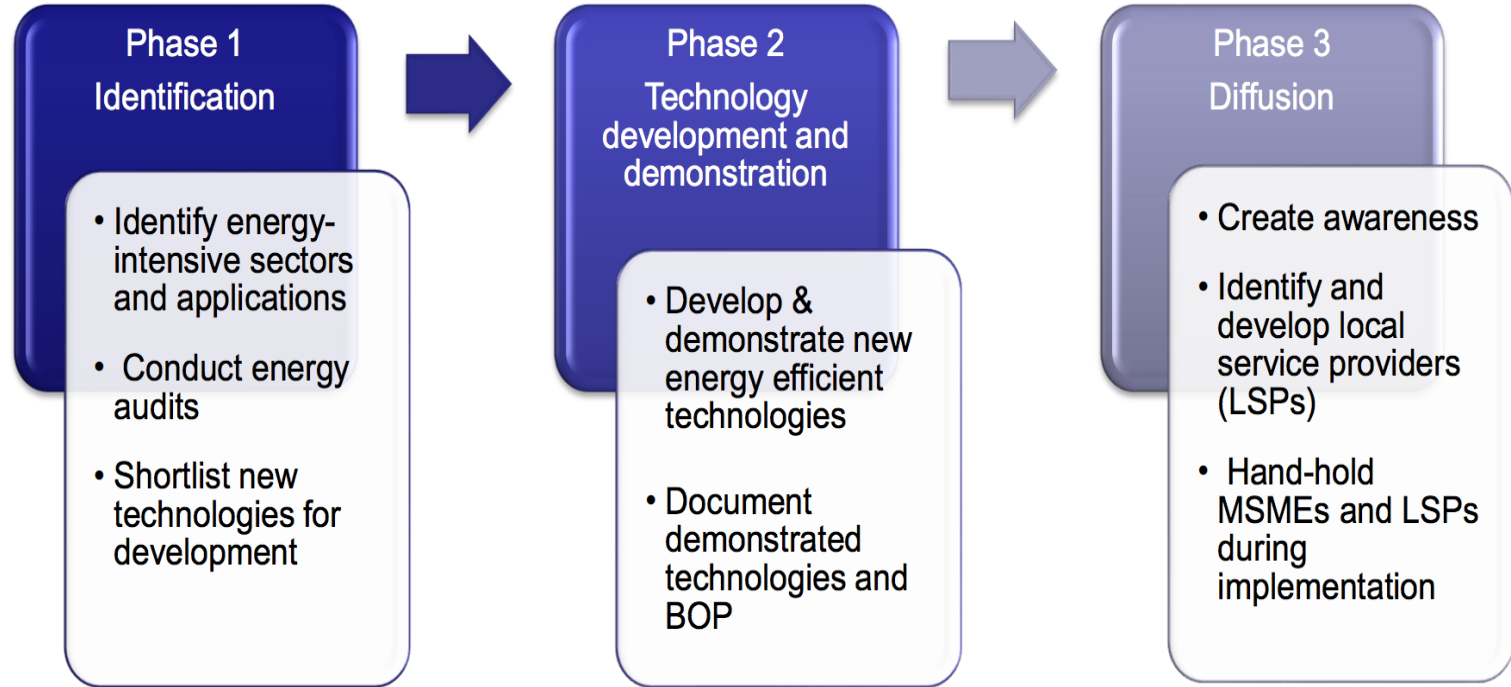
## Advantages

- >Encourages continuous improvement in energy performance
- >Addresses multiple organisational barriers

## Disadvantages

- >May lead to a focus on 'documentation' rather than results
- >Effectiveness relies on management support and leadership

# Technology acceleration measures



# Firozabad Glass Cluster

- Largest cluster in small scale glass sector
  - Annual Glass Production: 1.0 million ton/yr.
  - Estimated annual energy consumption: 0.2 million toe
- Major product - Bangle
  - Other products: colored decorative items, tableware, lab-ware, glass shells etc.
- Falls within the Taj Trapezium Zone (TTZ)
- Industry mandated to switch over to natural gas (1996 Supreme Court Mandate)
- TERI with support of SDC (Swiss Agency for Development and Cooperation) worked in the cluster to design, develop, demonstrate and disseminate energy efficient natural gas-based technologies for glass bangle industries



Conventional coal fired pot furnace



Recuperative natural gas fired pot furnace



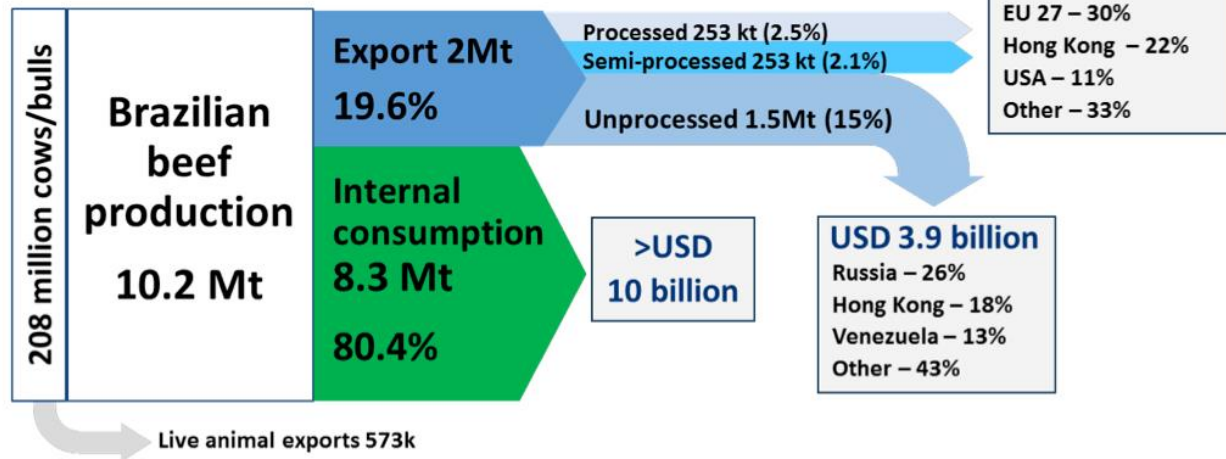
# Supply chain measures

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- The focus on energy efficiency improvement is typically within the boundaries of each organisation
- Large organisations are increasingly examining opportunities to improve energy efficiency across their supply chains
- This can deliver substantial benefits for suppliers *as well as* the corporation
- Governments can promote, encourage and provide support for supply chain initiatives.

# Beef supply chain in Brazil

Brazilian beef output is expected to increase from  
**10.2 Mt in 2013 to**  
**13.6 Mt in 2023**



Source: Adapted from (ABIEC, 2014) and (Abreu, 2011). Note: The value of the internal market is an estimate which assumes the same value/kg proportion seen in beef exports

**Inaction will lead to larger impacts**

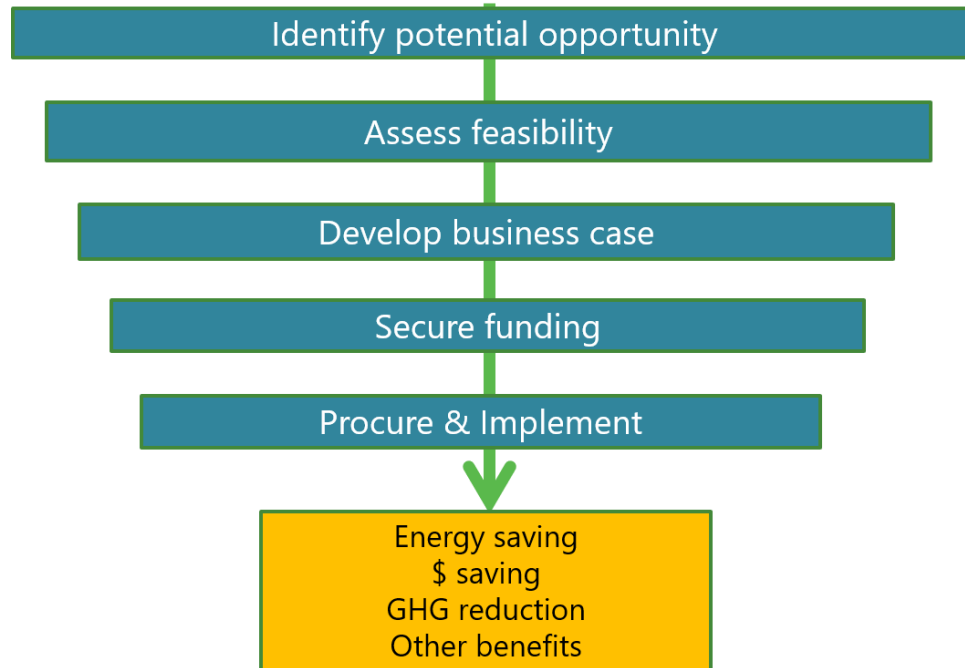


# Choosing between different measures – key questions

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- Who is your target market?
- What barriers are you attempting to overcome?
- To what extent will each measure contribute to the policy objectives?
- How certain are the outcomes?
- What resources will each require – costs, time, people, admin support, other?
- How fast acting are they?
- Are the outcomes sustainable in the long term?
- How difficult are each to organise? What partners could help?

# Consider project life cycle and barriers to improvement



# Bringing measures together

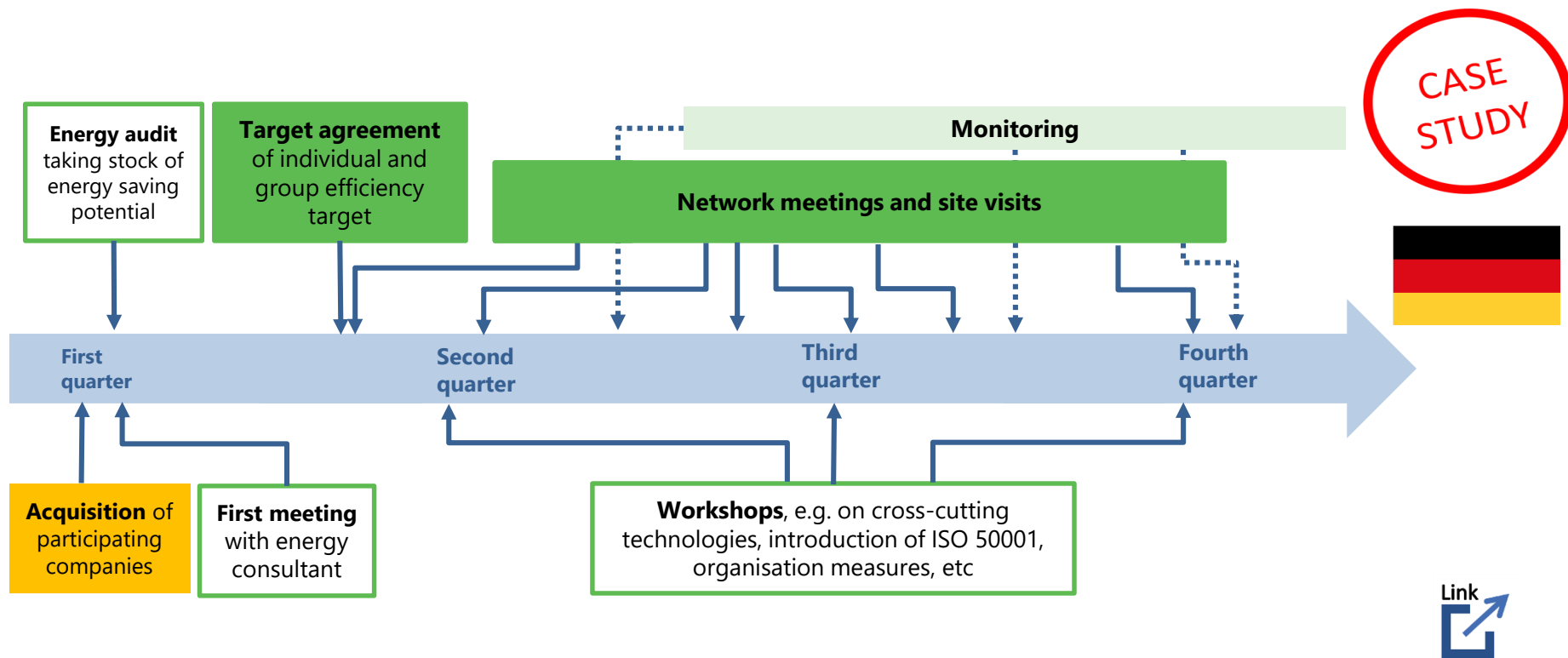
## Energy efficiency networks (EENs) - Germany

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- Companies brought together from a region, sector, supply-chain, or within a corporate group
  - Exchange experiences and undertake steps together to improve energy efficiency.
- 30 pilot networks in Germany with 210 participating companies
  - Almost 2000 different EE measures realised
  - Energy savings of 870 GWh, 10% energy cost savings and 1000 tonnes CO2 reduction



# Energy efficiency networks (EENs) - Germany





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