



energy

Department:
Energy
REPUBLIC OF SOUTH AFRICA

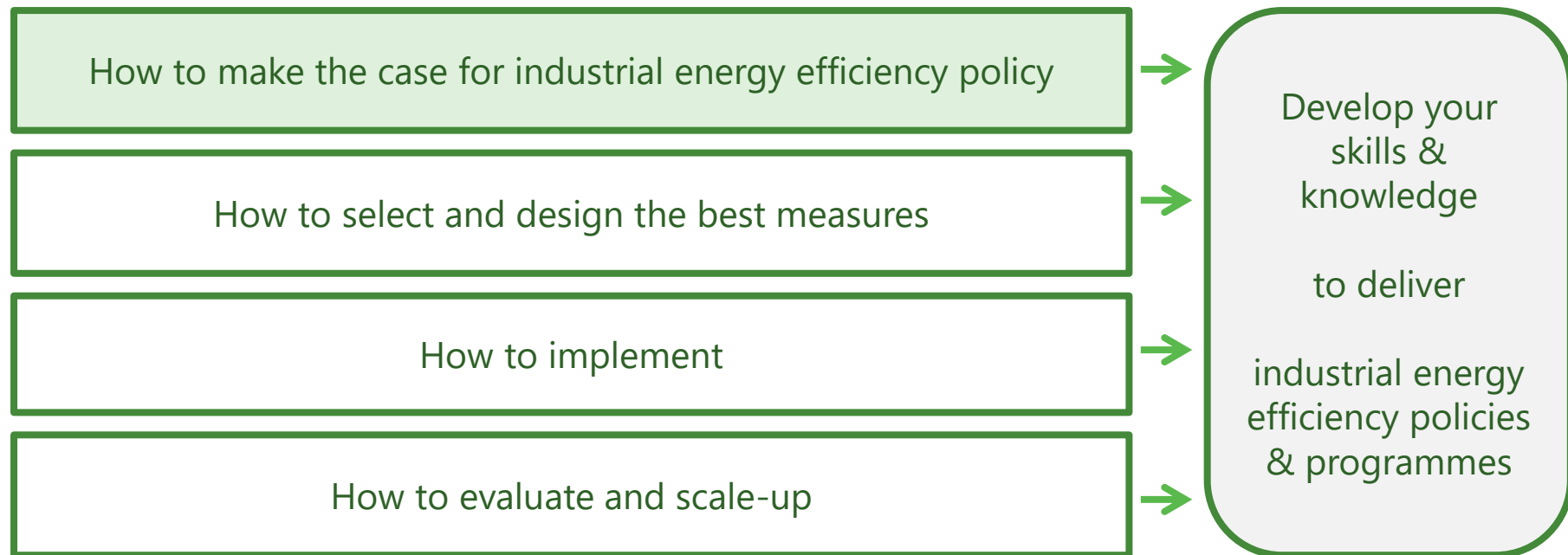


Making the case for industrial energy efficiency policy

Patrick Crittenden and Hugo Salamanca

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

Link between training content and objectives



Learning outcomes

This session will focus on developing your capabilities to:

- Establish the barriers to energy efficiency in your country context
- Set meaningful programme objectives
- Identify other relevant policies and programmes that can complement your efforts

These are all important factors that help you to make a compelling case and rationale for an industrial energy efficiency policy or programme.

What is industrial energy efficiency policy?

- A set of strategies, legislation, measures, programmes that together stimulate energy efficiency improvement in the industrial sector.
- The industrial sector includes very large energy users ...



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- The industrial sector includes very large energy users ...
- And small and medium-sized enterprises in sectors that collectively consume significant energy.

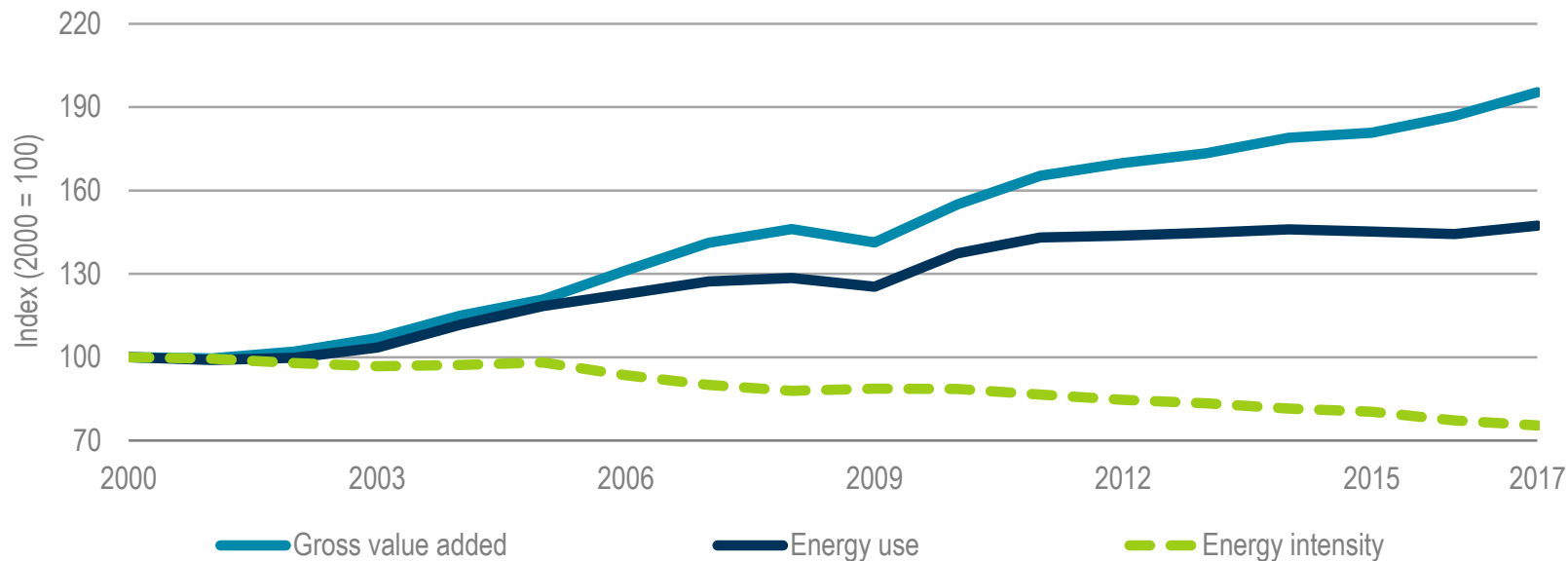


Industrial energy demand is important

- 24% of global CO₂ emissions in 2016
- Consumption has grown by about 1.3% annually since 2010 (industrial sector value-added has grown by 2.9%)
- Highest energy demand growth in 2010 to 2016 period occurred in India (4.7%), South Korea (2.7%), China (2.6%), and the Middle East (2.5%)
- Global industrial productivity (industrial value-added per unit of energy used) has increased by 1.6% annually from 2010 to 2016

Industrial energy demand trends

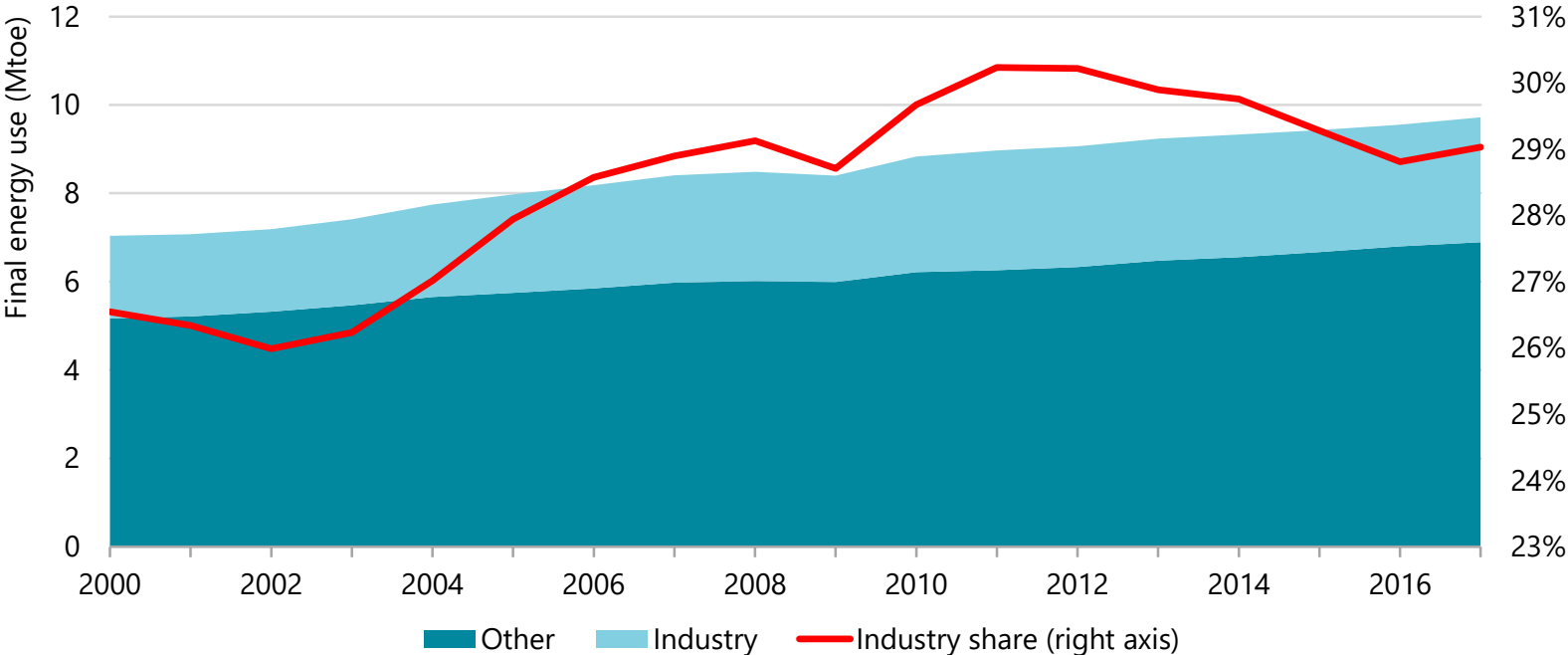
Energy intensity trends for the manufacturing industries



Countries covered for trends from 2000-17 are IEA members plus Argentina, Brazil, China, India, Indonesia, Russian Federation and South Africa. Industry energy intensity in the NPS and EWS is calculated on the basis of energy use per unit of gross value added (GVA), measured on a purchasing power parity basis in 2016 US dollars. Source: IEA [Energy Efficiency 2018](#).

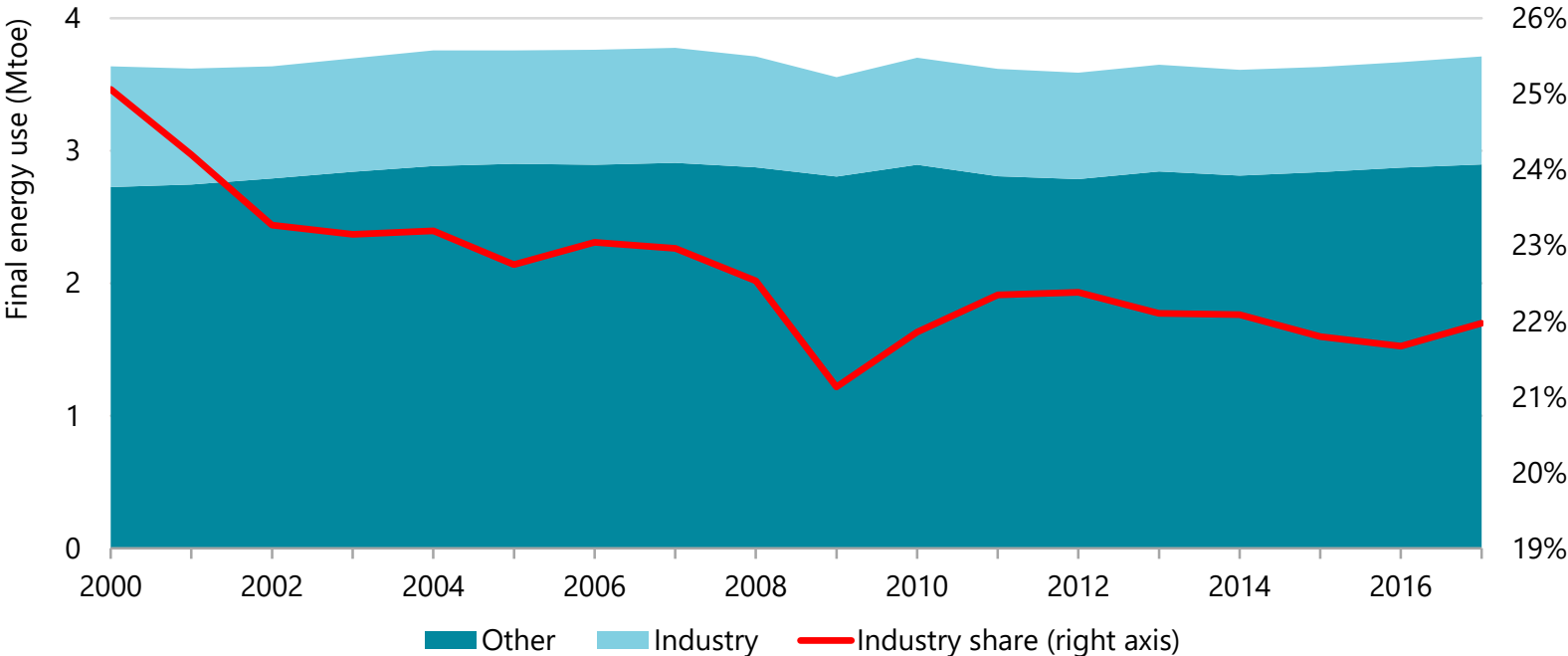
Global industrial energy use

Total final energy use in the world and share of industry energy use (right axis) from 2000 to 2017



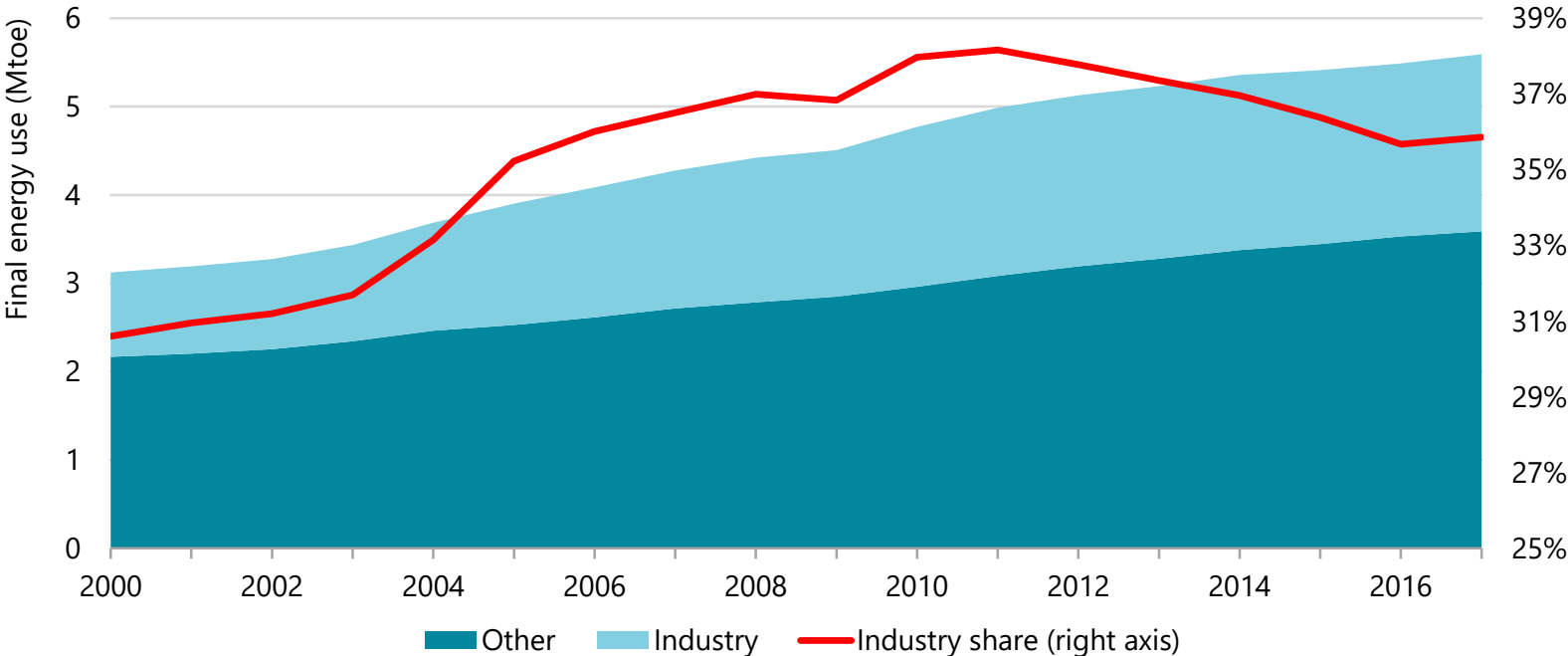
Industrial energy use in OECD countries

Total final energy use in OECD countries and share of industry energy use (right axis) from 2000 to 2017



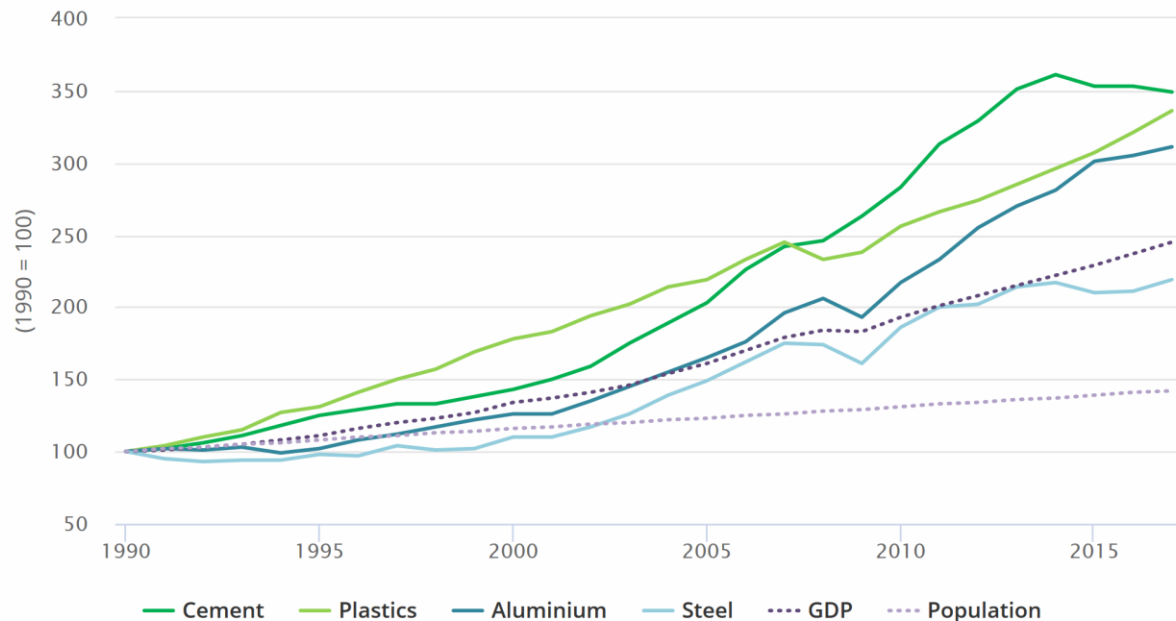
Industrial energy use in non-OECD countries

Total final energy use in non-OECD countries and share of industry energy use (right axis) from 2000 to 2017



Global demand for materials

Demand for key energy-intensive materials has grown rapidly since 1990 but recently began to level off for a number of materials.



Importance of industry sector energy in South Africa

South Africa's industry sector:

- Accounts for 35% of South Africa's final energy consumption – more than the transport sector, and more than the other demand sectors (agriculture, commerce, and residential) combined.
- Accounts for around 23% of gross domestic product (GDP)
- Employs more than 2 million people
- Is essential to South Africa's future socio-economic development by addressing poverty, inequality and unemployment.



Source: Energy Research Centre 2018, Iron and steel energy footprint report

Obtaining support for industrial energy efficiency policy

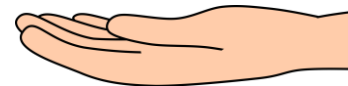
Energy efficiency is good... but there are many demands on government funding



Minister of finance

Image: Cartoonsmix

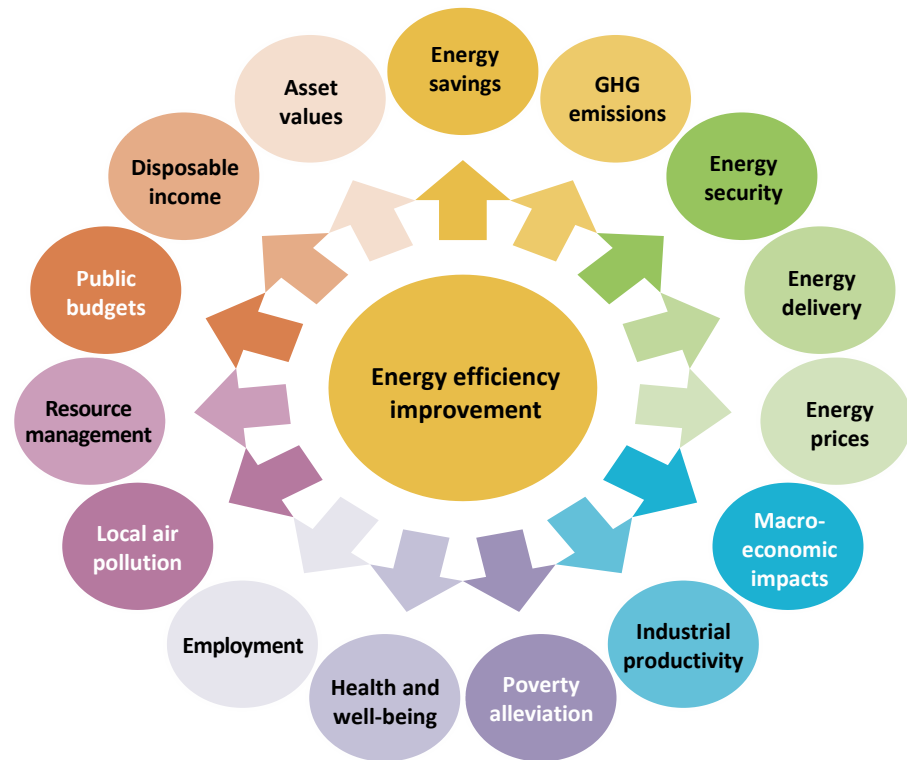
Energy efficiency is
good



Energy Efficiency
Agency

Identify all of the benefits

Build support by aligning your Industrial energy efficiency policy with national priorities!



Case study: multiple benefits



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION



SUSTAINABLE DEVELOPMENT GOAL 9
INDUSTRY, INNOVATION AND INFRASTRUCTURE

Iron and Steel – South Africa

Arcelormittal

Saldanha Works

ArcelorMittal

- ✓ Electricity demand : 160 MW
- ✓ Manpower: 548 permanent employees
- ✓ Sales output: 1,2 million ton HRC/annum

Adjustments/optimization of
production operations, energy systems
optimization, fuels switching, etc.....
driven by EnMS!

2012 Energy Savings (Norm.) > 100 GWh



Energy Efficiency Achievements 2011

Energy Management System Implemented

No. of Projects/Measures	11
Total Capital Investment (USD)	0
2011 Gross Financial Savings (USD)	9,076,000
Overall Payback Period (in years)	0
2011 Energy Savings Norm. (GWh)	79.95
2011 GHG Reductions (tons CO ₂)	77,000



Source: Presentation by
Marco Matteini (UNIDO) in
May 2019 (IEA Training
Week)

Case study: multiple benefits

- Australian aluminum producer – system optimisation to reduce energy demand – increased production by 3000 tonnes per year (value USD 6 million)



Case study: multiple benefits

- Peruvian smelting company (secondary lead)
- Implemented suite of energy efficiency measures including new burner, fuel mix optimisation, upgraded refractory bricks and furnace hood
- Reduced energy (value less than USD 2000) and increased extraction of lead by 34.7 tonnes per year (value almost USD 17000)



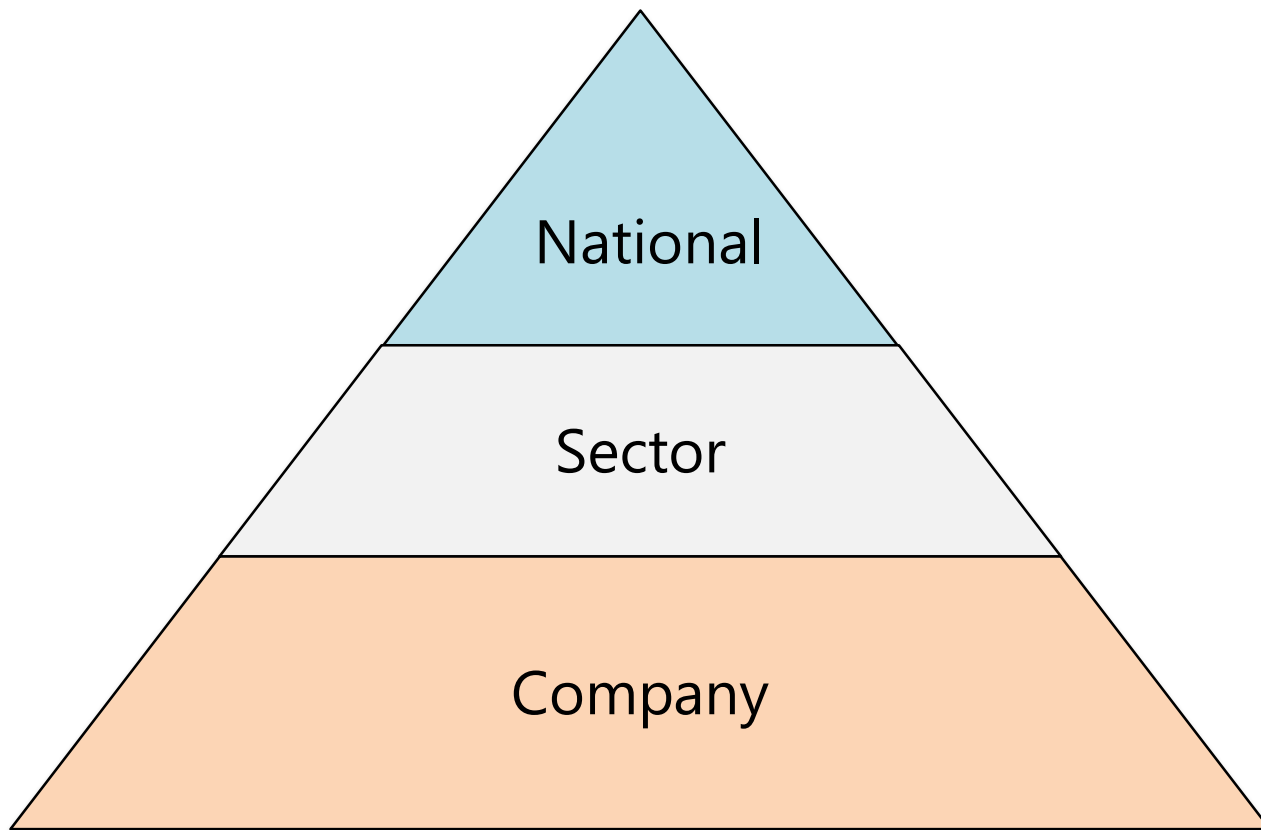
Benefits for companies

- Enhanced production
- Improved product quality
- Reduced liability
- Improved work environment
- Improved working conditions
- Reduced need for maintenance
- Improved environmental performance
- Improved profit margins
- Improved reputation

Benefits for economies

- Reduced pollution
- Reduced environmental impacts
- Deferred need for new power plants and grid
- Lower need for energy imports
- Improved competitiveness of industry

Benefits occur at different economic levels



Select objectives that align with national priorities

Energy efficiency

- Reduce energy use (all types, specific fuels)
- Improve efficiency (not necessarily the same as reducing use)
- Reduce GHG emissions – counteract climate change

Multiple benefits

- Reduce air pollution
- Make environmental improvements
- Improve energy security
- Avoid need for new energy capacity
- Improve security of supply
- Improve competitiveness of industry
- Stimulate innovation
- Stimulate development of service and technology markets
- Create new jobs



Why is policy needed?

- Policy mechanisms including energy management programmes, minimum performance standards for industrial equipment (esp. electric motors) and other policies have **contributed** to a 20% fall in industrial energy **intensity** between 2000 and 2016...

Industrial energy efficiency barriers

Information

- lack of access
- too much information
- no time, not a priority
- perception that energy efficiency measures could have a negative impact on production



Capacity

- no internal expertise
- equipment vendors lack skills and incentives
- low external consultant quality (or no consultants)

Industrial energy efficiency barriers

Economic and finance

- lack of internal finance – how return on investment is calculated
- energy efficiency projects not seen as competitive
- no capacity to write bankable projects
- local financial institutions not supportive
- low energy prices



Regulatory barriers

- utility business model
- fossil fuel subsidies

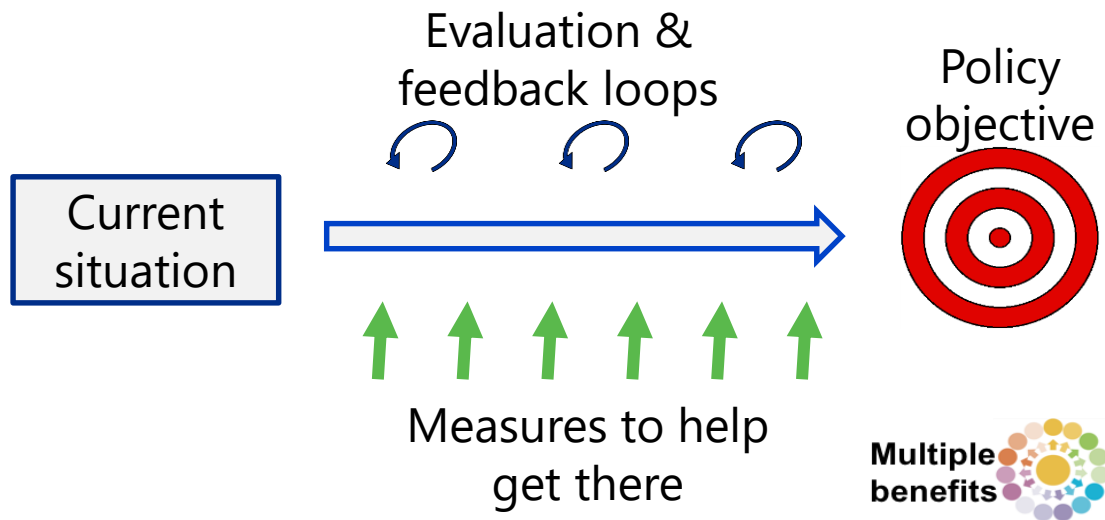
Industrial energy efficiency barriers

What are the key barriers in your countries?



Policy rationale

- Policy makers need to answer a fundamental question ... How can policy overcome barriers to deliver benefits?



Opportunities in Africa

- Southern African Development Community (SADC) Report 2019. Sand Assessment for the Designing of Industrial Energy Efficiency Programme for SADC Member States.
- 15 member states reviewed.
- Found significant opportunity to improve the implementation of energy efficiency policies and programmes.
- Challenges include:
 - Limited Minimum Energy Performance Standards outside of domestic sector
 - Low electricity tariffs do not incentivize energy efficiency
 - Challenges in coordination among public institutions and with private sector
 - Need planning and resource coordination across sectors

The role of industrial energy efficiency policy-makers

- Energy efficiency policy-makers have to effectively articulate why government intervention is needed and how best to intervene

Data that can be used to justify policy intervention

Types of data:

- Data on industrial energy use
- Data on fuel mix
- Data on sector specific use (e.g. energy used by textile industry)
- Data on specific energy use (e.g. energy per ton of clinker)
- Data to assess potentials

Data sources:

- National statistics
- Data from energy utilities
- Reports from companies (perhaps part of environmental reporting?)
- Samples, surveys
- Data from international organisations and other countries

Data that can be used to justify policy intervention

- What other types of data are useful?
- What other sources are available?



Map other policies and programmes

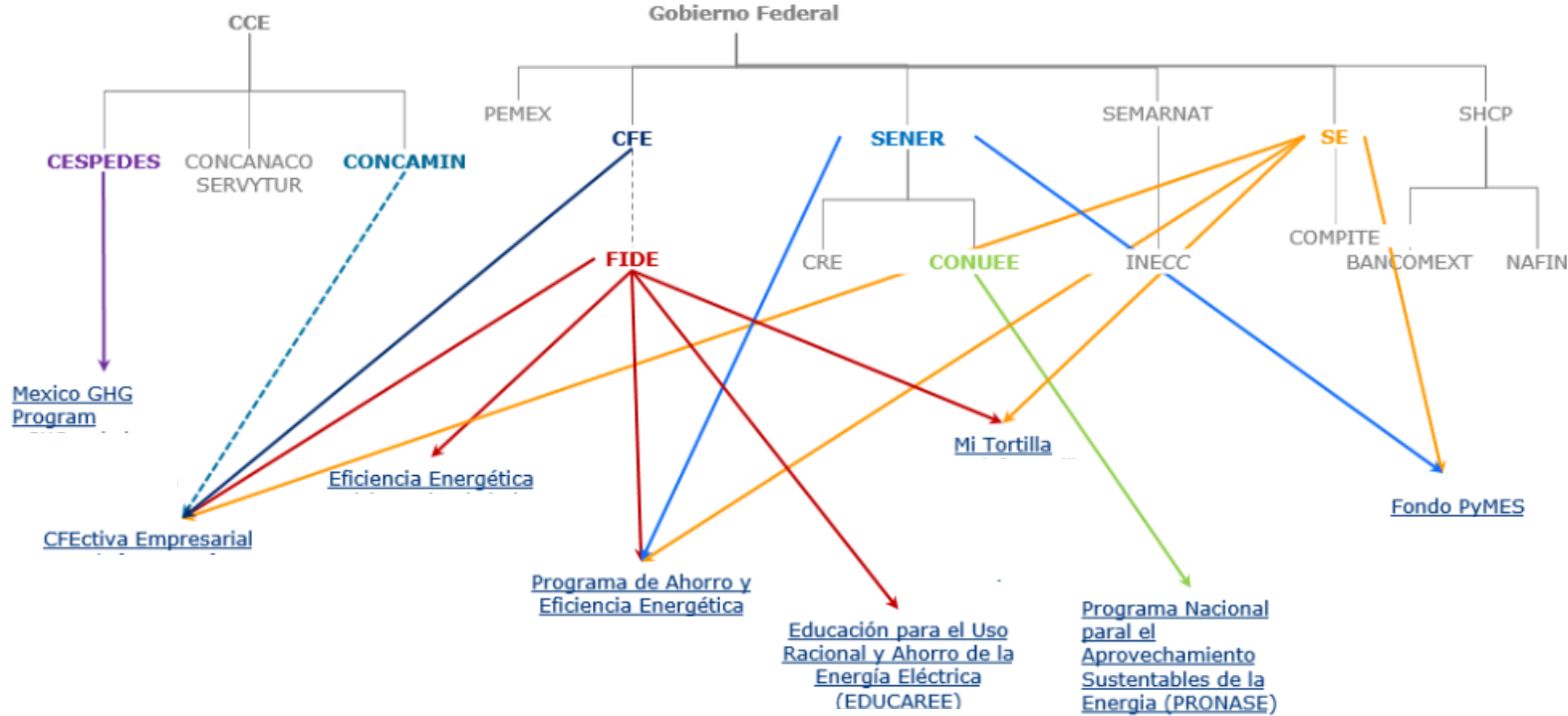
Identify existing policies and programmes

- National policies and programmes (climate, environment, business development, trade development, buildings energy efficiency, equipment energy efficiency)
- State and municipal programmes
- Donor-led initiatives

Analyse existing policies and programmes

- Scope and scale
- Successes & failures
- Possible synergies
- Possible negative impacts
- Duplication risk

Mapping policies in Mexico



What could the rationale include?

- ✓ Energy use trends
- ✓ Importance of energy efficiency
- ✓ Objectives
- ✓ Defined target group
- ✓ Energy efficiency potentials
- ✓ Barriers
- ✓ Multiple benefits
- ✓ Measures and mechanisms
- ✓ Mapping of policies and programmes

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What else
could be
included?

What would
convince your
stakeholders?

