



Africa Energy Efficiency Policy in Emerging Economies Training Week

Nairobi

18-22 March 2024





Africa Energy Efficiency Policy in Emerging Economies Training Week

Industry

Nairobi
18-22 March 2024





Policy Packages - Regulation

Patrick Crittenden, Sustainable Business Group & Corine Nsangwebusinge, IEA

Nairobi, 19 March 2024

This session will focus on developing your skills and knowledge to:

- Establish the reasons for and benefits of regulatory measures as part of a policy package
- Identify the advantages and disadvantages of regulatory measures
- Draw on examples of regulatory measures to review and strengthen policies in your own countries.

Policy Package – Industry Energy Efficiency

Immediate opportunities

Implementing better energy management practices has been shown to deliver savings up to 15% in the first 1-2 years, with little or no capital investment.

Heavy industry accounts for over two thirds of global industrial emissions, while over 70% of short term industrial energy efficiency savings are in light industry and SMEs.

Electrification is key to the decarbonisation of industry. In the IEA Net Zero Scenario the share of electricity in total industrial consumption increases from 21% to 46% by 2050.



REGULATION

- **Minimum Energy Performance Standards** for key equipment, such as motors and pumps, can drive up overall industrial efficiency levels.
- **Regulation** extends beyond technology to target areas such as research and development, energy auditing, mandatory consumption reporting, energy management systems, and upskilling of the workforce. Incorporating life cycle impacts into regulation helps promote material efficient choices at the design stage.
- **Regulatory Instruments** yield best results when rooted in a good understanding of local context and include ambitious, regularly updated, standards.
- **Regulations to ensure demand side response capabilities** help provide flexibility to the grid.



INFORMATION

- **Benchmarking, indicators and other forms of detailed data** allow governments to track the progress of policies and allow industries to compare their energy performance with that of their peers.
- **Digital technologies** enable industries to track energy use in real time and help ensure flexible demand side response, resulting in energy optimisation and cost saving opportunities.
- **Sharing information on energy efficiency best practice** through targeted information and industry networking activities helps industries raise ambition and improve energy performance.



INCENTIVES

- **Incentives** such as preferential finance, links to carbon trading, obligations and tax based measures can motivate crucial energy efficient decisions at the process design and equipment selection stage, supporting industry transition to near zero emission technologies.
- **Free or subsidised energy audits**, often targeted at SMEs and other sectors of strategic importance, can help rapidly increase energy efficiency.
- **Policies to foster Energy Service Companies** provide industry with access to significant external energy expertise and attractive structured financial packages.
- **Incentives for the reuse and recycling** of materials reduce the need for higher-emission primary materials production.

As we work through the session, we will draw on the regulatory measures that you have in place in your own countries



Country	Regulation	Information	Incentives

Regulation is essential to exclude the worst performing equipment and practices from the market, to drive average efficiency levels up, and to set rules for measurement or performance.



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INFORMATION



INCENTIVES

Perform, Achieve and Trade (PAT)



- Government sets energy consumption targets for individual firms
- Enterprises achieve energy targets through energy efficiency measures or purchase energy savings certificates (ESCs) generated by companies that have gone beyond their target

Mandatory Energy Management for existing and new facilities in Singapore

- Existing facilities

Registration of Companies	Appointment of Energy Manager	Periodic Reporting of Energy Use	Improvement Plan for Energy Efficiency	Energy Management System	Energy Efficiency Opportunities Assessment	Energy Performance Monitoring	Minimum Energy Efficiency Standards	Records to be Kept
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- New facilities

Energy Efficiency Opportunities Assessment (EEOA) for New Ventures	Energy Performance Measurement for New Ventures	Minimum Energy Efficiency Standards
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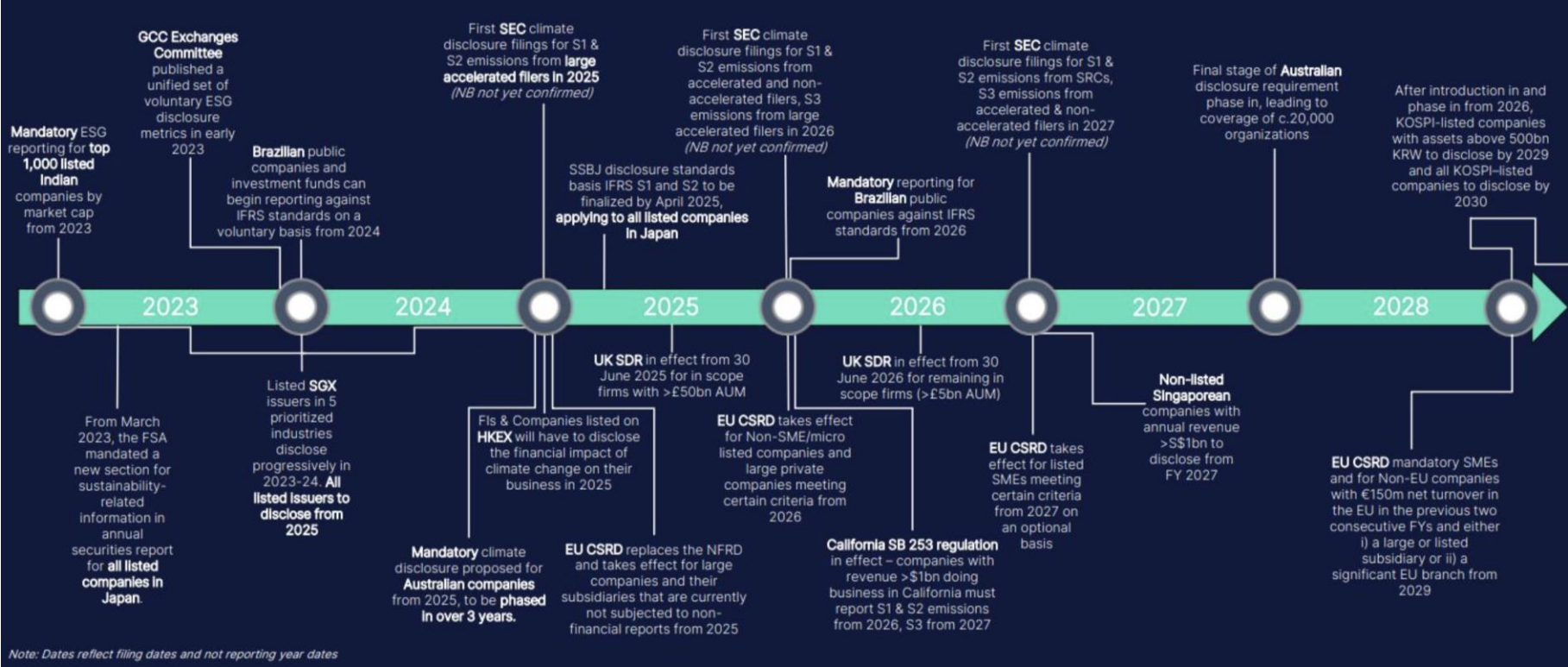


Streamlined Energy and Carbon Reporting (SECR) in the United Kingdom

- Outlined in the Companies (Directors' Report) and Limited Liability Partnerships (Energy and Carbon Report) Regulations 2018
- Designed to:
 - increase awareness of energy costs within organisations,
 - provide them with data to inform adoption of energy efficiency measures to help them to reduce their impact on climate change.
 - Also seek to provide greater transparency for stakeholders.
- The content of reports required under SECR includes:
 - annual quantity of Greenhouse Gas (GHG) Emissions from combustion of gas and transport fuels
 - annual quantity of GHG emissions resulting from purchase of electricity for business use
 - an intensity metric (a ratio expressing emissions in relation to a quantifiable factor – e.g. revenue or employees)
 - total UK energy use, or total global energy use for quoted companies
 - a narrative commentary on energy efficiency action taken in that financial year.
- The UK Government is currently considering integrating the SECR into Net Zero Transition Plan Reporting



Mandatory climate and energy reporting in multiple jurisdictions



What are the strengths and limitations of **regulation** as a policy measure?

Regulation

Strengths

Limitations

INTERACTIVE ACTIVITY

Strengths

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

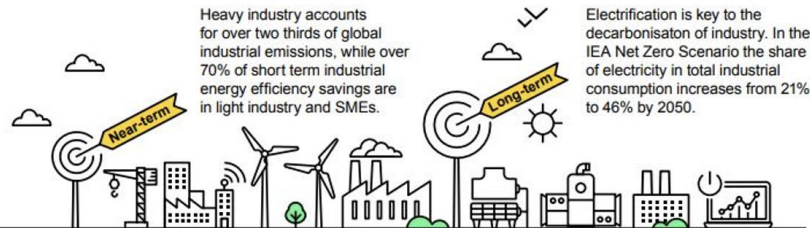
Potential limitations

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

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Policy Packages - Information

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This session will focus on developing your skills and knowledge to:

- Establish the reasons for and benefits of information measures as part of a policy package
- Identify the advantages and disadvantages of information measures
- Draw on examples of information measures to review and strengthen policies in your own countries.

As we work through the session, we will draw on the information measures that you have in place in your own countries



Country	Regulation	Information	Incentives

Information helps people make more efficient choices in what they buy and how they use energy



REGULATION

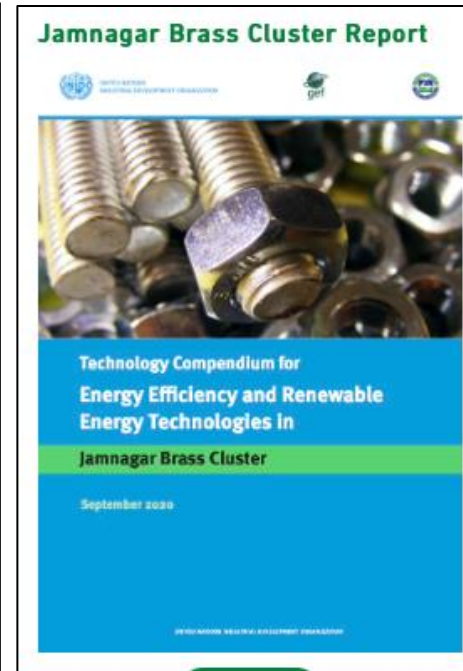
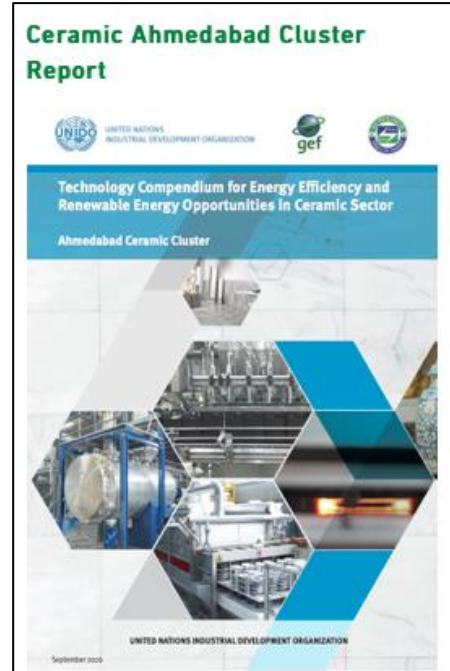
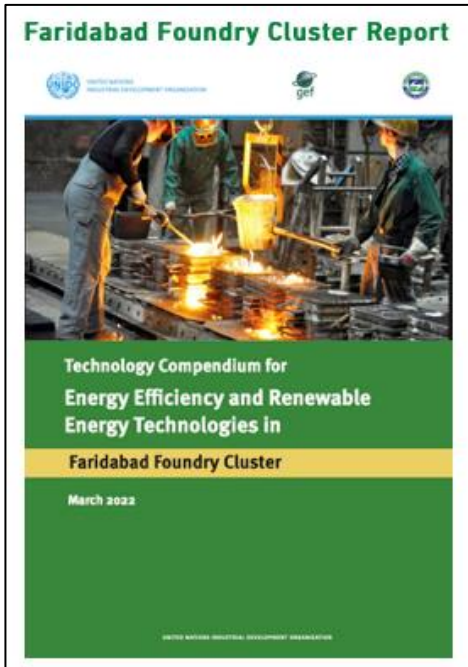


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INCENTIVES



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

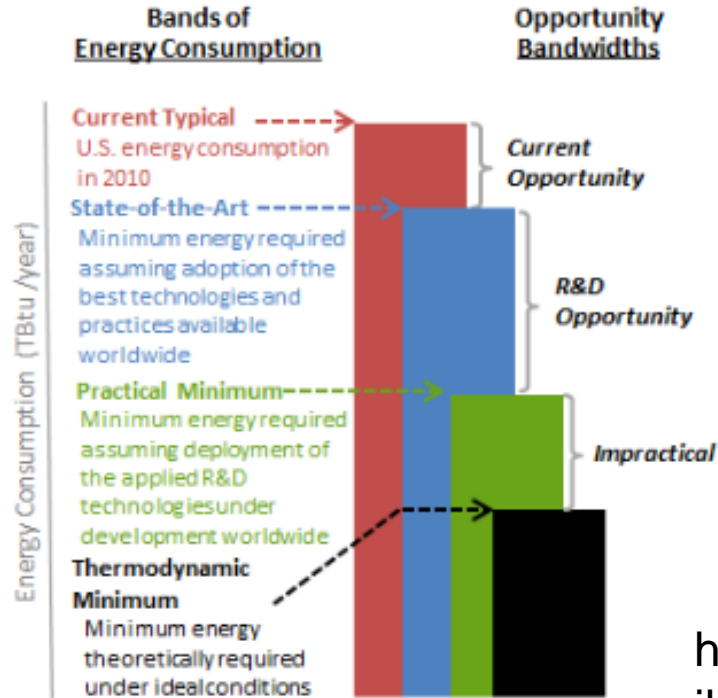


Conventional coal fired pot furnace



Recuperative natural gas fired pot furnace





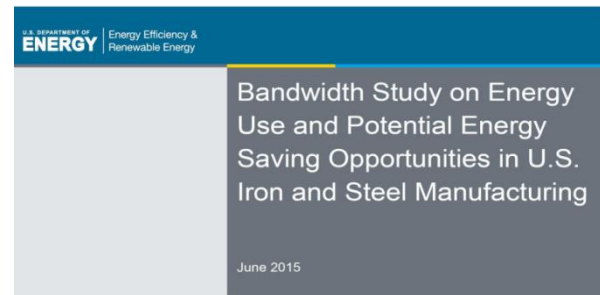
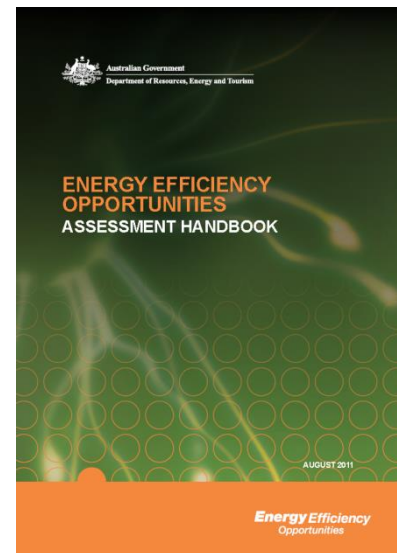
https://www.energy.gov/sites/prod/files/2017/12/f46/Food_and_beverage_bandwidth_study_2017.pdf

Information measures – a range of options

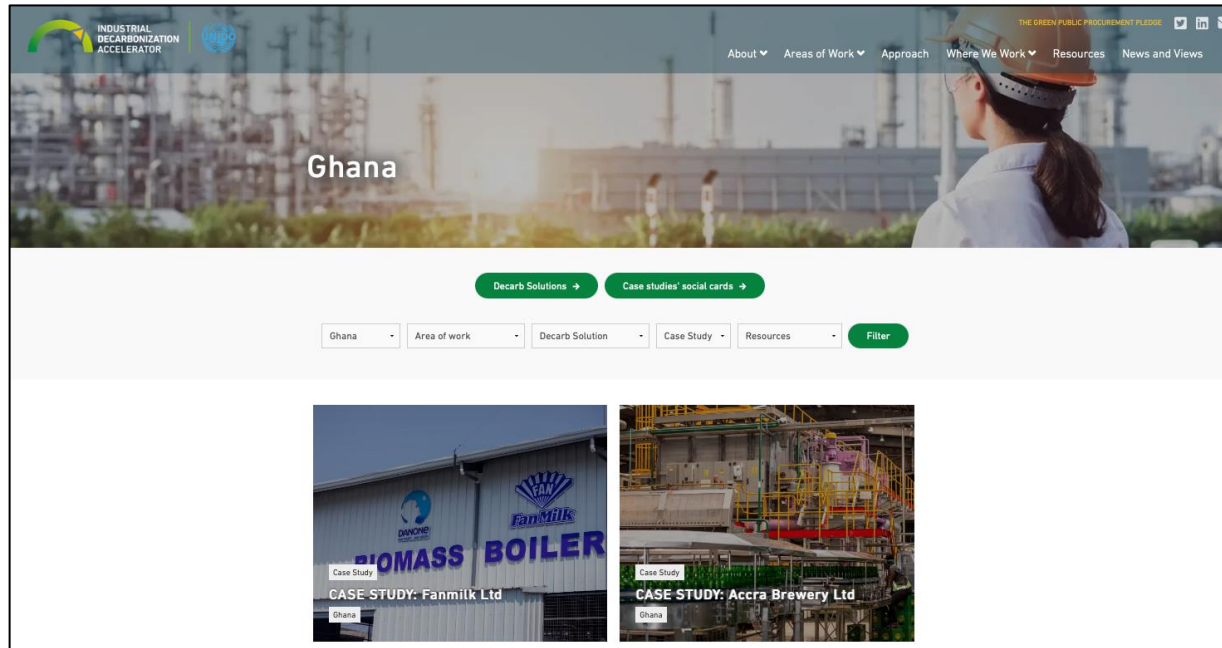
- “How to” guidance materials
- Fact sheets
- Lists of typical energy efficiency projects and equipment
- Case studies
- Advice hotlines
- Workshops
- Webinars
- Energy Efficiency Networks



Improving the efficiency of bakery ovens Case study



Information measures – a range of options



https://www.industrialenergyaccelerator.org/category/ghana/?resource_tag=case-study&iea-posts=resources

Energy efficiency networks as an information measure

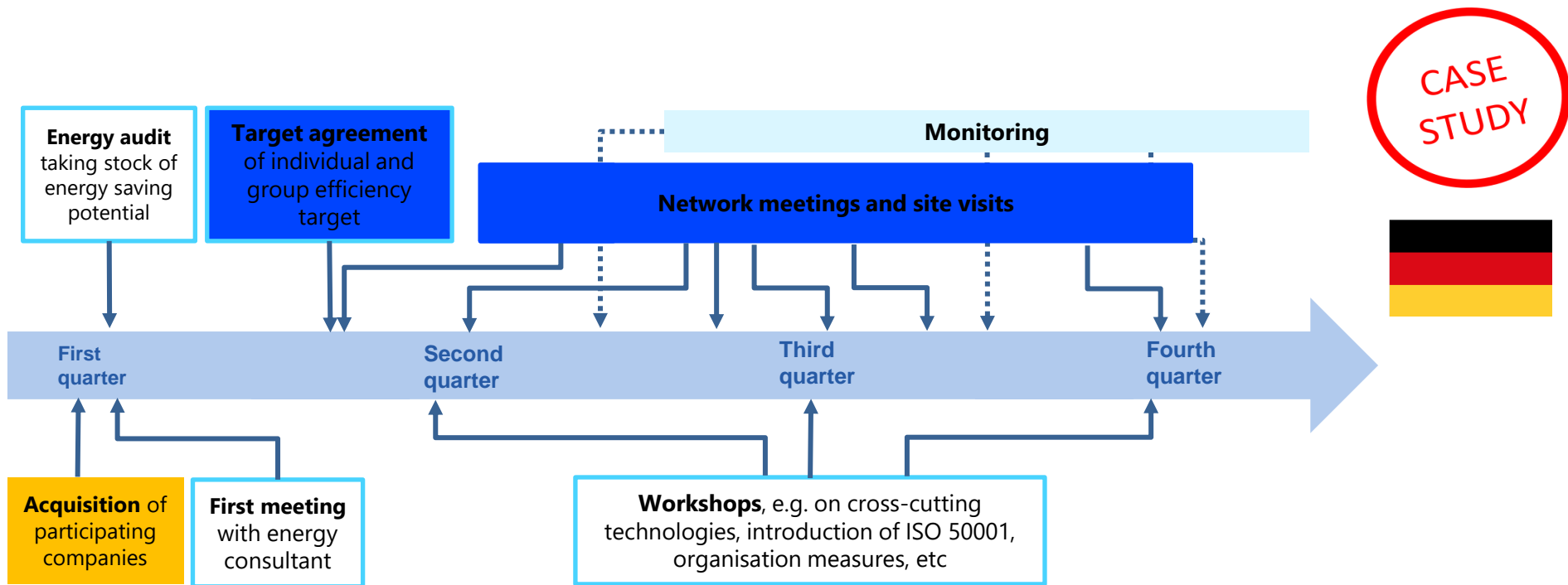


Figure 1. Typical implementation steps of an EEN. (Source: Durand and Damian 2019, based on IPEEC 2017.)

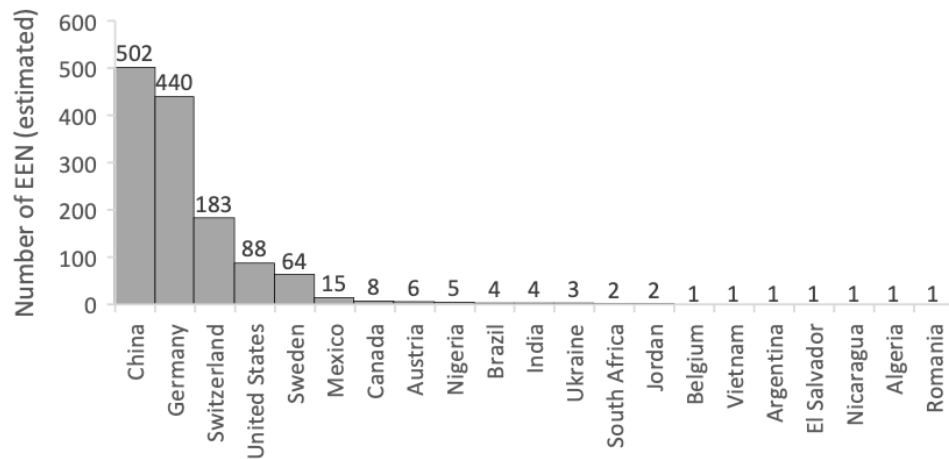


Figure 2. Estimated number of EENs in each country. (Source: Based on Durand and Damian 2019.)

What are the strengths and limitations of **information** as a policy measure?

Information	
Strengths	Limitations



Strengths

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

Potential limitations

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

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Energy Management Systems (EnMS)

Patrick Crittenden, Sustainable Business Group & Corine Nsangwebusinge, IEA

Nairobi, 19 March 2024

Introduction and Benefits

What are Energy Management Systems (EnMS)?

- Energy management systems provide a framework for organisations to:
 - develop and implement an energy policy
 - set achievable targets for energy use
 - design action plans to reach those targets
 - measure and communicate progress
- Progress is typically achieved by implementing new energy-efficient technologies, reducing energy waste or improving current processes to cut energy costs and reduce greenhouse gas emissions.
- Energy management is distinct from other energy efficiency interventions due to its:
 - holistic and integrated approach
 - Intention to build capability and a culture of continuous improvement

Case study

Aditya Aluminium

Aditya has achieved several awards and accolades on energy as per attached list.



CASE
STUDY

Case Study Snapshot

Industry	Metal
Product/Service	Pig Ingot, Sow Ingot, Primary Foundry Alloy
Location	Aditya Aluminium (A Unit of Hindalco Industries) At/Po- Lapanga, Dist Sambalpur-(Odisha)
Energy performance improvement percentage (over the improvement period)	3 % improvement over 2 years (2021-22)
Total energy cost savings (over the improvement period)	USD 17,804.73
Cost to implement Energy Management System (EnMS)	USD 109376.43
Total energy savings (over the improvement period)	422723 MWh
Total CO₂-e emission reduction (over the improvement period)	380451 Metric Tons

Case study – Cummins Inc.



ISO 50001 Energy Management System – Case Study

2023

India, China, Latin America, United States, United Kingdom

Cummins Inc.

Cummins achieves ISO 50001 certification in 45 sites.



Newly trained Energy Champions in the US, ready to improve energy performance (June 2019)

Case study – Cummins Inc.

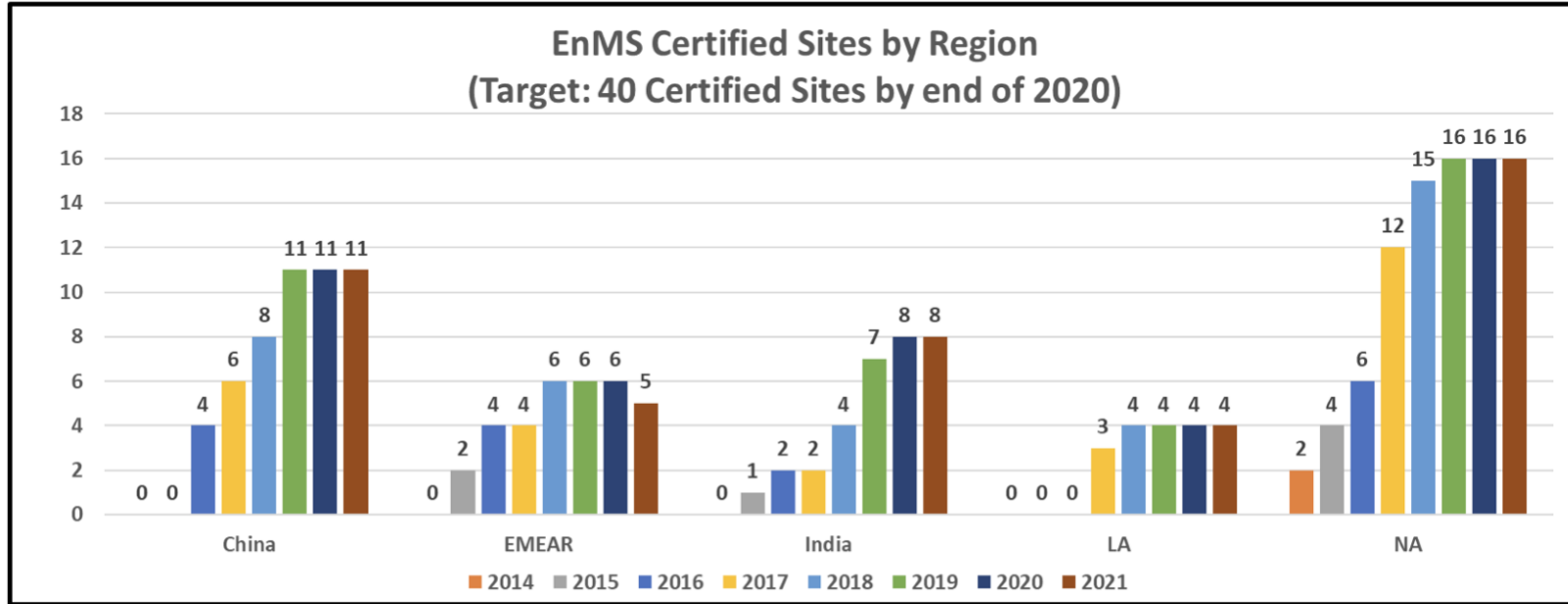


Figure 1: Implementation of ISO 50001 certification at its sites by region.

The importance of a multiple benefits approach



Multiple benefits of energy efficiency

"There is only so much time and so many projects we can focus on. What is important to me is helping us grow our business and retain our customers."


– CEO, Insurance Brokerage Company



Implementing an Energy Management System in a business

Applying the 50001 Ready Navigator to a business





LANGUAGE

English

Log In

Contact

FAQs

Explore

[← Back to Main](#)
[Explore the Navigator →](#)

About the 50001 Ready Navigator

The 50001 Ready Navigator is an online guide for establishing an energy management system to plan, identify, prioritize, and implement projects that will improve your facility's energy performance. Completion of the 50001 Ready Navigator prepares facilities to pursue certification to the international best practice for energy management systems, ISO 50001.

Applying the 50001 Ready Navigator to a business

- Use a computer or phone and go to <https://navigator.lbl.gov/guidance/dashboard> (or Google '50001 Ready Dashboard')
- You will then be nominated to review 1 of the tasks. Take 25 minutes to read through your nominated task in detail and identify the following information:
 - Why is this task important?
 - Who in an organisation should be involved with implementing the task?
 - What are the key steps that are needed to implement this task for a business that is just starting out?



Linking EnMS Tasks to government policies and programs

Task	Policies and programs
Risks and opportunities (1)	Information
Top management (4)	Information and recognition
Data collection (8)	Information, training and support
Improvement opportunities (10)	Energy audits, training
Competency & training (14)	training
Internal audit (22)	Networks and training support

Policy options to accelerate the uptake and quality of Energy Management Systems

Policy options - regulation

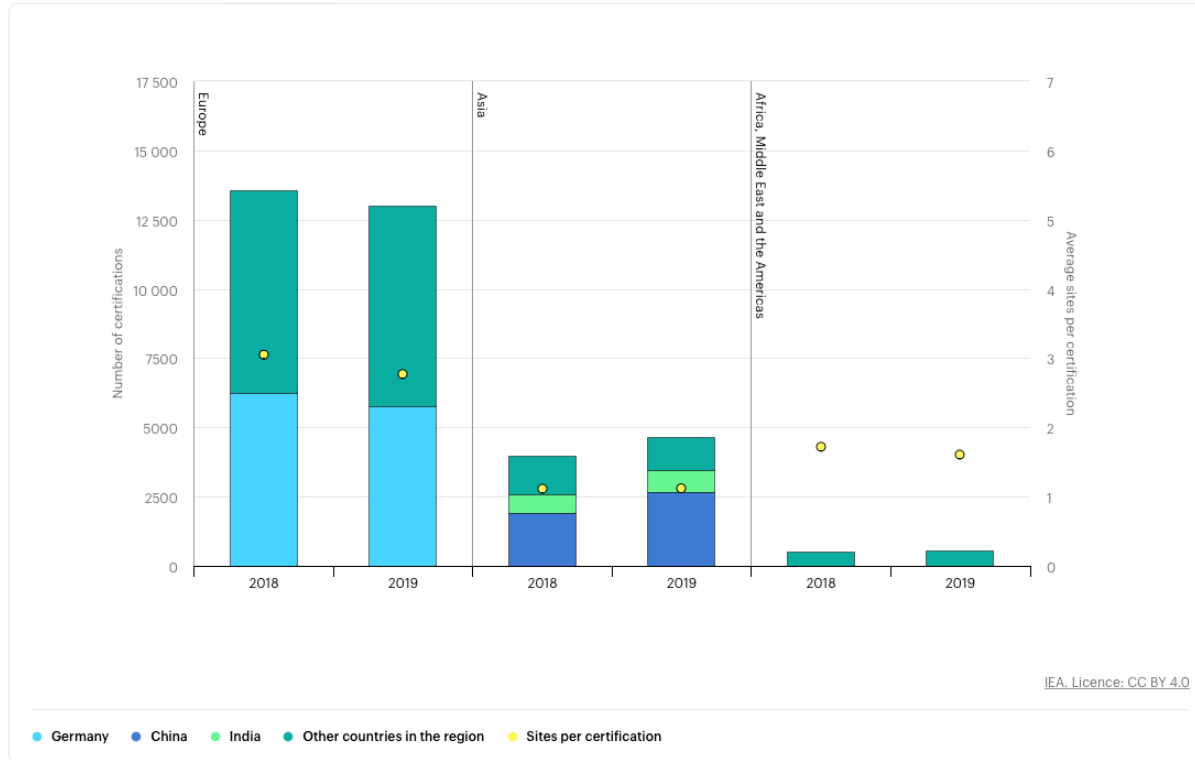
- Given the diverse energy uses, company sizes and other factors it is important to start by understanding your target audience.
- Regulatory approaches:
 - Require businesses to develop, implement and certify an EnMS
 - Require businesses to develop and implement an EnMS but without requiring certification
 - Require businesses to develop a specific component of an EnMS only (e.g. measure and report baseline energy, conduct energy audits/ energy reviews)

Policy options - incentives

- Given the diverse energy uses, company sizes and other factors it is important to start by understanding your target audience.
- Incentive approaches may include:
 - Provide grants for businesses to develop an EnMS or a component of an EnMS
 - Provide a tax deduction for businesses that implement an EnMS
 - Develop an 'awards and recognition' program to promote businesses that develop an EnMS
- Policy examples include:
 - In 2012 Germany provided a tax deduction for companies that introduced an ISO 50001 Energy Management System. Germany has the highest uptake of certifications globally



ISO 50001 certifications in selected regions



Policy options - incentives



Clean Energy Ministerial 14
Goa, India • 19–22 July 2023

2023
**Energy Management
Leadership
Awards**

**Calling All Global Leaders
in Clean Energy**

The Clean Energy Ministerial invites
your organization to compete for a
prestigious award

Policy options - information

- Given the diverse energy uses, company sizes and other factors it is important to start by understanding your target audience.
- Incentive approaches may include:
 - Published guidance and case studies
 - Training programs
 - Technical assistance and support
 - Energy efficiency networks
- Policy examples include:
 - Large Industry Energy Network in Ireland¹
 - Energy Efficiency Networks in Mexico, China and Germany²

Policy options - information

- Video case study developed by the Sustainable Energy Authority of Ireland
<https://www.seai.ie/business-and-public-sector/large-business/lien/looking-forward/>

MSD, Ballydine, discuss their energy management journey including their recent certification to ISO 50001 at four of their sites.

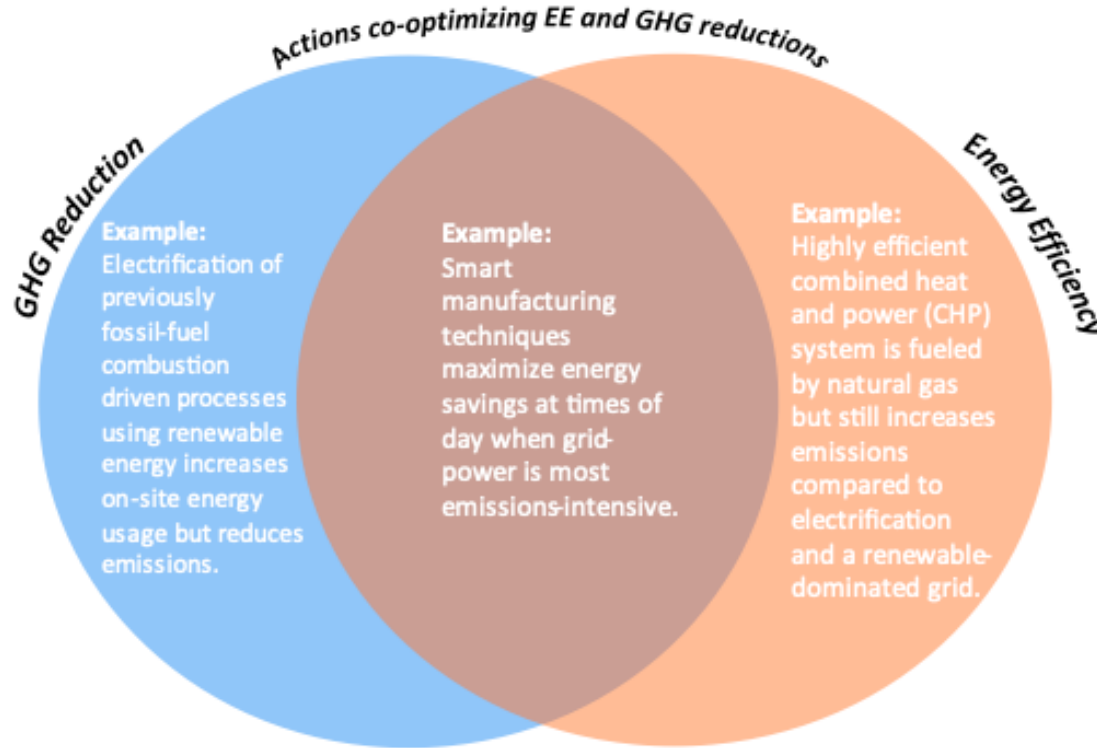


Challenges and opportunities for Energy Management Systems

EnMS in the context of decarbonisation

- Energy efficiency is typically the lowest cost option to reduce greenhouse gas emissions.
- EnMS is also a useful framework for carbon management
- In some cases however, energy usage outcomes do not align with GHG emission outcomes

EnMS in the context of decarbonisation



EnMS in the context of decarbonisation

Task 1: We determine the strategic issues that affect our ability to improve energy performance and achieve the goals of our 50001 Ready energy management system.

[Log in to track progress](#)

Detailed Guidance: An EnMS and Your Organization

Getting It Done

Task Overview

Full Description

Decarbonization

Notes ⓘ

Playbook

👤 Assignments

Decarbonization

Not required for DOE recognition

When reviewing the strategic issues that affect your ability to achieve the goals of your energy management system, you should keep in mind that these goals will likely include the reduction of energy-related GHG emissions.

The first step in integrating energy-related GHG emissions into the management system is to identify the issues that may affect your ability to achieve the intended outcomes of the management system, including the reduction of energy-related GHG emissions. Examples of the issues that may be relevant to your organization are provided in the “Full Description” tab for this task and in many cases will come from the organization’s strategic or long-term planning processes.

EnMS in the context of decarbonisation

Task 4: Our top management demonstrates leadership and commitment to continual improvement of energy performance and the effectiveness of the energy management system.

[Log in to track progress](#)

Detailed Guidance: Management Commitment

Getting It Done

Task Overview

Full Description

[Decarbonization](#)

Notes 0

Playbook

 Assignments

When meeting with top management, be prepared to answer GHG-related questions such as:

- Does adding energy-related GHG to the EnMS make it more complicated? Does it add risk now and in the future?
- What are the risks of not managing energy-GHG emissions?
- What are the costs of managing energy-related GHG emissions (e.g. data collection and monitoring, equipment, reporting)?
- How does managing energy-related GHG help the organization?
- What do we understand or know to be our current sources of energy-related GHG emissions? How much do those emissions cost (financial, environmental, etc.) the organization now and how much might they cost in the future?
- What does top management need to do to make the energy-related GHG and energy management program successful?





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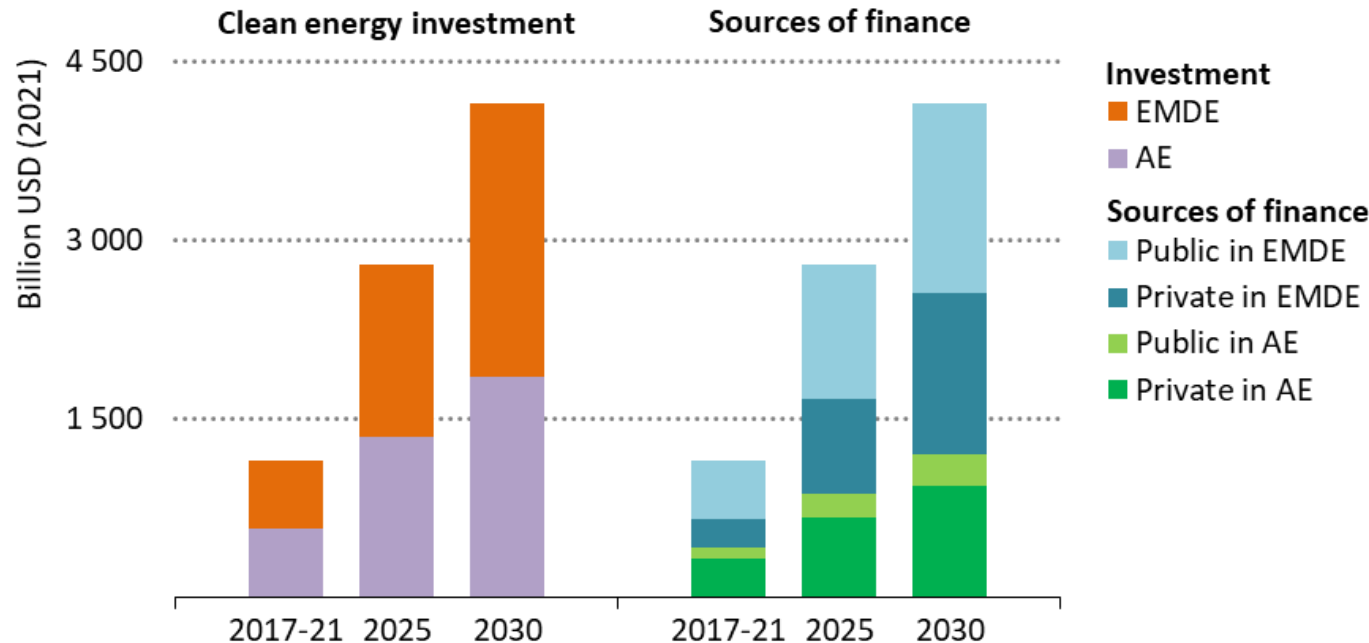
Policy packages – investment incentives

Patrick Crittenden, Sustainable Business Group & Corine Nsangwebusinge, IEA

Nairobi, 19 March 2024

Upscaling and higher levels of private finance are needed

Clean energy investment and sources of finance in the NZE Scenario to 2030



Reaching the NZE Scenario investment levels requires a larger contribution from private sources than seen today, particularly in emerging market and developing economies

- **Investment vs financing:** What's the difference?

- **What are the biggest challenges?**

Technical capacity

Heterogeneous projects

Small project scale

Payback periods

Complexity

Upfront investment

Business model (cost savings vs revenues)

Split incentives

- **Which risks can be involved and why does it matter?**

Technology

Regulatory

Physical

Organisational

Energy Market

Economic

Behavioural

Financial

Partial Credit Guarantee Schemes: Credit enhancement mechanisms for debt instruments (bonds and loans)

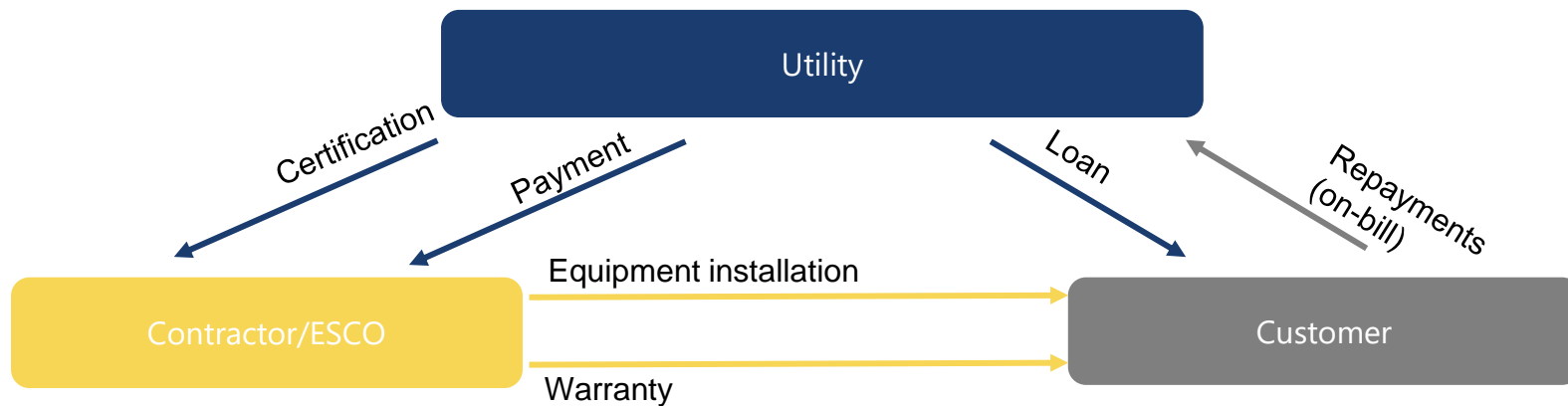
- Offered by many MDBs, GCF, GEF etc.
- **Example: Partial Risk Sharing Facility for EE (PRSF) India:**
 - Component 1: Risk sharing facility
 - Component 2: Technical assistance, capacity building and operations support
 - 29 PRSF guarantees of USD 17.2 million issued, leveraging total investment of USD 55.7 million (February 2021)
 - <http://prsf.sidbi.in>
- **Example China: Utility-based Energy Efficiency Finance Programme ([CHUEE](#))**

Local currency loans: e.g. offered by IFC to mitigate the risk for companies to face losses from currency mismatches of assets and liabilities in developing countries.

Utility on-bill financing

On-bill financing and repayment programmes allow utility customers to invest in energy efficiency improvements and repay the funds through an additional charge on their utility bill.

Financing scheme:



Examples

- [ECOFRIDGES Senegal](#): Efficient refrigerator programme through on-bill financing
- SANEDI South Africa: Efficient appliances programme through OBF

- **Energy Technology List:** list of pre-assessed and pre-approved energy efficient appliances and equipment that can automatically qualify for subsidies or funding
 - Procurement tool
 - De-risking instrument
 - Regular reviews of criteria as well as of technologies and products
- UK [Energy Technology List](#) - Government list of energy efficient plant and machinery that meets specified energy savings criteria
- [EBRD Green Technology Selector](#): online platform with country-specific directories of products and vendors that offer high-performing technologies to businesses
 - Pre-assessed and pre-approved technologies that are automatically eligible for GVC financing through a participating financial institution (up to 100% of costs not exceeding EUR 300,000 per equipment)
 - Regular adjustments of baseline and included technologies

Energy Technology Lists can qualify efficient products for financing



GREEN
TECHNOLOGY
SELECTOR

[ABOUT](#)

[PRODUCT CATALOGUE](#)

[VENDOR](#)

[EN - ENGLISH](#)

Egypt

[Back to country selection](#)

Product catalogue

Vendor overview

Categories

Windows & Doors

Thermal Insulation Systems

Boilers

Heat Pumps

Power & Cogeneration

Cooling

Motors & Pumps

Process Technologies

Transport

Appliances

Quick search

Area of use

Type of savings

Technology

Manufacturer

Search



- An energy performance contract commits an energy service company to install energy efficient equipment, provides a performance guarantee and establishes the terms of any payments.

- **Common types:**

- Shared savings

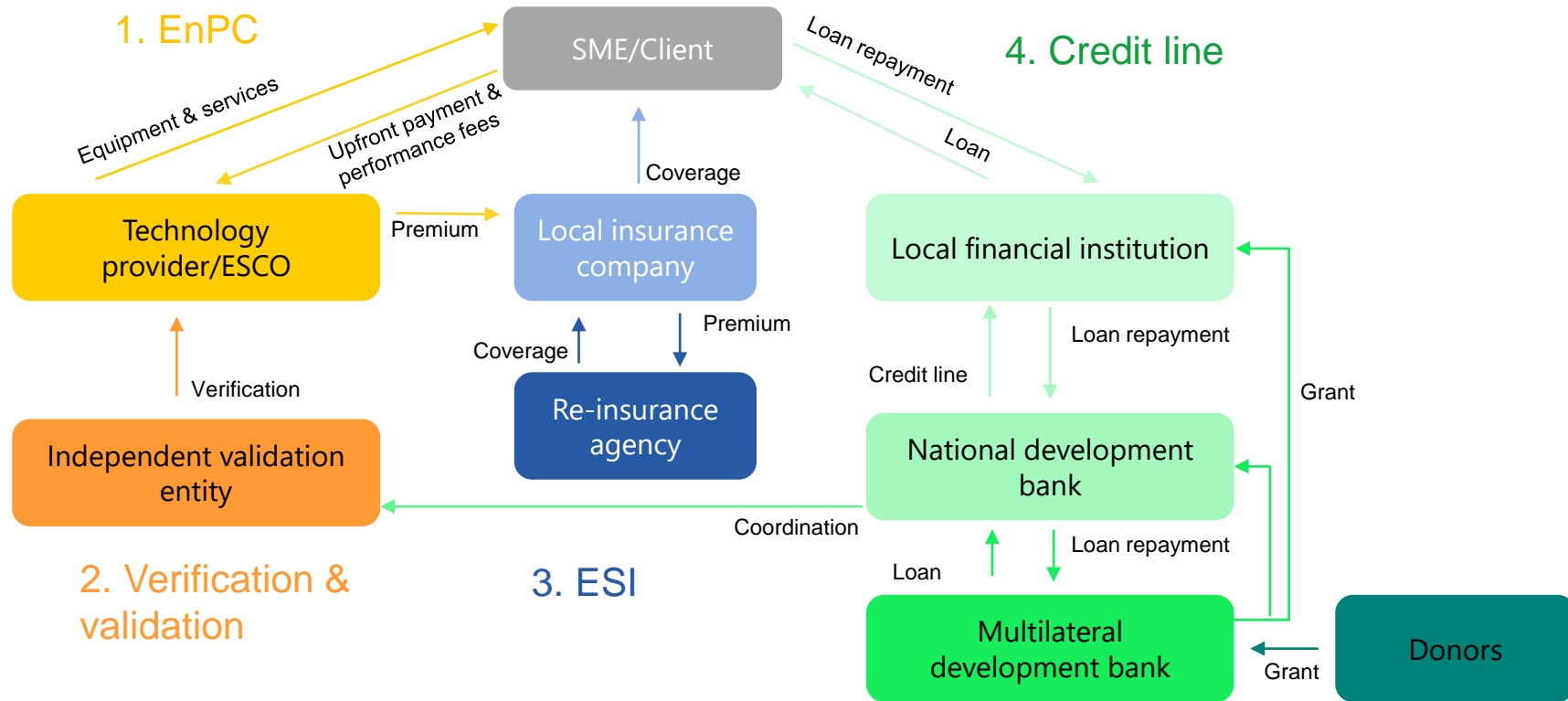


- Guaranteed savings



- Possible risk mitigation instruments include
 - Energy savings insurance models
 - Credit risk guarantees

Energy Savings Insurance (ESI) Model



- **Pay-per-use model:**

Client

- No upfront investment
- Pays for services received
- Lower life-cycle equipment costs and access to BAT

Technology provider

- Invests in and owns the equipment
- Bears costs of operations and maintenance
- Long-term and predictable revenue stream and new clients

Investor

- Green funding opportunity
- Option to purchase equipment and lease it back to the provider (monthly payments)
- Collateral: equipment, contract provider-client, default guarantee





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Understanding & consulting with stakeholders

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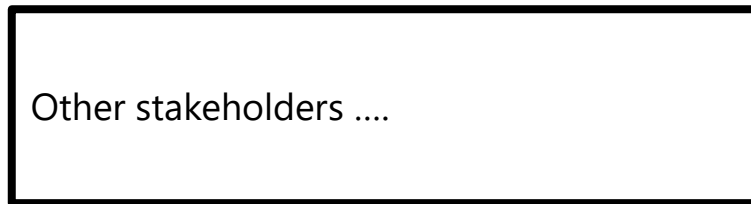
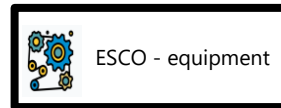
- Identify the stakeholders that can influence your programme
- Establish stakeholder interests and influence
- Select stakeholder consultation methods
- Develop strategic partnerships and consultation processes to support strategic policy objectives

- Understand needs of target audience
- Help design effective programmes
- Make partnerships
- Get data
- Find out what other programmes and initiatives are underway (investigate synergies, avoid duplication)
- Get buy-in
- Increase the acceptance of the programme
- Ensure wide participation

- Form a group around one of the following scenarios:
 - Scenario 1: Designing and implementing an energy efficiency programme across industry
 - Scenario 2: Designing and implementing an energy efficiency programme within a business
- Questions to consider within each scenario:
 - Who are the key stakeholders?
 - Why are they important?
 - What are their interests?



Stakeholder mapping exercise



- National policy makers
- Local administrations
- Programme designers/administrators
- Other ministries or departments
- Industry or business associations
- Utilities or energy providers
- International organisations
- Researchers
- Companies
- Consultants
- Equipment vendors
- Process designers
- Financial institutions
- Others...

Questions to ask:

- Why are they interested or should they interested?
- What is the case for each of these participant groups?
- What can they offer to the design process?
- What can they offer to further programme development and implementation?

What is the case for them? What can they offer?

Stakeholder	Interest	Can offer
energy providers	new business opportunities, peak demand reductions	direct contact with companies, insights in energy use, better billing, smart metering and monitoring
local government	business development, new jobs, economic growth, positive relationship with constituents	direct contact with companies, experience with other programmes, insights in their regions and businesses
industry associations	valuable services to members, competitiveness of members, new members	contact with members, trusted source, insights in their sectors, their technologies
equipment vendors	sell products and services	know technologies and processes, have experts

What are the methods?

Method	+	-
Direct contact	access to in-depth information, building relationships, possible to ask follow up questions	expensive, time consuming, could be biased
Workshops	new ideas come up during discussions	need to organise, need to get participants, participants may be unwilling to share information
Surveys	can reach a large number, cheap, can get large geographic spread	difficult getting people to fill out, need to limit number of questions
Expert group meetings	access to expertise, insights	second hand information, possible bias
Calls for inputs, suggestions	anyone could respond – even stakeholders you have not thought of	might create expectations that opinions will be considered in design

Who: Australian Government

Method: Drafted discussion papers and asked for industry inputs

Facilitated workshops to explore:

- *What would an effective assessment involve?*
- *What should be included in public reports?*
- *How could the programme be designed to achieve the government's objectives while minimising administration costs and maximising business benefits?*

Result: Companies were more supportive of the programme because their views had been taken aboard, programme design was improved



- Tip: Make sure you ask the right questions at the right time

Case study – Mongolian consultation

Who: Mongolian Ministry of Energy (supported by German aid agency GIZ)

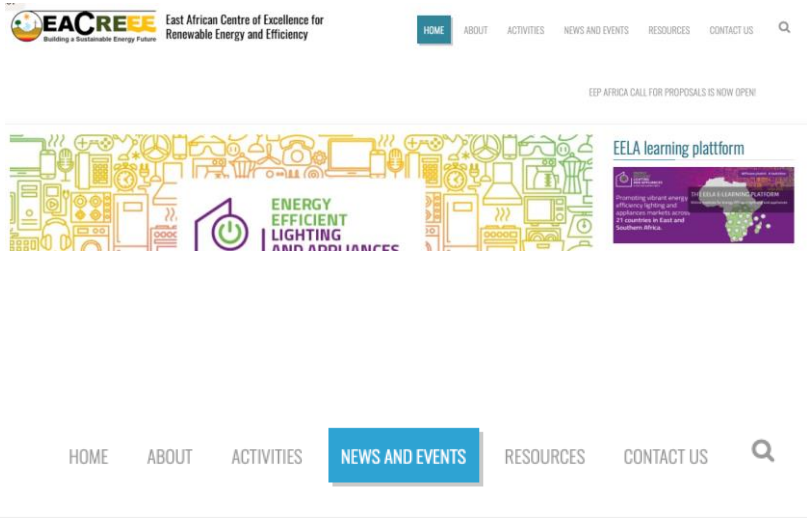
Method:

- Telephone survey to solicit input from SMEs.
- A high response rate was ensured by collaborating with electric utilities, taking advantage of their existing relationships with SMEs.
- Utilities promoted the survey and joined forces with local universities to conduct telephone interviews.

Result: Valuable inputs at low cost



Tip: Make sure you ask the right questions at the right time



The Central African Centre for Renewable Energy and Energy Efficiency (CEREEAC) takes shape in Luanda, Angola

