

# ABC of Energy Efficiency – Concept, Approaches and Policies

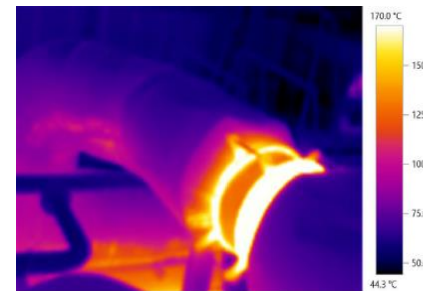
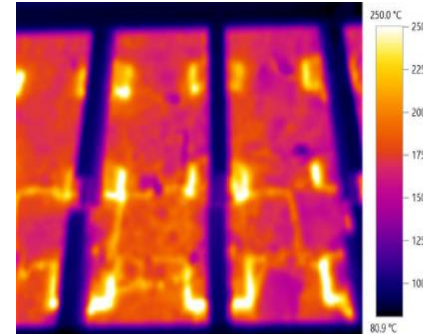
Shaping the Discourse: Effective Energy Efficiency Storytelling

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# Why energy efficiency

- ❑ Energy efficiency improvements are the cheapest and most effective way of reducing CO<sub>2</sub> emissions and mitigating climate change
- ❑ According to the IEA (International Energy Agency), improving energy efficiency must account for more than 50% of the measures needed to win the battle against global warming



# Energy efficiency has an attractive payback

- ❑ Energy efficiency improvements required capital investment or manpower or both
- ❑ Payback period =  $\frac{\text{Capital required}}{\text{Annual savings}}$

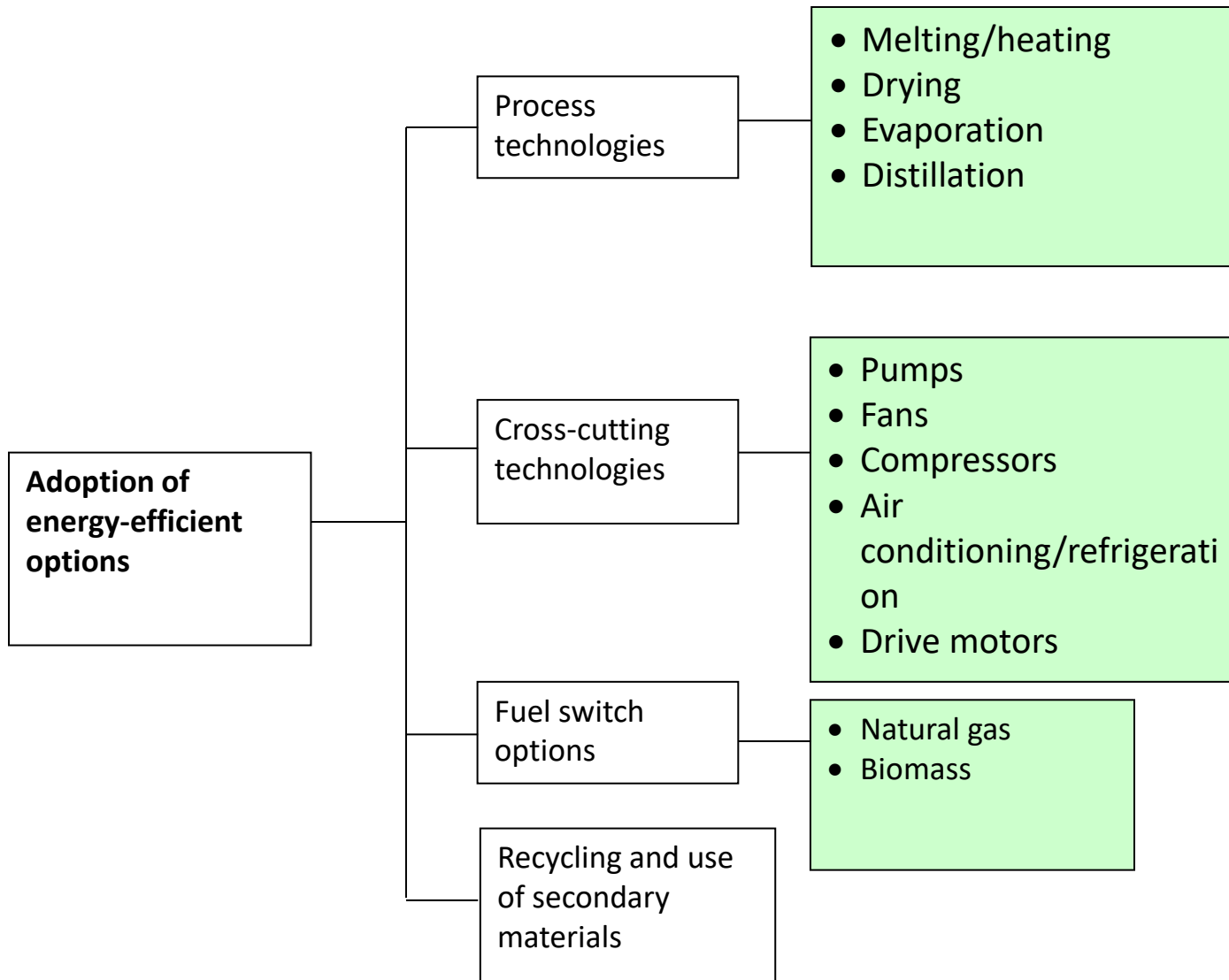
Option	Payback, years
Solar	7-8
Wind power	10-12
Energy efficient equipment	2-5



# Energy Consumption in Industry

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- ❑ Large energy-intensive industries like fertiliser, cement, pulp and paper, textiles, iron and steel, aluminum, chemicals
- ❑ Many energy intensive small scale industries like glass, ceramics, forging, foundry, brick
- ❑ Parallel existence of newer state-of-the-art plants and older technologically obsolete plants
- ❑ 20-25% energy conservation potential



# Understanding of 'areas' and 'levels' of energy efficiency helps targeting

	Energy audits	R & D
	Area 1: Energy production and distribution (plant auxiliaries)	Area 2: Energy usage within processes
Level 1: Efficient operation of the existing plant (good housekeeping measures)	Better maintenance (rewinding) practices	Best operating practices in furnace
Level 2: Major improvements in the existing plant (retrofits and revamps)	Variable speed drive for electric motor	Improved furnace insulation
Level 3: New plant or process designs	New energy efficient electric motor	New energy efficient furnace

# Approaches

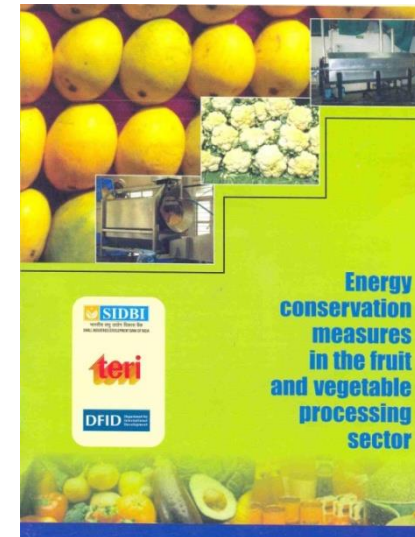
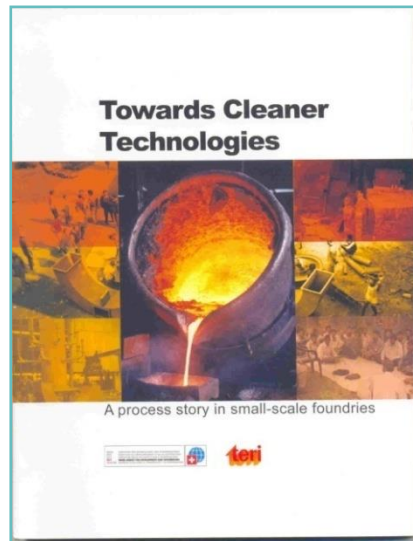
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- ❑ Training and awareness creation
- ❑ Energy audits and implementation of EE technologies and practices
- ❑ EE technology innovation
  - ❑ Technology demonstration vs Technological capacity through Research, Development, Demonstration and Dissemination (RDD&D) initiatives
- ❑ Policies (financial concessions, regulation etc.)



# Documentation and awareness generation

- ❑ Process documentation for policy makers and funding organisations
- ❑ Dos and don'ts for industry
- ❑ Sharing of best practices through newsletters like SAMEEEKSHA
- ❑ Video films on energy efficient technologies and best operating practices
- ❑ Hands-on training programs for operators and supervisors





# Case Study: Energy audit of municipal water pumping installations in Accra, Ghana

- ❑ Energy audits of pump-sets installed in water pumping installations
- ❑ Energy of about 18% of electricity bill identified through adoption of measures like:
  - Power factor improvement
  - Replacement of inefficient pumps with new ones
  - Retrofitting of pump internals like impellers, sleeves etc.
  - Relaying of header pipe line
- ❑ Measures would result in energy saving of \$ 0.6 million with an investment of \$ 1.2 million
- ❑ Simple payback period is below 2 years



# Technology characteristics of energy-intensive SMEs

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- ❑ Conventional technologies which have remained unchanged for decades
- ❑ Little R&D efforts
  - Underdeveloped support institutions and local service providers
  - Limited capacity to innovate



# RDD&D in SMEs

- ❑ Glass making is very energy intensive – energy accounts for 40% of manufacturing cost
- ❑ Considerable potential to reduce energy consumption and carbon emissions by adoption of energy efficient furnaces



# Approach

- ❑ Involved international and local experts to develop (conduct R&D) on:
  - Better furnace construction
  - Burner design
  - Recuperator design
- ❑ Demonstrated the energy efficient furnace in one SME





# Energy savings of 30-35% demonstrated



Conventional coal/NG  
fired Pot Furnace

Recuperative Natural Gas fired  
Pot Furnace



# Disseminate

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- ❑ Local service providers provided training
- ❑ Deployment
  - 86 units have adopted the new technology; about 90% of the cluster
  - Cumulative energy savings of 100,000 toe and CO2 savings of 300,000 tones

# Energy Efficiency Policies –Key Recent Initiatives

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- ❑ Energy Conservation Act (ECA), 2001
  - Bureau of Energy Efficiency (BEE), under the Ministry of Power , is the nodal agency for implementation of ECA
  - Modified in 2010 to provide legal mandate to PAT
  
- ❑ National Action Plan on Climate Change (NAPCC), 2008
  - Eight missions were set-up. National Mission for Enhanced Energy Efficiency (NMEEE) pertains to energy efficiency
  - Performance, Achieve, and Trade (PAT) mechanism was launched under the NMEEE in 2008



# Perform Achieve Trade (PAT) scheme – salient features

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- ❑ PAT is an innovative, market-based trading scheme
- ❑ Aim is to improve energy efficiency in industries by trading in energy efficiency certificates in energy-intensive sectors
- ❑ Mandatory specific energy consumption targets for larger, energy-intensive facilities (called Designated Consumers)
- ❑ Implemented in three phases-the first phase was from 2012-2015
- ❑ BEE is administering the PAT scheme
- ❑ Energy Efficiency Services Ltd (EESL) will administer the trading

# Preparatory activities undertaken by BEE

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- 5 years energy data from DCs collected through the notified format
- Baseline Energy Audits conducted in all DCs
- Data compiled & analyzed for arriving at baseline SEC
- PAT Consultation Document prepared
- Stakeholder workshops conducted with different Industry groups
- The methodology for M&V system, Issuance of ESCerts & Trading prepared

# Thank You

