Promoting EE technologies and best practices: TERI interventions among MSMEs in Eastern region:

Creating Innovative Solutions for a Sustainable Future

SAMEEEKSHA Platform – 14th meeting

Small and Medium Enterprises: Energy Efficiency Knowledge Sharing

23rd August, 2018

Kolkata

Backdrop

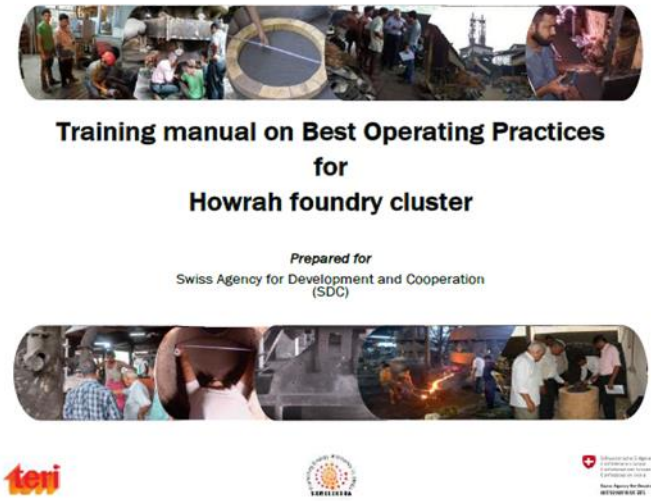
- Greenhouse gas (GHG)/CO_2 emissions from fossil fuel combustion has been increasing globally
- Industry sector is the largest consumer of fossil fuel based energy (coal/coke, oil, gas, electricity)
- MSMEs are the backbone of industrial activity in India contributing 45 % to the industrial output
- Many obsolete (inefficient) equipment/ technologies and practices in use in MSMEs leads to high GHG emissions
- Little R&D efforts on developing cleaner technologies
- Energy audits can help in identification of energy saving measures

RDD&D foundry

- TERI-SDC have partnered with Indian Foundry Association (IFA) in Howrah since 1996
- Focus on RDD&D (R&D, *demonstration, dissemination)* of two cleaner technologies
  - Energy efficient Divided Blast Cupola (DBC)
  - Focused on Pollution Control System (PCS)

Dissemination

- DBC design & commissioning support provided to 150 foundries in Howrah, Rajkot, Coimbatore, Ahmedabad (& Bangladesh)
  - Cumulative savings achived
    - 71,000 toe/ 257,000 tCO_2
- ‘Hands-on’ training on BOP for operators & supervisors



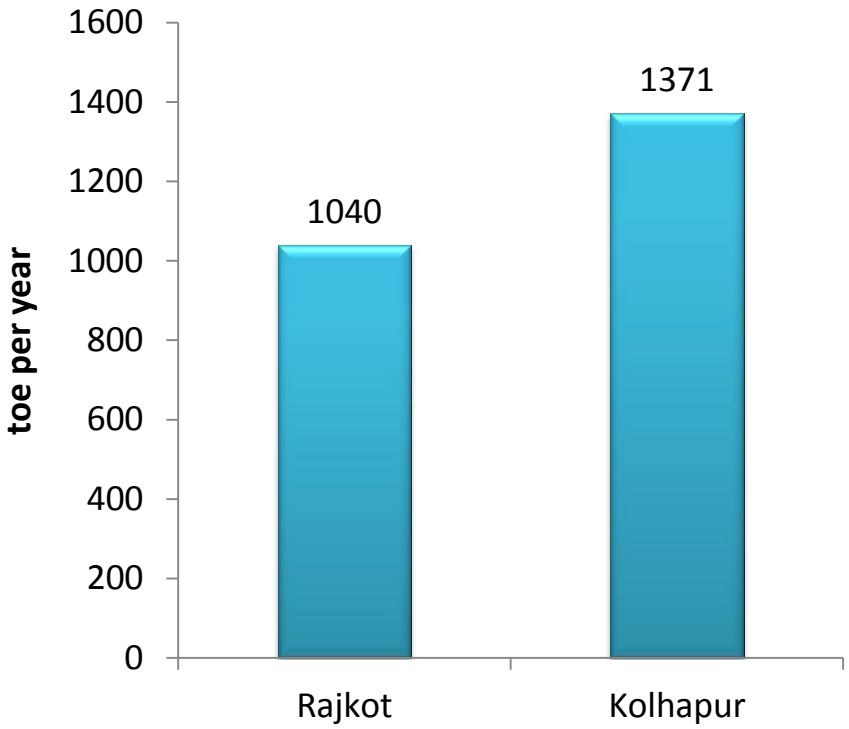
Energy audits

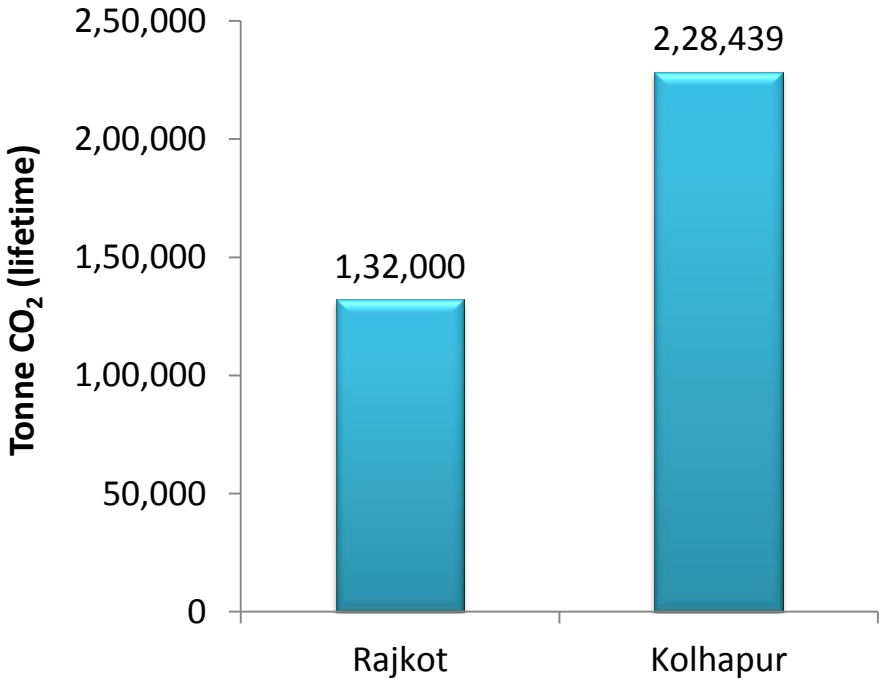
- 50 foundries selected by IFA
- Focus on identifying best operating practices (low/no cost measures)
- Energy saving opportunities
  - *Correcting low voltage (360 V) by servo voltage regulators (415 V) - power saving of 2% and less burnt out of motors*
  - *Replacing flat belts (η 90-92%) with cogged V-belts (η 95-98%)*
  - *Better cupola maintenance and operation practices*

Energy audits – Kolhapur and Rajkot

- 100 detailed energy audits conducted and implementation support provided in each cluster
- Typical energy saving opportunities
  - *Replacement of SCR furnace with IGBT furnace (SEC reduced from 680 to 540 kWh/t, payback 1.1 year)*
  - *Lid mechanism for induction furnace (radiation losses reduced from 6 to 3%, immediate payback)*
  - *Replacing fixed speed with VFD PMSM screw air compressor (SEC 0.13 kW/cfm, payback 1.3 years)*

Energy savings & GHG reduction achieved





Energy audits – Al casting units

- Al industry is highly energy intensive. Secondary processing is mainly done in MSMEs
  - 12 detailed energy audits conducted
- Typical energy saving opportunities
  - *Replacing of old crucible furnaces with new EE furnace (SEC reduced from 540 to 370 kWh/t, payback 1.6 year)*
  - *Replacing reverberatory with tower furnace (SEC reduced from 105 to 60 ltr of FO/t, payback 1.4 years)*
  - *Replacing conventional PDC with servo based PDC (energy savings, 35%)*

West Bengal brick manufacturing

Energy consumption: 1.75 million toe

Energy Type	Annual consumption	Equivalent energy (toe)	GHG emission (tonnes CO_2)
Coal	29,24,000 tonne	17,54,400	31,86,300
Diesel	3,317 KL	2,753	8,600
Total		17,57,153	31,94,900

Energy Saving Opportunities

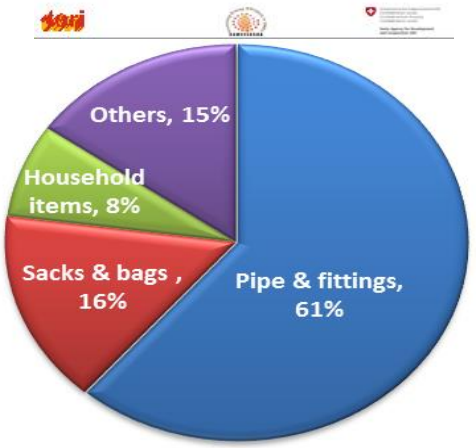
- *Adoption of zig-zag firing technology / tunnel kiln*
- *Production of Resource Efficient Bricks like Perforated bricks and hollow blocks*

Plastic cluster Balasore

Type	Unit	Quantity	Equivalent energy (toe)
Electricity	Million kWh	27.8	2,389
HSD	kL	452	429
LPG	tonne	36	42
Total			2,860

Energy Saving Opportunities

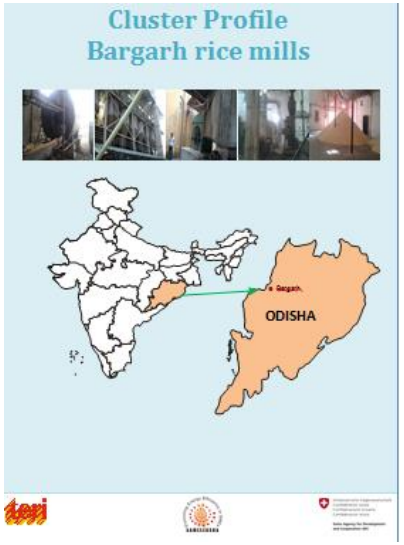
- *Radiant barrel heater band On-off to thyristor based PID type (20-30% saving potential)*
- *All-electrical injection moulding machines (saving potential >50%)*



Distribution of energy consumption share by different plastic industries

Rice mills Bargarh

Energy type	Annual consumption	Equivalent energy (toe)	Annual energy bill (million INR)
Rice husk*	2,41,445 tonne	72,433	290
Electricity	50 million kWh	4,303	280
Total		76,737	570

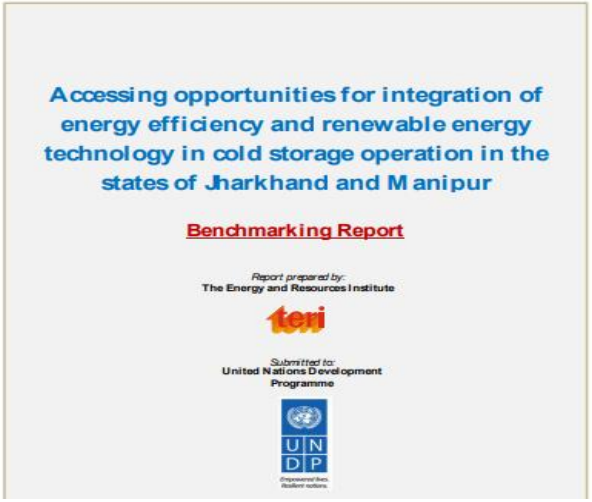


Energy Saving Opportunities

- *EE boilers (single pass to three pass with WHR, 15-27% saving potential)*
- *Solar water heaters for soaking of paddy and preheating of boiler feed water*

Jharkhand cold storage

Energy type	Annual consumption	Equivalent energy (toe)	Annual energy bill (million INR)
Electricity	7.9 million kWh	678.7	63.9
HSD	75.2 kL	7.5	4.9
Total		686.2	68.8



Energy Saving Opportunities

- *Premium efficiency class (IE3) motor (Slip ring to IE3 motor, 7-9% saving potential)*
- *Direct drive reciprocating compressor (5-7% saving potential)*
- *Energy Efficient air-circulation fan – evaporator coils (BLDC fan, 50-55% saving potential)*
- *Hermetic sealed doors (3-5% saving potential)*

Thank you for your attention