



TERI's intervention in Glass sector

Seminar on Energy Efficiency and Waste heat recovery system for glass industry

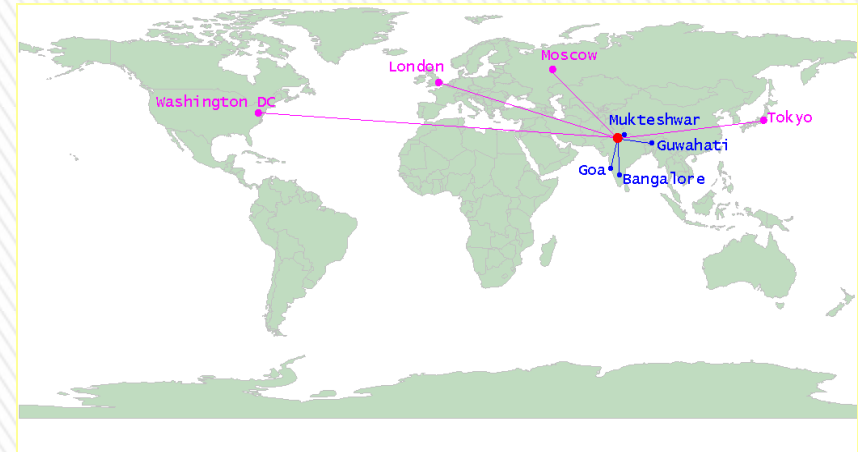
Mumbai

19 April 2014



About TERI

- An independent, not-for-profit research organization established in 1974
- Pursuing activities related to energy, environment, and sustainable development
- Staffed by nearly 1000 professionals drawn from over a dozen disciplines
- Based in New Delhi; regional centres in southern; western and north-eastern India; and staff presence in Japan
- Affiliates: TERI-NA in Washington, DC
TERI-Europe in London, TERI-Gulf in Dubai





Industrial Energy Efficiency

Key activities

- Energy audits of large industries, buildings, municipal water pumping installations and thermal power plants
 - ❑ Worked in industry sectors like sugar, glass, cement, engineering, oil & gas, chemicals, food processing, airports, power etc.
 - ❑ Audits undertaken in other countries like Malaysia, Indonesia, Africa etc.
- Promoting energy efficient technological solutions for small scale industry sectors
 - ❑ Working in foundry, glass, brick, chemicals, dairy and forging industries
 - ❑ Major ongoing programs with SDC, JICA, WB etc.





Industrial Energy Efficiency

Key activities ... contd

- Baseline assessment studies under the PAT scheme of GoI
 - ❑ Working in textile, power, chlor-alkali and cement sectors for BEE
 - ❑ Directly working with a few private sector designated consumers
- Knowledge sharing and capacity building on energy efficiency
 - ❑ Ongoing programs like SAMEEEKSHA platform, ITEC training programs, India Japan Energy Forum Series, etc.
 - ❑ Training programs on regulatory framework for power sector
- Demand Side Management studies with state level Distribution companies



TERI's initiatives in glass sector

- » Energy Audits in six large glass manufacturing units
- » Energy conservation activities in Firozabad glass industry cluster
 - ✓ Pot furnace, Muffle furnace, Sikai bhatti etc.
- » Sectoral study covering glass sector to explore the potential for inclusion in the next phase of PAT cycle



Large Industries

- » Identified Energy Conservation Measures
 - ✓ Short term (payback less than 1 year)
 - Re-positioning of fan, shifting/installing capacitors, replacing blades of cooling tower fan etc.
 - ✓ Medium term (payback 1 – 3 years)
 - Installing VFDs, proper blower sizing, installing high efficiency pumps and motors , etc.
 - ✓ Long-term measures (payback above 3 years)
 - Blower replacement, proper designing of lighting system etc.

- » Saving potential: 40 lakhs to 240 lakhs



Firozabad glass industry

- » Largest cluster in small scale glass sector
- » 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



Specific interventions in the cluster

➤ Technology developed

- Energy efficient recuperative open pot furnace – for producing small quantity melt glass of different colour
- Muffle furnace – for baking glass bangle
- Reheating furnace – for reheating glass lumps

➤ Energy Audit in Tank Furnace



Key features of developed technologies

- » Energy savings: 25 – 30% lower than conventional technologies
- » Simple payback: ~ 1 to 2 years
- » Drastically reduced pollution
- » Improvement in the working environment
- » Reduced health risks to workers and the society at large
- » Improved profitability and sustainability of the sectors



Pot furnace



Conventional coal fired pot furnace



Recuperative natural gas fired pot furnace



Muffle furnace



Traditional coal fired muffle furnace



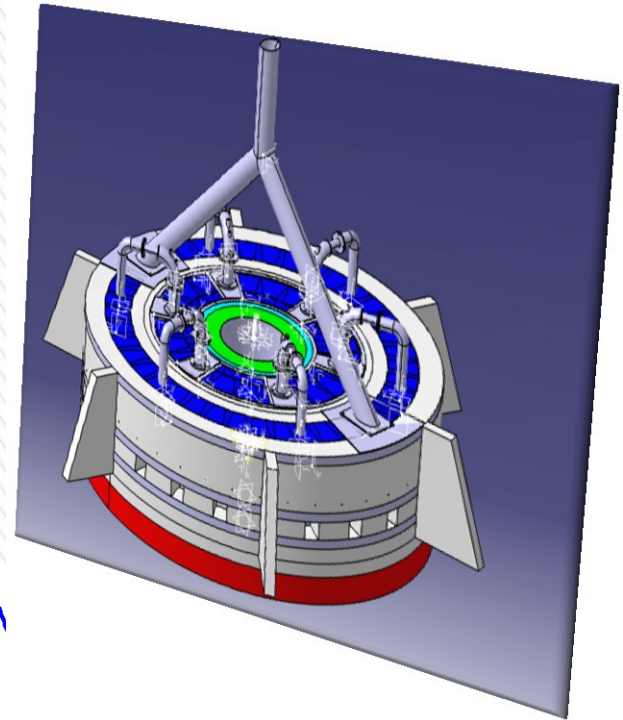
Natural gas fired muffle furnace



Reheating furnace



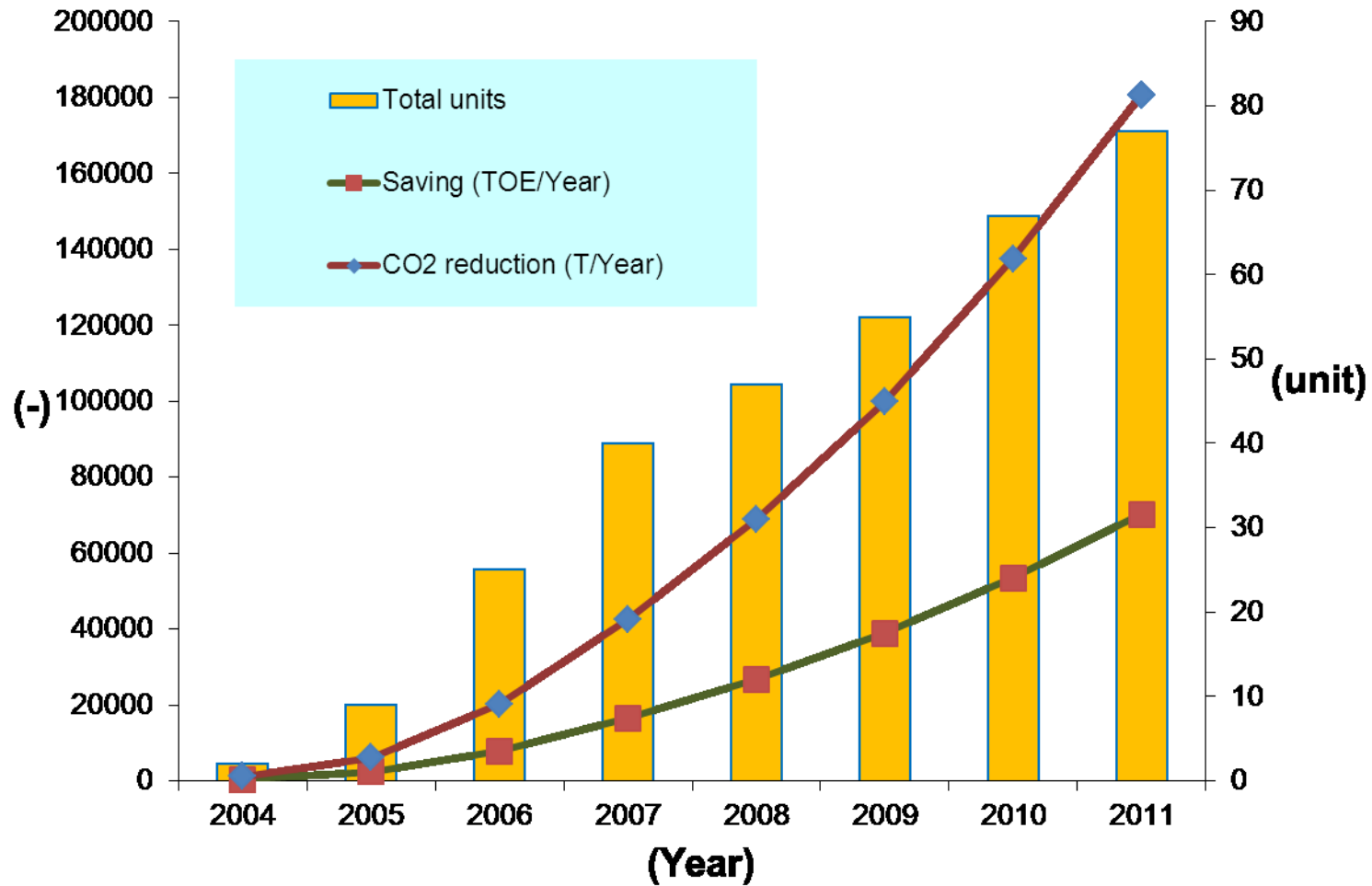
Natural gas fired converter reheating furnace



Reheating furnace



Impact of TERI design pot furnace in Firozabad cluster



90% pot furnace units adopted TERI-design and achieve consistent energy savings of 35%, resulting 71000ToE and 0.14 million tonne of avoided CO2 saving per year

Sectoral study – glass sector

- » Plan of Government of India to widen the coverage of existing PAT (Perform, Achieve and Trade) scheme
- » Glass was one of the sector covered under the study
 - Melting and refining are most energy intensive processes and accounts for 60-70% of total energy use in glass industry
 - Thermal energy consumption is about 80% of total energy consumption
 - Estimated annual energy consumption is about 1.17 mtoe
- » Need to strengthen the database



Thank You

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