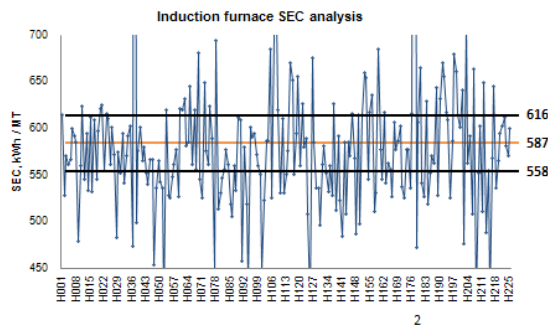


Industrial Energy Efficiency



INDUSTRIAL ENERGY EFFICIENCY

Industry lies at the heart of economic development. It drives the processes of growth in all sectors of the economy – commerce, agriculture, transport, infrastructure, and household. It also consumes large amounts of energy: in India, the industrial sector accounts for more than half of the total commercial energy consumed in the country. Industrial energy consumption can be reduced by 10–20% through better energy management practices and by adoption of suitable energy efficient technologies. At the unit level, better utilization of energy will reduce operating costs and improve profitability and competitiveness – both vital in an increasingly globalized market.

TERI's Industrial Energy Efficiency Division (IEED-TERI) works with both large and energy-intensive MSMEs (micro, small and medium enterprises) to improve their energy and environmental performance. In order to maximize the reach of its specialist teams and synergize their capabilities and activities, both within and outside India, IEED-TERI functions from two hubs:

- Industrial Energy Efficiency and Sustainable Technologies (IEEST) Area, located at TERI, New Delhi
- Industrial Energy Group (IEG), located at TERI's Southern Regional Centre, Bangalore (TERI-SRC)

Focus /Thrust areas

- Conduct energy audits and identify options for energy conservation measures for implementation by the industries to reduce their energy consumption levels
- Undertake technology assessment studies for different industry sectors with regard to energy and environment
- Support to energy intensive MSME sub-sectors through energy sector studies, technology development, demonstration and creating enabling environment for large scale adoption of energy efficient technological options.
- Facilitate knowledge sharing, learning and awareness creation among different stakeholders through workshops, seminars, and publications
- Facilitate development and execution of Global Environment Facility (GEF) and other climate related projects in the field of energy efficiency
- Undertake corporate greenhouse gas (GHG) accounting and development of emissions calculation tools, using internationally accepted guidelines
- Undertake research on transfer and diffusion of environmentally sound technologies in the context of climate change
- Capacity building and training programs for industry stakeholders that help them in adopting best practices.

Energy audits

TERI is the market leader in conducting energy audits for industry in India. Over the last two decades, IEED-TERI has conducted over 1500 energy audits in both large-scale and small-scale industrial establishments in sectors such as power, cement, chemicals, fertilizer, pulp and paper, food processing, glass, ceramics, engineering, etc. Energy audits have also been conducted in various commercial establishments such as hotels, printing presses, commercial buildings, hospitals, airports, etc. Both the areas located at Delhi and Bangalore have a wide range of portable instruments that aid in measurements and monitoring of various operating parameters of different process equipments in an industry such as boilers, furnaces, motors, compressors, air-conditioning plants, etc. In recent

years, IEED-TERI has successfully extended its energy audit consultancy services to other developing countries like Guyana, UAE, Tanzania, Uganda, Nigeria, Ghana, Ethiopia, Bhutan, Indonesia, Maldives, etc.

What is an energy audit?

In order to improve the energy efficiency of an industrial unit, it is necessary first to study the existing industrial processes and identify the patterns of energy use in various sections of the plant. This exercise is known as energy audit. Typically, an energy audit examines major energy-consuming equipment and systems such as motors, furnaces, boilers, pumps, blowers, HVAC (heating, ventilation and air-conditioning) systems, and the load and demand management of the plant. The exercise (1) helps identify the areas in which energy saving opportunities exist, and (2) provides the basis on which to develop and recommend energy efficient technological options for the plant.



Field measurement during energy audit

Demonstrating energy efficient solutions for MSME sector

Industrial Energy Efficiency Division of TERI has a specific focus on the MSME (Micro, Small and Medium Enterprises) sector as it contributes substantially to a country's economy. In case of India, it accounts for around 45% of the nation's manufacturing output, 40% of exports and employs nearly 100 million people. A large proportion of MSME units in developing countries continue to use obsolete, inefficient technologies, which result in wastage of fuel as well as release of high volumes of greenhouse gases and particulate emissions. TERI's experience shows that fuel costs make up 20%-30% of the total cost of production among many MSME units, eroding their profitability in an increasingly competitive globalized market.



TERI- designed energy efficient glass melting

The technology related projects in the MSME sector undertaken by TERI in India during the past few years have focused on finding innovative solutions to the problem of high energy usage in energy intensive industry sub-sectors like glass, foundries, forging, brick manufacturing, chemicals, etc. The activities include systematic identification of options for technology demonstration, identification of barriers to adoption and diffusion of energy efficient technologies and actually facilitating/hand-holding the SMEs in adopting energy efficient technologies and practices in their factories.



An Energy efficiency DBC in a foundry

Technology assessment studies

The Industrial Energy Efficiency Division also conducts technology assessment studies of entire industrial sectors—for instance, the cement industry, fertilizer industry, glass & ceramics or the thermal power sector—with specific focus on the energy and environmental performance of the technology (ies) in use. Such studies enable the formulation of plans to improve the energy and environmental performance of the industrial sector in a country as a whole through the identification of possible technological options, and developing suitable frameworks to facilitate adoption of these technological options. Depending upon the requirements of the clients, in-depth studies on various cross-cutting technological options are also undertaken.

Capacity building

Capacity building activities related to promoting energy efficiency are complimentary to the leading work done by TERI in conducting energy audits and technology assessment studies. TERI has been promoting energy efficiency in the industrial sector through organizing focused training programs for various industrial clients and energy practitioners and through various outreach activities like publications of papers, newsletters, case studies and energy efficiency booklets. TERI has also published a “Handbook on energy audits and management”. The handbook brings together the vast experience TERI has in carrying out energy audits and enables users to understand the operation of various equipment and system from the energy viewpoint and identify opportunities for energy conservation. TERI also regularly conducts a 3 week training programme for participants from developing countries on energy efficiency aspects that is supported by the Ministry of External Affairs, Govt. of India.

Recent projects

Examples of a few projects recently completed/ being undertaken by TERI presently that best illustrate TERI’s experience in the field of energy conservation are given below:

- Energy audits in a range of industrial and commercial establishments in India in sectors like cement, food processing, textiles, glass, thermal power plants, pharmaceutical, automobile, engineering, hotels, airports, commercial/public buildings, etc. (sponsored primarily by private companies and public sector units)
- Action research programs for the design, development and promotion of energy efficient technologies in foundry, glass and brick industry sectors (sponsored by Swiss Agency for Development and Cooperation)
- Energy audit in food processing plants in Nigeria (sponsored by Tolaram Group)
- Energy audit of gold mines in Ghana (sponsored by AngloGold Ashanti (Ghana) Limited)
- Energy and water audit of Municipal Water Pumping Stations of Dar Es Salaam City (sponsored by World Bank)
- Energy audit of platinum mines in Zimbabwe (sponsored by Zimplats)
- Energy audit of water pumping installations in five African cities (sponsored by UN-HABITAT)
- Supporting energy efficiency initiative of Govt. of Guyana in various industrial establishment (supported by Office of President, Govt. of Guyana)
- Identifying and facilitating implementation of energy efficient technologies and practices in SMEs located in forging, foundry, engineering and chemical clusters in India (Sponsored through SIDBI/World Bank/GEF)
- Energy audits of more than 100 industrial and commercial establishments in Uganda including industries, public buildings, university, water pumping installations, street lighting etc (sponsored by Ministry of Energy and Mineral Development, Government of Uganda through a World Bank/SIDA funded program)
- Energy audit/Energy efficiency advisory services for a leading privately owned paper mill in Columbia (M/s Cartones America, S.A -CAME Group) (sponsored by International Finance Corporation)

- Technology assessment studies on the energy conservation potential in the fertilizer, cement, thermal power and integrated iron and steel sectors in India (sponsored by a few Japanese institutes)
- Collaborative study to identify barriers to the transfer of low carbon energy technologies (jointly undertaken with University of Sussex, UK)
- Development of GHG accounting tools for the Indian cement and thermal power sector using GHG Protocol guidelines (sponsored by USEPA)
- Implementing BDS in Rajkot and Mohali-Panchkula Chandigarh MSME clusters supported by Small Industries Development Bank of India (SIDBI)
- Knowledge and implementation support to BEE to promote energy efficiency in SMEs
- Baseline and Monitoring & Verification (M&V) studies of `Designated Consumers' under the PAT (Perform, Achieve and Trade) scheme under the National Mission on Enhanced Energy Efficiency (NMEEE) – supported by BEE/EESL
- Application of low carbon technologies in small scale industries (A joint project with IGES, Supported by JICA and JST)

Publications

- Handbook on energy audit and environmental management
- Light Right: A practicing engineer's manual on energy efficiency lighting
- Towards Cleaner Technologies – A process story in small scale foundries
- Towards Cleaner Technologies – A process story in the Firozabad glass industry cluster
- Working with the Brick Firemen Community – A techno social initiative in eastern Uttar Pradesh
- Booklet on “Energy conservation measures in the Fruit and Vegetable Processing Sector”
- SAMEEEKSHA – Quarterly Newsletter on energy efficiency (Small and Medium Enterprises: Energy Efficiency Knowledge Sharing)

Videos

- Through the smoke screen – A short film on Muffle furnaces in Firozabad
- A short film on Vertical Shaft Brick Kiln (VSBK)
- Igniting change: Accelerating collective action for Indian foundry industry–A TERI-SDC joint initiative
- Changing the convention: Introducing newer concepts in Firozabad glass industry – A TERI-SDC joint initiative
- Construction practices using REBs: A film on brick industry
- A short film on Best Operating Practices in Cupola Melting – Energy Efficiency Divided Blast Cupola by TERI
- A short film titled ‘Ring the changes – Towards an energy-efficient future for small enterprises’

Website

- <http://www.sameeeksha.org/>: Website of the Small and Medium Enterprises: Energy Efficiency Knowledge Sharing (SAMEEEKSHA) platform, which aims to promote energy efficiency in SMEs.

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