SKILLING SHOP FLOOR TECHNICIANS TO CATALYSE ENERGY EFFICIENCY IN FARIDABAD CLUSTER

Tags
Type: Cluster case study
Sub-sector: Engineering
Location: Faridabad
Partners: SSEF, TERI, IamSMEofIndia
Period: 2018

Backdrop

A major reason why MSMEs do not utilize energy efficiently is that their shop floor level personnel lack the awareness, knowledge and technical skills required to operate the plant equipment/machinery optimally, i.e., with minimum wastage of energy, materials and time. While the need for upgrading the skills of shop floor technicians is obvious in cases where new technologies are being introduced, experience shows that even the existing technologies can yield significant energy savings at relatively low cost, if the technical knowledge and capabilities of machine/equipment operators, supervisors and other shop floor personnel are upgraded through training on best operating practices (BOP). However, there are few, if any, programs focusing exclusively on the training of shop floor personnel in MSME clusters. Another challenge is to find ways by which the new/improved technical knowledge and skills on energy efficiency (EE) can be imparted to other MSMEs across and even beyond the cluster, without external support.

TERI, with the support of Shakti Sustainable Energy Foundation (SSEF), undertook an initiative to promote EE in the Faridabad engineering cluster through the training of select shop floor technicians on EE technologies and BOP in 'train-the-trainer' (TOT) mode. The aim was to create a core group of 'animators', who would themselves function as trainers to convey their knowledge and skills related to EE to other shop floor personnel in MSMEs across the cluster.

Faridabad is one of India's largest and fastest growing engineering clusters, with over 12,000 MSME units representing a wide range of energy intensive sub-sectors such as forging, foundry, die casting,

metal fabrication, rubber and plastics, textiles and so on. TERI formulated and conducted its activities in the Faridabad cluster in close partnership with the local industry association, IamSMEofIndia. This initiative was a component of the SSEF-supported project (see Box).

About the project

The project titled 'Advancing Energy Efficiency in the Micro, Small and Medium Enterprise (MSME) sector in India", supported by SSEF and implemented by TERI during 2017–18, had the following components:

- Preparing energy profiles of 10 MSME clusters
- Studying and assessing the training/skilling needs of shop floor technicians in the Faridabad MSME cluster

Assessing energy saving potential, gauging training needs

The first step was to conduct baseline studies on select MSMEs in the cluster—to understand the current technologies and operating practices; assess the potential for energy savings; identify possible energy conservation measures (ECMs); and get a better idea of the existing capabilities of shop floor personnel and the areas in which they required additional/improved knowledge and skills. iamSMEofIndia nominated 10 MSME units for the studies, representing six energy intensive sub-sectors (Table 1). TERI conducted the baseline surveys, prepared detailed survey reports and shared them with the respective units. Follow-ups visits were made to the individual units to encourage the entrepreneurs to adopt the identified ECMs. Typical ECMs included:

- Replacing existing furnaces with EE furnaces
- Thermal insulation improvement
- Use of blowers in place of compressed air
- Optimizing pressure setting in air compressors
- VFD application on motor drives
- Overhauling of DG set

Vitally, the surveys and follow-up visits provided an opportunity for the TERI team to interact and establish rapport with the plant-level personnel, understand their existing capabilities and perspectives, and pinpoint the important technological and process areas in which the shop floor technicians needed strengthening of their knowledge and skills. These included:

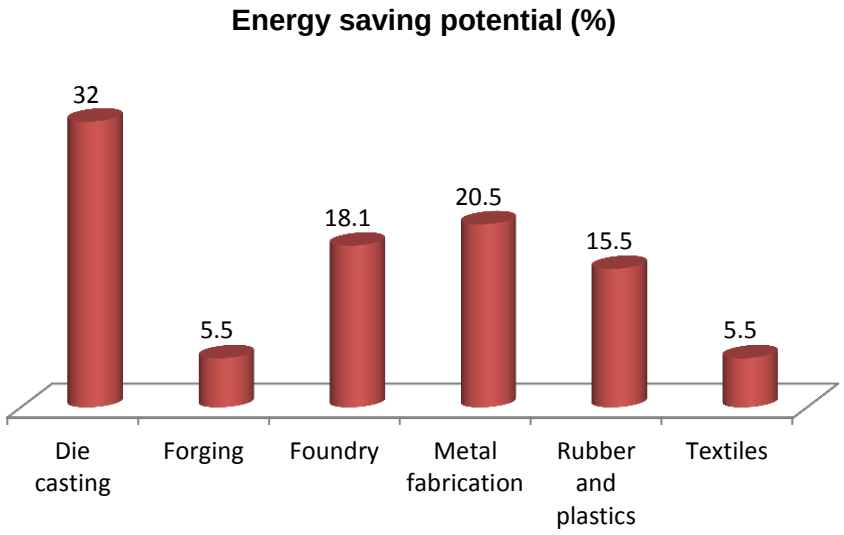
- New EE technologies like IE3 motors, IGBT furnaces and invertor air compressors
- BOP like furnace insulation, optimum pressure setting of air compressors, and instrumentation & control

- Analysis of electricity bills to optimize demand charges and power factor
- Preventive maintenance aspects such as cleaning of air filters, greasing and ventilation.

Table 1. MSMEs covered by baseline surveys

Sub-sector	No. of MSMEs
Die casting	2
Forging	2
Foundry	1
Metal fabrication	1
Rubber and plastics	2
Textiles	2
Total	**10**

Baseline surveys



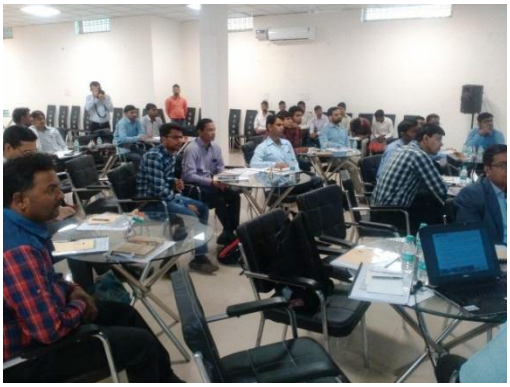
Energy saving potential identified for different sub-sectors

Training the trainers

Based on the insights gathered from the baseline surveys— which constituted a 'needs analysis' of the training requirements of the shop floor technicians— TERI developed a curriculum and training modules for its TOT program. This was a challenging task. TERI's available training resources were designed for middle/senior level industry personnel—who typically possess theoretical knowledge in science or engineering. In sharp contrast, the shop floor technicians had little or no theoretical knowledge of sciences or engineering disciplines. TERI therefore customized its existing training modules for the shop floor technicians, to make the content easy to understand yet comprehensive, with less emphasis on theory and much greater stress on practical/hands-on training and BOP. Five broad topics were identified for the TOT program:

- Furnace systems
- Electrical systems
- Compressed air systems
- Cooling water systems
- Lighting systems

Detailed training modules were prepared for each of the five topics. Particular care was taken to keep the content simple and practical so as to match the needs and capacities of the trainees. The training modules were enriched with visual content such as photographs, diagrams, graphs, flow-sheets and tables for easy comprehension and enhanced retention by the participants. A number of case studies were included to highlight the benefits of EE technologies and practices, in terms of energy and monetary savings and the payback periods on investments in ECMs.



1st TOT session

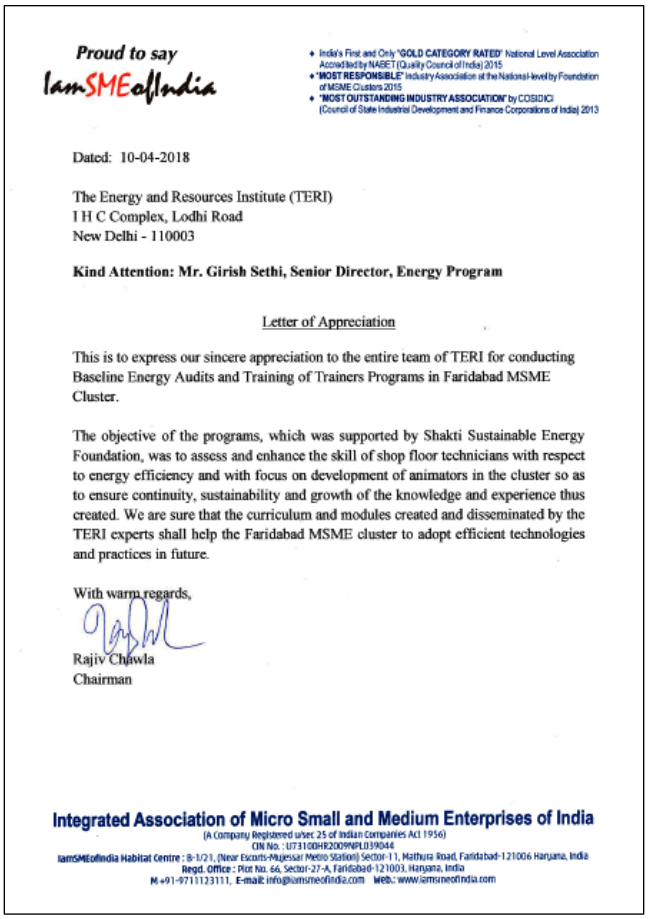

2nd TOT session

The TOT programs were carried out in two sessions at the office of IamSMEofIndia. The first session was held on 15th March 2018 for about 20 shopfloor technicians selected by the association. In this session, the participants were provided with sound foundational knowledge on each of the five topics. The second session was held in 10th April 2018, and was attended by a total of 45 participants comprising the core group of 20 as well as others. During this session, a number of trainees were encouraged to practice and hone their own presentation/training skills using the training modules, with TERI providing technical backstopping support. This session helped in boosting the participants' confidence levels and enhancing their training skills.

Taking stock

The project has created a core group of ‘animators’ among the shop floor technicians in the Faridabad cluster; a group whose members have each been empowered with some basic knowledge and expertise on EE technologies and practices, as well as the training skills and resources to impart their knowledge and skills to other shop floor level technicians in the cluster. The feedback from the participants suggests that the animators are proving effective as trainers.

The project has clearly underlined the effectiveness of customizing training modules to match the needs and capacities of shop floor technicians, with less focus on theory and more on practical aspects, with stress on BOP. The training modules have contributed to strengthening the knowledge base of the cluster. There is good potential to replicate the shop floor level TOT model not only within the Faridabad cluster but also in other MSME clusters.



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Dated: 10-04-2018

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Kind Attention: Mr. Girish Sethi, Senior Director, Energy Program

Letter of Appreciation

This is to express our sincere appreciation to the entire team of TERI for conducting Baseline Energy Audits and Training of Trainers Programs in Faridabad MSME Cluster.

The objective of the programs, which was supported by Shakti Sustainable Energy Foundation, was to assess and enhance the skill of shop floor technicians with respect to energy efficiency and with focus on development of animators in the cluster so as to ensure continuity, sustainability and growth of the knowledge and experience thus created. We are sure that the curriculum and modules created and disseminated by the TERI experts shall help the Faridabad MSME cluster to adopt efficient technologies and practices in future.

With warm regards,

Rajiv Chawla
Chairman

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