



BUREAU OF ENERGY EFFICIENCY



UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION



GLOBAL ENVIRONMENT FACILITY  
INVESTING IN OUR PLANET

## Training Programme on “Best Operating Practices in Energy Management for MSMEs”

Nagaur Hand Tools Cluster

25<sup>th</sup> – 27<sup>th</sup> July 2018

### Background

GEF-UNIDO-BEE organized 3 day training program from 25<sup>th</sup> July to 27<sup>th</sup> July 2018 at Center of Excellence for Training in Energy Efficiency (CETEE), Dr. Ambedkar Institute of Productivity, Chennai to escalate the best operating practices in Energy Management for Nagaur Hand Tools Cluster under the project “Promoting Energy Efficiency and Renewable Energy in MSME Clusters in India”.

### Classroom Training

During the course of training various lecture presentations were conducted in classroom for general understating of energy efficiency in various thermal and electrical utilities. Classroom sessions were mainly focused on Energy management and auditing, Re-heating furnace, Induction furnace, best operating practices in forging and refractory applications.



## Hands-on Training in Energy Efficiency Laboratory

Hands-on training on various Industrial Energy Utility designed to demonstrate practically various aspects of energy efficiency opportunities, understanding of performance assessment methodology and mapping of energy performance.

### Compressed Air System Training

The compressor lab has two screw compressors, one with load-unload control and other with a VFD control. Each compressor is driven by a 7.5 kW motor.

The compressed air system comprises of air receiver, a refrigerated air dryer, air filter and distribution system of various pipe sizes and headers.



The following experiments were conducted in compressor lab:

- Load/unload control vs. speed control using VFD
- Effect of pressure reduction on power consumption
- Variations in pressure drop and power consumption with different pipe diameters
- Effect of leakage on power consumption

### Pumping System Training

The pump training facility has 2 pumps one connected with VFD and other with trimmed impeller. The pumps are driven by 5.5 kW motor.

The following experiments were conducted in lab:

- Determining the head-flow characteristics of pumps □  
Effect of speed control with VFD vs. throttling
- Effect of impeller trimming on power, flow and head



### Fan System Training

The fan training facility consists of a centrifugal fan connected to a 7.5 kW motor. The motor is connected to a VFD to enable operation of fan at various speeds.

The following experiments were conducted in lab:

- Effect of suction damper control on power consumption
- Variation in pressure drop and power consumption with different pipe diameters
- Effect of discharge damper control on power consumption
- Impact of power consumption with speed control using VFD vs. damper control



## Lighting Performance Training

This training facility is comprised of indoor light fittings of various technology and wattage with measurement of lux and all electrical parameters.

The Following demonstrations were carried out:

- Demonstration of lux measurement for various types of energy efficient lamps
- Demonstration of electrical energy savings by selection of lamps for different applications, varying voltage and controls etc.

## Training Outcomes

- Basic understating of energy management and auditing through learning by doing approach
- Impacts of various energy conservation interventions on industrial energy consuming equipment
- Brainstorming sessions on implementation of various energy conservation measures Useful formats for data collection

## List of Participants

S.No.	Name of Nominee	Designation	Member Unit
1	Ashfaque Ali	Unit Head	Karimbux Hand Tools Udhyog
2	Mohdammed Iqbal	Unit Head	Rajasthan Tools
3	Gause Mohammed	Unit Head	Parveen Forgings
4	Muktyar Ahmed	Unit Head	Jayco India
5	Zulfiqar	Unit Head	Toshiba Forgings
6	Dilawar Ali	Unit Head	Ranjha Hand Tools
7	Raseed Ali	Manager	Kohinoor Forgings
8	Sakhawat Ali	Manager	F Mmachine Tools
9	Sharafat Ali	Unit Head	N S Engg. Works
10	Akhtar Husain	Manager	Ranjha Engg. Works
11	Wajid Husain	Manager	Asia Forgings
12	Sakhawat Husain	Manager	Suffi Hand Tools
13	Aijaz Ahmed	Manager	Vision Tech. Hand Tools
14	Muktyar Ahmed	Manager	Master Engineering
15	Firoj Ahmed	Manager	Fine Engineering
16	Sanat Kumar Jain	Unit Head	Jaina Forgings
17	Mohhamed Aslam	Unit Head	Super Forgings
18	Mohammed Suleman	Unit Head	Auzaar Collection
19	Abid Hussain	Manager	Khatoon Engg. Works
20	Sakhawat Husain	Unit Head	S H Enterprises
21	Shabbeer Ahmed	Manager	Saeed Engg. Works
22	Shakeel Ahmed Ajmery	Unit Head	Ajmery Udhyog

## Feedback from Participants

1. Industry representatives felt very happy after attend the training programme (Training Materials, Faculties, Food & Stay arrangement).
2. Learning by doing approach will be very helpful in implementing the BOPs & Case studies.
3. Will be carrying periodic performance assessment of energy consuming equipment.
4. Will be focus on Energy Management & Audits.
5. Will try to develop some internal energy professional.
6. Will try to convey the same thing (awareness) to others entrepreneurs and own units.
7. Thanks to UNIDO for organized such type of training programme on Best Operating Practices & Energy Efficiency for enhance awareness & our knowledge.