



**ENERGY EFFICIENCY SERVICES LIMITED**  
A JV of PSUs under the Ministry of Power



  
Ministry of Micro, Small and Medium Enterprises,  
Government of India



## PROMOTING ENERGY EFFICIENCY AND RENEWABLE ENERGY IN SELECTED MSME CLUSTERS IN INDIA

Ministry of micro, small and medium enterprises (MoMSME), Government of India in association with United Nations Industrial Development Organization (UNIDO) is implementing a project funded by Global Environmental Facility (GEF) titled “Promoting Market Transformation for Energy Efficiency in Micro, Small and Medium Enterprises” in India. Energy Efficiency Services Limited (EESL) is the implementing partner for the project.

The overall project objective is to promote the implementation of energy efficiency in the MSME sector; to create and sustain a revolving fund mechanism to ensure replication of energy efficiency measures in the sector; and to address the identified barriers for scaling-up energy efficiency measures and consequently promote a cleaner and more competitive MSME industry in India. The project envisages to extend support to 470 MSME units across 10 identified energy intensive MSME clusters with a target of reduction of energy consumption by 110,000 tonnes of oil equivalent and greenhouse gas emissions by 1 million tonnes of CO<sub>2</sub> emission, leveraging an investment of USD 150 million towards energy efficiency, during its tenure.

### CASE STUDY - 7

#### Installation of Condensate Recovery System (18 Jet dyeing machines)

##### Objective:

Steam is used as an important utility in textile dyeing and printing process. At present, most of the units in the Surat Textile cluster meet their steam requirement with boilers; steam is used in jet machines for indirect heating of water use for dyeing. In most of the units, condensate formed in the indirect heating process is drained out. Also, a significant amount of steam is flashed out along with the condensate. In this process, a significant amount of water and energy is lost into the atmosphere. The project envisaged saving in terms of energy and water through installation of condensate recovery system.

##### Implementation:

The unit has a 6 TPH boiler and 35 numbers of jet dyeing machines. Out of the overall jet dyeing machines, indirect heating is carried out in 18 machines. The condensate formed in the process was drained out along with flash steam. The project supported installation of a condensate recovery system with built-in flash steam generator that helped the unit to recover waste steam and water leading to energy efficiency and cost competitiveness.

##### Principle:

Indirect heating using steam leads to the formation of condensate. This condensate is usually drained out leading to significant wastage of useful energy. Along with the condensate, considerable amount of steam is also flashed out. An efficient condensate recovery system makes use of a pressurized pump and flash steam generator to capture the useful condensate and steam. The condensate is pumped back into the system in the boiler feed water tank. A deaerator is used to filter out the impurities from the recovered condensate. Flash steam can be reused directly in the process, wherein the condensate can lead to increase in the feed water temperature of the boiler and also a considerable share of the make-up water.

Implementation partner





## Unit Profile

**Pashupati Prints Pvt. Ltd** was incorporated in the year 1989. Located in Pandesara, Surat, the unit is spread over an area of 60,000 sq ft with 110 skilled workers. The unit has both dyeing and printing facility in their premises.

## Benefits



- ◆ Reduction in specific energy consumption by 2-3%
- ◆ Boiler Efficiency improvement 2-5 %
- ◆ Maintenance cost reduction 20-30%
- ◆ Reduction in breakdown 20-30%



Before



After

## Project Economic

 **Savings**  
₹ 10,80,000

 **Investment**  
₹ 6,50,000

 **Payback**  
0.6 Years

## Project Impacts



178 Tonne/year fuel saving per year



8,151 kL/year of annual water savings



242 TOE of annual energy savings



376 tCO<sub>2</sub> GHG emission reduction per year

## Cost Economics

Coal consumption in boiler (Baseline)	18 tonne/ day
Coal consumption in boiler (Post Implementation)	17.5 tonne/ day
Annual Coal Saving	178 Tonne/year
Annual water Saving	8,151 kL/year
Annual Monetary Saving	Rs. 10,80,000
Investment	Rs 6,50,000
Simple Payback	0.6 years

## Replication Potential



The technology has significant replication potential in across all industrial process. In Surat Textile Cluster, the replication potential is expected in 46% of the units i.e. around 45 units.

## Calculation

*Savings in terms of Coal:*  
Coal saving corresponds to the rise in feed water temperature.



*Savings in terms of RO water*  
Make up water used during baseline – total condensate recovered.

## Contact details:

### Energy Efficiency Services Limited

5<sup>th</sup> & 6<sup>th</sup> Floor, Core - 3,  
Scope Complex,  
Lodhi Road, New Delhi, Delhi 110003

### United Nations Industrial Development Organisation

Mr Debajit Das  
National Project Coordinator  
D.Das@unido.org