



**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 - 2

#### Installation of Screw Air Compressor with Variable Frequency Drive and Permanent Magnet motor (282.6 CFM, 60 hp machine)

##### Objective:

Compressed air is one of the key utilities in the process of textile dyeing and printing. Most of the units still use one or more old and obsolete reciprocating compressors consuming significant energy. The project envisaged saving in terms of energy through technology up gradation.

##### Implementation:

The unit replaced 9 numbers of reciprocating compressors with a single screw air compressor with VFD and PM motor with 282.6 CFM, 60 hp capacity. The project supported replacement of the existing reciprocating compressor with energy efficient screw compressor with variable frequency drive (VFD) and permanent magnet (PM) motor to help units become energy efficient and cost competitive.

##### Principle:

In a typical 24 hour operating textile-processing process where the compressed air demand is continuous and fluctuating in nature with an air pressure requirement of up to 7 bars, a screw air compressor with variable operation mode is more suitable as compared to the reciprocating compressed system. Moreover, a screw compressor is able to compress higher volume of compressed air as compared to a reciprocating compressed air system at same pressure.

A screw air compressor uses two meshing helical screws, known as rotors for compressing the air whereas a reciprocating air compressors use pistons driven by a crankshaft to compress the air. Due to less numbers of moving parts, the screw compressors are subjected to less wear & tear. Also, screw compressor operated at less internal air-end operating temperature. The efficiency of these compressors is high due to the use of PM motor.

Implementation partner





## Unit Profile

**Narayan processor** was incorporated in 1981. It has been a market trendsetter in creating wide range of cotton, polyester sarees & dress materials. Located in Bhestan, the unit is spread over an area of 45,000 sq ft with 150 skilled workers working in it. It has total "Grey to Pack in house facility." The unit has both dyeing and printing facility in their premises.

## Benefits



- ◆ Reduction in specific power consumption by 40%
- ◆ Replacement of multiple compressors with one compressor
- ◆ Reduction in maintenance cost and break-down time by 50%.
- ◆ Noise free operation and improvement in working environment.



Before



After

## Project Economic

 **Savings**  
₹ 14,20,000

 **Investment**  
₹ 16,00,000

 **Payback**  
13 months

## Project Impacts



187,651 kWh of annual energy savings



₹ 14,20,000 of annual cost savings



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

## Cost Economics

Annual Compressed Air Demand	1,876,512 cfm/year
Specific Energy Consumption (Baseline)	0.27 kWh/cfm
Specific Energy Consumption (Post Implementation)	0.17 kWh/cfm
Energy Saving per Day	625 kWh
Energy Saving per Annum	187,651 kWh
Annual Monetary Saving	Rs. 14,20,000
Investment	Rs 16,00,000
Simple Payback	13 month

## Replication Potential



The technology has significant replication potential in across all industrial process. In Surat Textile Cluster, the replication potential is expected in 25% of the units i.e. around 100 units.

## Calculation

Energy saving per annum = (Specific power consumption of reciprocating air compressor - Specific power consumption of screw air compressor)\*annual running hour\*compressed air requirement per hour.



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