



**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 - 3

#### Installation of Programmable Logic Controller (PLC) based Automation & Control system in Jet Dyeing Machines (8 Nos. of PLC)

##### Objective:

Jet dyeing is a process of pressurized dyeing of raw cloth and a key process in a textile processing industry. Significant amount of water is utilized in the jet dyeing process, which is controlled manually currently. Manual control leads to extra intake of water. Also, steam required for heating the water is wasted in the process. The project envisaged saving through automatic control of the Jet Dyeing process.

##### Implementation:

The unit has 25 U jet machines and 4 long jet machines. There are different capacities of jet machines installed in the unit. The project supported installation of the PLC based automation and control system in the Jet Dyeing machines to help units become energy efficient and cost competitive.

##### Principle:

The Jet Dyeing process is used for dyeing the cloth by forcibly contacting the jet flow of dyestuff chemical with the fabric. During the process, it is ensured that the cloth is dyed evenly with a relatively less quantity of chemical without applying much tension on the cloth in order to keep the quality of the cloth intact.

A PLC system operates the jet machine as per logic programme. The PLC system optimizes the water intake during each cycle, thus reducing the batch time of the existing process and steam required for raising temperature for extra water intake, thereby reducing the fuel consumption. It also enhances the overall production capacity of the jet dyeing machines

Implementation partner





## Unit Profile

**Annapurna Industries Pvt. Ltd** was incorporated in 1976. It has been a market trendsetter in creating wide range of cotton, polyester sarees & dress materials. Located in Palsana, the unit has total “Grey to Pack in house facility.” The unit has both dyeing and printing facility in their premises.

## Benefits



- ◆ Water intake during each cycle is optimized
- ◆ Batch time is optimized and reduced.
- ◆ Steam for raising the temperature for extra water is saved, thereby reducing the fuel consumption.

## Project Impacts



14,400 kWh of annual water savings



345 tonnes of annual coal savings



₹ 17,40,000 of annual cost savings



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



Before



After

## Cost Economics

Total water requirement	320 kL
Total water requirement for heating cycle	128 kL
Total water saving	14,400 kL/y
Annual Coal saving	345 t/y
Annual Cost Savings	₹ 17,40,000
Investment	₹ 18,00,000
Simple Payback	12 month

## Project Economic

₹ Savings

₹ 14,20,000

₹ Investment

₹ 16,00,000

Payback

12 months

## Replication Potential



The technology has significant replication potential in across all industrial process. In Surat Textile Cluster, the replication potential is expected in 35% of the units i.e. around 120 units.

## Calculation

Saving per annum = (Water consumption of jet machine without PLC per day - Water consumption with PLC per day ) \*Total running days.



## Contact details:

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