



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



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



## PROMOTING MARKET TRANSFORMATION FOR ENERGY EFFICIENCY IN MICRO, SMALL & MEDIUM ENTERPRISES

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 Energy Efficient Vertical Agitator System for Reaction Vessels (7.5 hp & 5 hp)

##### Objective:

Reaction vessels are one of the major power consuming equipment in the utility section of a chemical unit. Apart from the energy cost, there is maintenance and running cost of the horizontal type belt driven agitator in reactor vessel. The project envisages implementation of energy efficient direct coupled vertical agitator system designed by considering the viscosity, specific gravity of material etc. which reduces the transmission losses and improves quality of the final product.

##### Implementation:

The unit is equipped with two numbers of reaction vessels of capacity 250 L (7.5 hp) and 2.5 kL (5 hp) with belt driven agitator system. The project supported installation of direct coupled agitator system on the reaction vessels in place of belt driven agitator system, thus helping the unit become energy efficient and cost competitive.

##### Principle:

Vertical agitator systems are scientifically designed by considering the viscosity, specific gravity of material etc. By considering these parameters into the design of agitator, the system will improve the heat and mass transfer in the system in process liquid; which will improve the quality of the final product. Direct coupled agitator system are equipped with plenary / helical gears and direct coupled energy efficient motors to provide optimum efficiency to the agitator system



## Unit Profile

**Ree Maam Rasayan** was established in the year 2004 with an aim of producing high quality chemical products.. The unit is located in GIDC, Ankleshwar , Gujarat

## Benefits



- ◆ Reduction in specific energy consumption by 20-25 %
- ◆ Reduction in batch time by 10-15%
- ◆ Reduced maintenance cost
- ◆ Reduction in breakdown by 25-30%
- ◆ Enhanced transmission efficiency



## Project Economic

₹ Savings  
₹ 2,11,000

₹ Investment  
₹ 3,64,000

Payback  
2.1 Y (25 months)

## Project Impacts



21,485 kWh/y of annual electricity generated



106 TOE of annual energy savings



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

## Cost Economics

Power consumption, 250 L Vessel (Baseline)	4.48 kW
Power consumption, 2.5 kL Vessel (Baseline)	2.98 kW
Power consumption, 250 L Vessel (Post Implementation)	3.58 kW
Power consumption , 2.5 kL Vessel (Post Implementation)	2.39 kW
Annual electricity Saving	21, 485 kWh/h
Annual Monetary saving	Rs. 2, 11,000
Investment	Rs. 3,64,000
Payback	25 months

## Replication Potential



The technology has significant replication potential in across all industrial process. In Ankleshwar chemical cluster, the replication potential is expected in 10% of the units i.e. around 58 units.

## Calculation

Annual Energy Savings =  
Baseline energy consumption –  
Post energy consumption.



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